SHORTENING THE LAST MILE: **WINNING LOGISTICS STRATEGIES IN THE RACE TO THE URBAN CONSUMER**

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1. INTRODUCTION

Over the past ten years, three seemingly independent but highly impactful changes have occurred[1]:

1. Since 2008, urban populations ballooned from 3.4 billion to 4.2 billion—over half of today's global community.

2. Ten years ago, 1 in 100 individuals owned a smartphone. Today, 1 in 5 have one.

3. Internet retail sales quintupled between 2008 and 2018, from $290.4 billion to $1.6 trillion.

These three facts are all emblematic of a fundamental shift, to which the logistics and transport industry is currently striving to adapt regarding consumer expectations of the last mile. Consumers are more urbanized, more connected, wealthier, and shop more than ever before. They now prioritize products and services that lighten the day's tasks, fulfill errands quicker, and generally make their lives more convenient to enjoy. At the same time, they expect that the products offered to them are environmentally friendly and sustainable, even if this means having to pay a little more for these features—syndicated global surveys from Euromonitor International indicate that over one quarter of 2017's respondents find value in purchasing

[1] Euromonitor International, Passport Database 2018

eco- or ethically-friendly products.[2] Furthermore, shopping online has become more popular in the urban environment—one that continues to push for more convenience in favor of higher productivity. More online shopping means more orders that need to be fulfilled, but only if the arrangements around the last mile, i.e. delivery window and drop-off options, suit the contemporary urban consumer's expectations.

In this context, the logistics industry is faced with the task of balancing a seamless experience within the last mile, while also bearing in mind their more nuanced requirements in being environmentally responsible. By targeting a more adaptive approach towards fulfillment and the last mile—through localization efforts, flexible delivery options, improved seasonal logistics and the gradual integration of innovative technology—the logistics industry will be well placed to absorb these new customer requirements.

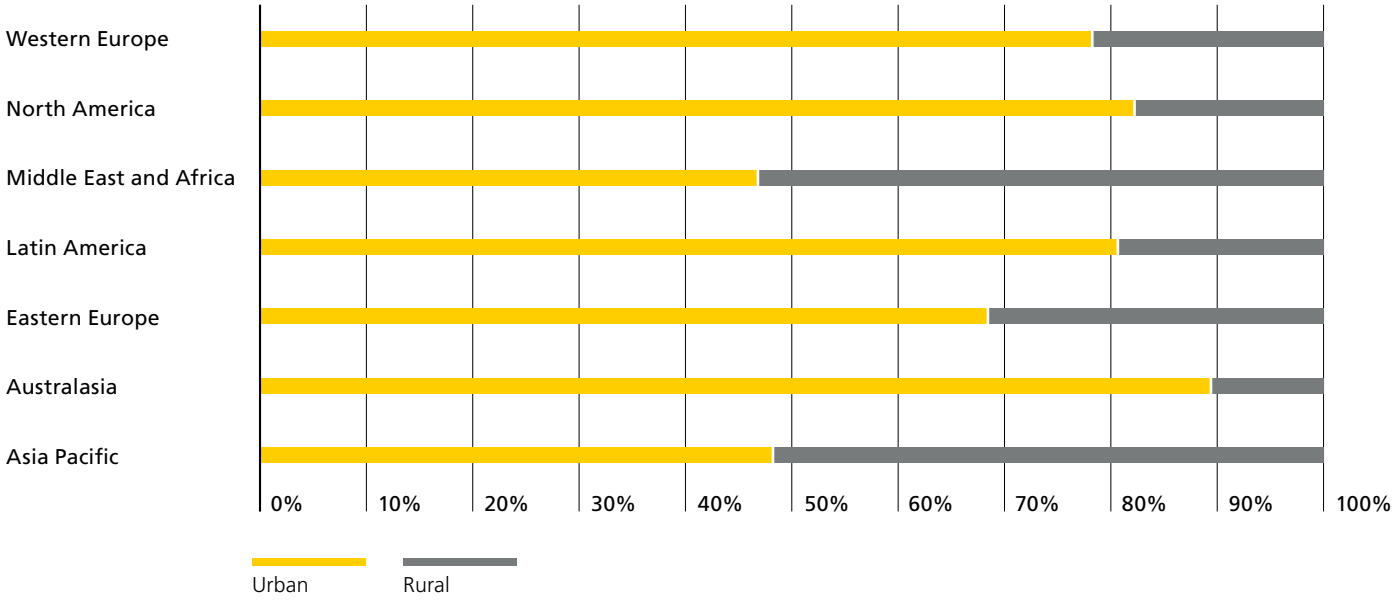
DHL has observed these and many other trends that have had a fundamental impact on logistics. White papers on The 21st Century Spice Trade: A Guide To The Cross-Border E-Commerce Opportunity, The Next Industrial Revolution—How E-Commerce is Transforming B2B and the Logistics Trend Radar are only a few of the examples of the company's collective finger on the pulse of today's developments. This white paper will discuss in depth the evolution of the interaction between consumer and industry and the impact this has had in reshaping the future of the last mile. By evaluating the urban consumer's delivery needs and how current innovations seek to service them, the paper aims to light the path for transport operators towards developing a flexible business model that can adapt to new expectations while maintaining profitability. This will be illustrated through a conceptual framework—the FAD triangle—that describes the parameters and considerations necessary to acknowledge as the industry adapts to tomorrow's last mile. For adjacent industries, it will also offer practical guidance to online retailers on how to best leverage transport operators over the last mile to maximize their competitiveness.

[2] According to Euromonitor's Lifestyles Survey, a global syndicated survey on consumer trends.

2. THE URBAN CONSUMER TODAY

Prior to examining how logistics and e-commerce players are innovating for change, it is worth illustrating the consumer group they are pivoting towards. In this section, a portrait of the urban consumer around the world is used to contextualize the environment in which internet retailers and transport operators must learn to operate.

Urban consumers today live in an increasingly populated, connected, and fast-paced environment. This provides a platform for innovation and development of services that help ease the pressure from time-consuming and mundane tasks, and help consumers to better experience the environment around them, all while bringing to light increasingly salient issues such as sustainability.



Urbanites 2030

According to Euromonitor International, there will be an additional 1 billion people on the planet by 2030, with 60% living in an urban environment and the significant majority of them coming from today's emerging markets.[3] There will also be a 47% growth in the number of consumers aged 65+ who are healthier and wealthier than any of their predecessors in this cohort. Urban centers are ultimately projected to host more working residents with different cultural and socioeconomic backgrounds,

[3] Euromonitor International, Passport Database 2018

a significant portion of which will be older and have higher purchasing power. All of this translates into a shift in preferences for daily purchases by 2030—space will be limited, so consumers will seek to centralize their tasks for the sake of convenience. This will primarily be achieved through an already growing digitization wave in society.

A truly digital consumer

All these trends, regardless of their location, have been driven by an increasing use of social networks to promote the user's consumption experience. Daily internet usage statistics from Euromonitor International have been on the rise globally, particularly driven by developed markets, and this expansion has been fueled by social media becoming a key marketing tool for consumer-facing brands. Virtually all mobile devices—approximately 99%—will be connected to the internet by 2022, fueling an expected $2.4 billion spend on internet retailing.[4] The challenge to innovate an online presence lies in forming a connection with urban consumers, who are now making closer connections with endorsements and stronger associations with brands, and who show unique loyalty to products that find a way to resonate with them via social media.

The rise in digital connectivity and internet usage has also generated a new business model for several services and products. Ride hailing, online food delivery, accommodation booking, and centralizing daily life management on a smartphone have spread rapidly, as companies seek to capitalize on operating from the palms of their customers' hands while balancing the values these customers identify with. In the future, however, these companies will have to go even further to make their customers' lives easier. Augmented reality shopping, autonomous cars, and food delivery by robots are now being rolled out. Interestingly, the same trends that drove the first set of changes are also fueling this shift to the next generation. Time-savings, flexibility in managing daily life, seeking out special-label products (ethical production, high wholegrain, organic variants, etc.) and preference for environmentally friendly alternatives such as green transportation have all been identified as new rules of engagement for e-commerce players.

[4] Euromonitor International, Passport Database 2018

Despite the global nature of these developments, market reactions vary from region to region. Much of the innovation and growth in Asia is driven by the expansion of the middle class; per capita disposable income of Asian consumers will expand by 34.3% between 2018 and 2023.[5] In Asia Pacific, primarily China, social commerce is taking center stage with a shopping model similar to Groupon—a platform where bulk purchases from groups generate discounts—but with the added influence of a P2P (peer-to-peer) element. Similarly, the growth of P2P mobile payments is affecting shopping trends in Africa, with a rise in both the bankable urban population as well as smartphone ownership having laid the foundation for African e-commerce. In the Middle East and North Africa, a shift towards infusing Western lifestyles into local tastes and habits has driven the rise of modernized local brands.[6]

I want it when I want it

These consumer trends have had a significant impact on transport operators. Urban consumers now have a wider array of products from which to choose, making impulse purchases with fast deliveries in mind—not only do they want products a certain way, they also want them at a certain time. When shopping online, rather than adapting their daily schedule to receive their purchase delivery, consumers are seeking a seamless experience where deliveries adapt to their schedule. Tracking and delivery scheduling solutions have become commonplace, and a basic service offered to customers. From a consumer perspective, these changes are timely. When asked via Euromonitor's syndicated Lifestyles Survey what they consider a driver for their online shopping habits, consumers identified these drivers and adjacent factors, with the most popular being "best price," "time savings," "ability to order anywhere and anytime," and "free shipping."[7]

[5] Euromonitor International, Passport Database 2018

[6] Euromonitor International, Country Reports 2018

[7] According to Euromonitor's Lifestyles Survey, a global syndicated survey on consumer trends.

Across the world, key industry players have heard the call and are mobilizing. In France, giant retailer Carrefour is planning to invest €2.8 billion (US$3.2 billion) in e-commerce by 2022 to challenge Amazon, making the development of home delivery likely. Even emerging markets are playing a role—in India, for example, Alibaba Group has expressed interest in growing its portfolio of companies that are experienced in deliveries for online retail players, such as local delivery companies.

With these investments, e-tailers have also acknowledged that urban consumers are also seeking more transparency. With a few taps on a smartphone or tablet, they can see that their order has left the warehouse at a specific time and is currently out for delivery, at a time they have likely selected as most convenient to them. As Lee Spratt, CEO DHL eCommerce Americas, stated, the "industry is already quite dynamic," but these changes illustrate how intertwined e-commerce strategies and the role of transport operators truly are, as well as the challenges they both face from a digitally connected, commercially opinionated and more informed urban consumer.[8]

The transport industry has had to consistently reinvent itself to tackle the impact from these changes in urban consumer behavior and environment. By using today's world to envision the future, the following section will describe the latest innovations and pivots that the logistics industry has undergone in realigning itself with today's last mile.

[8] Interview with Lee Spratt, CEO DHL eCommerce Americas

3. GLOBAL TRENDS, INNOVATIONS & DISRUPTIONS

Today, urban consumers around the world live in a more diverse and fast-paced environment than ever before. They spend more time on social networks, so their choices are better informed, and their preferences are widely voiced. They are willing to spend more on convenience and positive experiences. These combined factors have provided a favorable environment for the expansion of e-commerce. But it has also posed a great challenge for facilitating the last mile and placed pressure on the logistics players servicing this ever-expanding segment. Hence, innovation in the final mile has been focused on three core areas: localizing delivery networks enabled by enhanced capabilities in predicting consumption, providing flexible delivery solutions to guarantee convenience, and addressing cyclical cost concerns by reimagining seasonal demand.

3.1 LOCALIZED DELIVERY NETWORKS

Approximately three quarters of adults who shop online would pay a premium for an expedited shipping option.[9] This result is a manifestation of the urban consumer seeking faster and more flexible delivery options and being willing to pay for them. In response, delivery networks today are becoming more localized, shifting their supply chain to focus more on regional fulfillment strategies with the aim of shortening the last mile. Rather than a country-level localization, fulfillment hubs are getting closer—and even embedded within—urban centers and major cities (New York, Beijing, etc.). According to Roy Hughes, EVP Network Operations Europe, DHL Express, several of these "power cities" are "facilitating and driving this localization trend with numerous implications for transport operators."[10]

A foundational shift

A localized delivery network enables the kind of flexibility, connectivity, and convenience necessary to shorten and streamline the last mile. A decentralized but pegged system with a large warehouse that feeds into smaller regional warehouses closer to urban centers has its benefits. These smaller warehouses stock the most common and seasonal items to shorten the last mile. This has aided the industry to shift from making bulk deliveries to more frequent, smaller deliveries. The result has been the creation of a system of micrologistics, where transport operators place more emphasis on these smaller regional warehouses and increasing fulfillment centers. Amazon, for example, started with one fulfillment center and has 787 as of 2018.[11]

According to Lee Spratt, CEO DHL eCommerce Americas, transport operators as a result have been able to create better synergies for deliveries to streamline the last mile. For example, DHL's eCommerce division in the US works with the United States Postal Service (USPS) to facilitate the last mile of delivery, capitalizing on its more localized presence across the country.

Fitting this vision into the wave of fundamental and technological changes that have altered how delivery systems are "supposed to be designed" to "the way they should be" has been gradual. The previous model of shipping packages involved parcels loaded onto shipping containers, then onto large trucks driven to the transport company's warehouse, and from there, sent out in a fleet of smaller, company-owned delivery trucks operated by transport employees. Overhauling this model to absorb more inventory storage and management on the back end is a substantial task. However, optimizing the fulfillment timetable and shortening the last mile can be best achieved by increasing proximity to the urban consumer's location.

[9] Euromonitor International Lifestyles Survey 2018

[10] Interview with Roy Hughes, EVP Network Operations Europe, DHL Express

[11] Internal expert interview

Keeping a green route to the city

As companies work to get closer to the city, they are also balancing the potential implications of this shift, such as the environmental and social impact. Several major cities are already heavily congested as population density rises with the growing global population, and cannot absorb more delivery vehicles. Pollution and restrictions in city centers are a considerable challenge, as the size of delivery vehicles and the time window for deliveries are often restricted due to congestion. For cities where e-commerce has yet to mature, this can pose a particularly significant challenge. In Jakarta, for example, urban congestion will limit the benefits of localization no matter how close a fulfillment hub may be. As a city of 32 million people with growing disposable income, Jakarta's interest in e-commerce is already high and rising.[12] According to Euromonitor estimates, online retailing only represents approximately 2.3% of the total retail sales in 2018. Modelled estimates indicate that about 900,000 parcels every day are delivered by means of the traditional supply chain. Should online retailing continue to expand, the current state of congestion would significantly limit the profitability of transport operators, regardless of localization efforts.

Green business practices are also permeating further into target markets. Urban consumers, particularly the Millennial cohort (ages 22–37 in 2018) that accounts for over one fifth of the world's population, are increasingly aware about the environmental impact of their shopping behavior, such as non-ecofriendly plastic packaging.[13] Cities such as London are starting to crack down on emissions, and as logistics operators localize and improve proximity to urban centers, these regulatory efforts are increasingly relevant to achieving that goal. Industry leaders are constantly evaluating a more sustainable and green business model, but smaller companies are not willing or able to invest in such solutions and operational overhauls, which poses another challenge when relying on these players for localization efforts.[14] Ultimately, however, for those that do adopt a green delivery model, these efforts tend to be organic. According to an industry expert, companies "actually want to be greener and more sustainable."[15]

Industry still has a ways to go

These benefits notwithstanding, the challenge in achieving efficient localization lies primarily in inventory management rather than delivery. While the last mile is serviceable through local resources, which are immediately available, there are significant challenges in localizing inventory when fulfillment hubs become increasingly distant from manufacturing hubs, even with the presence of "dark"[16] facilities.[17] This challenge is particularly stark for increasingly regionalized delivery areas, such as in Europe and Asia Pacific. Partners may not always have the resources and technical expertise large players do, so their ability to ensure their inventory is managed efficiently in these smaller but closer hubs is potentially compromised. Additionally, redundant stocks are necessary but tend to be cash-intensive, making warehouse management for a decentralized and localized model a more complicated endeavor.

Currently, the industry has not achieved an optimally localized operational model, but it is positioned to do so over the long term. Alternatively, short-term goals are geared more actively towards investing in shortening the last mile with innovative, alternative, and flexible delivery solutions.

[12] Euromonitor International, Passport Database 2018
[13] Euromonitor International Megatrends Report 2018
[14] External expert interview
[15] Internal expert interview
[16] A physical facility that services online shopping exclusively.
[17] Interview with Lee Spratt, CEO DHL eCommerce Americas

3.2 FLEXI-DELIVERY SOLUTIONS

According to an industry expert, preferences around the last mile today are "not just about speed, but also delivering convenience through predictability."[18] Customers increasingly expect to select when, where, and how parcels are delivered—the time spent waiting for a package is a key concern. Developing flexi-delivery solutions has transformed the way transport operators service the last mile and innovate the final leg of their business model. Service points, parcel lockers, bicycle delivery, and electric vehicles for urban proximity are only a few examples, and all facilitate the push for urban localization. However, logistics players are pioneering into even more unconventional and increasingly creative "out-of-the-box" solutions, such as crowdsourced deliveries and other decentralized options. Streamlining, standardizing, and shortening the final mile for delivery has been a primary concern in achieving this—same-day, one-day or two-day footprints are on the rise as internet retailing expands. However, transport operators are also seeking to translate that speed of delivery into a more adaptive delivery timetable within the final mile.[19]

[18] Internal expert interview

[19] Interview with Roy Hughes, EVP Network Operations Europe, DHL Express

Variations on drop-off/pick-up model drive solution development

A prime example of this is the parcel locker, which has been adopted to different levels of success; commonly used in Poland, for example, but less so in France and the UK.[20] Locker locations vary and inherently dictate the delivery timetable for the consumer to varying degrees. Internal lockers, such as those placed in supermarkets and other retailers, are pegged to the establishment's working hours. However, external lockers that are either standalone or placed in all-day locations such as gas stations provide a more flexible window. DHL's Packstation, which was launched back in 2001, offers a network of automated booths with all-day service across more than 3,500 locations in Germany alone.[21] Success story Amazon Locker, a similar service, currently operates a network of over 3,000 locations in more than 50 cities.[22]

Despite all this activity, industry experts believe consumers are not sufficiently aware of the capabilities and benefits of this flexi-option, with several players from the e-commerce and logistics side working on developing the concept of central drop-off and pick-up. Examples include intelligent lockers that help facilitate two-way logistics via product returns through product codes, or Citibox in Spain, which provides a smart mailbox that can be installed within apartment buildings and allows for drop-offs and pick-ups to be arranged via smartphone. In Germany, DHL is looking to bring deliveries right to the urban consumer's car. A pilot project between DHL and Volkswagen fitted 50 Polo vehicles to use as mobile parcel lockers and provide "in-car delivery" for select customers.[23] A similar pilot was also conducted in partnership with Smart in Stuttgart, showing the potential for scalability.[24]

[20] External expert interview

[21] "Private Customers." *DHL Packstation - Have Parcels Sent around the Clock to a Packstation | DHL*, www.dhl.de/content/de/en/privatkunden/pakete-empfangen/an-einem-abholort-empfangen/packstation-empfang.html.

[22] "Amazon Locker Delivery." *Amazon*, Amazon, www.amazon.com/b?ie=UTF8&node=6442600011.

[23] Interview with Katja Busch, Chief Commercial Officer, DHL Customer Solutions and Innovation

[24] Johnson, Jennifer. "Smart Cars to Take DHL Package Deliveries in German Pilot." SCM | Supply Chain Digital, Jennifer Johnson, 28 July 2016, www.supplychaindigital.com/scm/smart-cars-take-dhl-package-deliveries-german-pilot.

Emerging markets provide learning opportunities

Despite several successes, learning experiences are also common. Utilizing convenience stores as a third-party pick-up location and temporary storage facility in China was attempted but did not pick up traction among consumers. The convenience store format is not particularly popular outside of major cities in China such as Shanghai and Beijing, which ultimately limited the potential coverage for this model in this market. Furthermore, the intended flexibility was limited by Chinese convenience stores not being open all day. This does not imply, however, that the model would not work elsewhere in Asia; for example, this model was successful in Taiwan, further validating efforts to make the last mile more flexible.

Other models also proved successful in emerging markets by adapting to unique local infrastructures and conditions. IKEA's recent entrance into the Indian market was a landmark in the company's global expansion. With deliveries being a key sales driver, IKEA developed a solution to facilitate the last mile despite rampant congestion and traffic in Hyderabad. At least 20% of its delivery vehicle fleet will be electric rickshaws[25], which will be charged in-store and run on solar power, offering a green yet culturally adaptive delivery option.

Despite the growth in alternative delivery options, demand for these methods seems to be outpacing their development. Same-day delivery requests may soon outstrip the capacity to deliver. For emerging markets, though, a focus on expansion in this capacity has not only been innovating and increasing capacity, but also maintaining the security of the last mile. TFG, the South African retailer, has acknowledged the safety concerns that accompany a flexible fulfillment timetable for the urban South African consumer. In response, the retailer has partnered with a startup that provides a network of video surveillance and 24-hour gas stations, offering a more secure last mile.[26]

Product returns become more viable

Alongside an increase in flexible delivery options is a spike in product returns. Until very recently, few companies had the technology and infrastructure to create a simple, transparent system of returns—this has now changed tremendously. Brick-and-mortar stores are increasingly used to facilitate product returns, such as Walmart allowing product returns across its entire network of stores.[27] E-commerce players have taken several creative routes to minimize product returns, primarily by seeking to minimize the possibility of dissatisfaction by offering product trials. For example, Birchbox is a beauty e-player that sends product samples to consumers who may pick one or more items they would like to purchase, thereby helping people make a more informed choice.[28]

The three return scenarios that can be improved through alternative solutions are:

1. Seller asks customer to send the product back individually.

2. Seller aggregates the product return with other returns via freight.

3. Seller asks customer to send the product back through a warehouse regionally where transport operators perform quality checks and repackage items to be resold.

If the cost of returning the product is higher than the cost of product itself, the seller may ask the customer to simply discard the item. In applying more two-way solutions that focus on combining drop-off and pick-up points, transport operators can improve costs while offering consumers the leeway of being able to return their products. Returns are costly to both retailers and logistics operators alike, so innovation efforts will organically pivot to assisting consumers in making more informed purchasing decisions. Examples of technological innovations to facilitate this are discussed in the next section.

[25] A compact three-wheeled vehicle popular in Asia

[26] "The Truth About Online Consumers." *KPMG.com, KPMG*, 2017, assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/01/the-truth-about-online-consumers.pdf.

[27] "Help: How to Return an Item You Purchased on Walmart.com," *Walmart.com* https://help.walmart.com/app/answers/detail/a_id/3228/kw/Help%3A%20How%20to%20Return%20an%20Item%20You%20Purchased.

[28] *Birchbox*, https://www.birchbox.com/

There is no one-size-fits-all solution, though. Other barriers also arise, such as cross-border purchase returns that are bottlenecked through customs—a considerable concern for global players like Alibaba and JD.com. Experts believe a mixed solution can alleviate this issue: working on fine-tuning delivery cycle stages that can be improved, such as the final mile, mitigating potential product returns, and potentially reassessing the conventional model (i.e. a mid-tier solution that falls between express and postal options).[29]

Reaching out beyond the conventional supply chain

For same-day deliveries—and potentially same-hour deliveries—fundamental and conceptual shifts to the supply chain are being considered. Crowdsourced deliveries, or outsourcing deliveries to third parties such as Postmates and UberRUSH or Grab and Go Jek in Asia, are rising in adoption.[30] In the crowdsourced model, contractors who own their delivery vehicle, with dedicated routes, deliver single parcels. The cost-savings here are evident—online retailers do not bear the cost of asset ownership or maintenance for the vehicle, and often pay on a per delivery basis. Costs that remain do need to be considered, such as the responsibility for ensuring that these alternative labor models remain green and sustainable. For now, though, there is sufficient demand and willingness to pay for same-day delivery to justify operational expenses for these contractors. This shrinks the full delivery cycle to potentially only one or two hours from the moment a purchase is made to the order arriving on the customer's doorstep.

Despite these changes being demand-driven, these alternative methods are becoming more of a necessity from an industry perspective in the wake of courier shortages and rising costs within the conventional last mile. High e-commerce sales volume notwithstanding, profitability for transport operators is still a central concern, so even minor cost savings can be important in maintaining profit margins. Creating a more elastic framework that includes alternatives to standard delivery methods, whether mechanized, invented, or crowdsourced, will be critical to overcome these barriers and control these costs. This is particularly true when orders spike for compressed periods of time during the year.

[29] Interview with Katja Busch, Chief Commercial Officer, DHL Customer Solutions and Innovation

[30] Interview with Mei Yee Pang, DHL Head of Innovation, Asia Pacific DHL Customer Solutions and Innovation

3.3 SEASONAL LOGISTICS

There has been a gradual expansion in geographic reach of what used to be regional or even local holiday seasons. Globally celebrated holidays—Christmas, Valentine's Day, Mother's Day and others—have now been joined by newly globalized regional holidays such as Chinese New Year and Diwali. E-commerce has increasingly penetrated these holidays as sales growth opportunities, contributing to the promotion of commercial holidays, such as Black Friday, Singles' Day, and Cyber Monday. These have also followed a similar pattern to their cultural counterparts in expanding their reach to urban consumers across national borders, making the final mile even longer. Through its recent acquisition of Lazada, Alibaba's Singles' Day has added the Philippines, Thailand, Malaysia, Singapore, and Vietnam to its markets.[31] Prime Day, a competitive Amazon shopping holiday, also expanded its list of participating countries.[32]

The impact these market movements have had on logistics networks manifests in sporadically high order numbers requiring fulfillment, placing unprecedented pressure on delivery networks. From an urban consumer perspective, however, expectations remain that both holiday presents and deep-discount goods, both sold during these periods, have a guaranteed on-time delivery on a timetable of their choosing. Consequently, transport operators have pushed to improve their contingency plans for the considerably heavier demand. Creative operations are key, and maintaining the efficiency of the last mile is critical, both of which contribute to an elastic business model to which the industry should aspire.

Temporary versus permanent solutions depend on the market

Solutions to this can be wide-ranging across the supply chain. Cainiao, otherwise known as China Smart Logistics Network, is an entity owned by Alibaba and was instrumental in improving fulfillment on Singles' Day. Cainiao links all logistics companies, so any merchant works directly with Cainiao to streamline the process through a network of transport operators. The results have been impressive. In 2014, orders made on Singles' Day amounted to 100 million parcels, and it took more than 30 days to handle fulfillment for all packages. After a few years of Cainiao's involvement, however, Singles' Day orders spiked to over 1 billion parcels leading up to 2017, and fulfillment was achieved within only one week.[33] Further underlining this capacity expansion, Alibaba's Chief Executive Jack Ma predicts that China's courier sector is on track to handle 1 billion parcels per day by 2025.[34]

Solutions can also be more agile and ad hoc. The strategy is to make the operational model more elastic to counter any seasonal logistic challenges. Most operators retain a fixed service model throughout the year with a set number of couriers per facility. However, during sales days and seasonal shopping times, this is adjusted to allow for more couriers and resources. DHL Parcel Metro is one example of an elastic business model for transport operators, where inventory management is handled internally but the last mile is more elastic, incorporating more couriers and resources.[35] E-commerce customers are also placing focus on developing contracts with service partners. For example, Amazon India expanded its service partner network in 2016 by 40% ahead of the festive season.[36] However, this is only one element of the seasonal strategy. Others include:

[31] Cadell, Cate. "Alibaba Doubles Lazada Investment to $4 Billion in Aggressive..." Reuters, Thomson Reuters, 19 Mar. 2018, www.reuters.com/article/us-alibaba-lazada-funding/alibaba-doubles-lazada-investment-to-4-billion-in-aggressive-southeast-asian-expansion-idUSKBN1GV09W.

[32] Lavin, Frank. "Amazon's Prime Day Vs. Alibaba's Singles' Day: Are They Any Different?" Forbes, Forbes Magazine, 11 July 2018, www.forbes.com/sites/franklavin/2018/07/10/amazons-prime-day-and-alibabas-singles-day-any-difference/#38ed05992506.

[33] External expert interview

[34] 于小明. "Alibaba's Cainiao to Create Smart Logistics Network." Alibaba's Cainiao to Create Smart Logistics Network - Chinadaily.com.cn, www.chinadaily.com.cn/a/201805/31/WS5b0fa0a0a31001b82571d739.html.

[35] Internal expert interview

[36] Balaji, Sindhuja. "How India's E-Commerce Players Prepare For The Diwali Shopping Frenzy." Forbes, Forbes Magazine, 21 Oct. 2017, www.forbes.com/sites/sindhujabalaji/2017/10/21/how-indias-e-commerce-players-prepare-for-the-diwali-shopping-frenzy/#1f8f0c942bf6.

- Training: Boosting their adoption by training contract personnel on key operations such as packaging techniques.
- Efficiency: Optimizing supply chain operations with a focus on maintaining efficiency standards through adjusted supply chain management.

Seasonal spikes in volume can only be managed through efficiency gains. Maintaining them, however, can be challenging regardless of the model used. Hiring temporary staff can be costly and difficult to manage in the short term, and these workers may also find it challenging to maintain steady employment prospects. Also, inter-season sales cannibalization may occur—industry experts have observed that consumers will more commonly use commercial holidays such as Prime Day to purchase a gift for another holiday. Adding resources for one or the other may result in inconsistent success in maintaining efficiency and cost margins, which is why forecasting these sales through more effective demand planning is crucial.

Big data illuminates path to efficiency

Ideally, to determine how much labor is required for a specific shopping period, all stakeholders in the supply chain need to be involved. Increasingly, companies are turning to data and automation to determine their demand planning for them. German retailer Otto has implemented an artificial intelligence system of demand planning that generates day-to-day forecasts on purchasing orders. Using big data to facilitate real-time decision-making, Otto's new system reportedly led to a 40% increase in forecast accuracy, and consequently generated a 20% reduction in overstock.[37]

The use of data, artificial intelligence, and other innovative technologies is critical in limiting more interventionist solutions, such as price surcharges during high stress delivery periods like those in ride-hailing business models. These technological advancements in logistics are not limited to the early stages of the supply chain. Every hinge point in the delivery process—from purchasing to warehousing and general fulfillment, as well as adaptive and innovative technologies within the last mile—are increasingly being incorporated to better service the urban consumer.

[37] Berttram, Philipp, et al. "The Magic of Predicting Demand from Data." *Strategy Business*, 15 Jan. 2018, www.strategy-business.com/article/The-Magic-of-Predicting-Demand-from-Data?gko=94906.

3.4 EVOLVING TECHNOLOGIES

Localization, flexi-delivery solutions, and seasonal logistics solutions have all been facilitated by innovative technologies in the e-commerce and logistics sectors. To serve the ever-increasing demand among urban consumers for online shopping solutions, new platforms are being invented and existing ones further developed to optimize the last mile. Often, these innovations have proven more grassroots and pragmatic than the futuristic aerial vehicles and delivery vehicle concepts, which remain limited to niche uses such as emergency medical needs in remote areas.[38] On the other hand, cloud computing, artificial intelligence (AI), data collection through the connectivity of the Internet of Things (IoT) and even blockchain technologies have contributed to a general automatization of transport operators. AI and the use of big data analytics are increasingly being adopted by all players to work towards the more adaptive and flexible model the industry should strive for.[39]

An appetite for digitization and automation

Several of these technologies are in fact already embedded in companies' operational frameworks. According to the International Data Corporation's (IDC) 2018 Supply Chain Survey, 75% of respondents believed cloud computing was critical to operations. In the same study, 50% of respondents also described current supply chain transformation efforts as consumer-driven.[40] To sell more to the urban consumer, deliver faster, and predict suggested future purchases, innovative technologies are facilitating operational improvements around the last mile, particularly in the collection and analysis of real-time data. This data is used in machine learning to expand the use of learning robotics in warehouses and peak planning in inventory management, as well as compensating for labor shortages.[41]

[38] Interview with Matthias Heutger, Senior Vice President, Global Head of Innovation & Commercial Development at DHL Customer Solutions and Innovation

[39] Interview with Mei Yee Pang, DHL Head of Innovation, Asia Pacific DHL Customer Solutions and Innovation

[40] "IDC.com IDC Table of Contents." *IDC: The Premier Global Market Intelligence Company*, www.idc.com/research/viewtoc.jsp?containerId=US42126117.

[41] Interview with Katja Busch, Chief Commercial Officer, DHL Customer Solutions and Innovation

Technology making an impact in fulfillment and last mile

Applications of real-time data and artificial intelligence are already relatively well-established in major logistics warehouses and fulfillment centers. Augmented reality (AR) glasses used by warehouse personnel have aided in improving productivity by providing data on-hand in a visual representation.[42] Uses for AR glasses in the field are expected but still need to be further developed before couriers can wear them for 3-D route planning and enhanced package scanning. AR and virtual reality (VR) capabilities are also being used to mitigate potential product returns.[43] DressingRoom by fashion retailer Gap is a mobile app that brings the dressing room experience straight to its customers' homes.[44] IKEA Place fulfills a similar purpose, allowing customers to scan an area in their home and select several products from their online store to view through their cameras via AR technology.[45] By giving the urban consumer the option of trying a product before purchasing it, not only have barriers to purchase been minimized, but the likelihood of a product return is also reduced.

There have even been applications for these innovative technologies for the last mile. DHL eCommerce management described how in some markets, couriers spend nearly an hour planning their routes manually, which significantly reduces efficiency. DHL has streamlined this last mile process through technology using geo-map reading (i.e. real-time mapping). This technology plans routes intelligently using live data on the roads, and is also agile in finding alternative routes in case of any road issues, based on weather and road condition information from several sources. This technology, which incorporates artificial intelligence, cloud computing, and real-time data capabilities, has helped improve last-mile productivity by 20–40%.[46]

Learning robotics (as opposed to standard robotics that several car manufacturers use, for example) will also be a key innovation for the future of the last mile. The PostBOT robot concept—an autonomous robot based on similar technology from Effidence S.A.S.—can store parcels weighing up to 150 kilograms and carry them alongside a courier for urban deliveries.[47] This technology is currently being assessed for scalability by Deutsche Post in Bad Hersfeld, Germany. Both are exemplary of how AI can make couriers' jobs easier and smoother, showing how the relationship between evolving technology and the human workforce can be healthy and beneficial in the future.

Consumer-facing virtual assistants and chatbots are increasingly being adopted by internet retailers and transport operators alike to streamline customer support throughout the delivery cycle. Package.ai is software that among other services offers an AI-automated interaction with consumers that want to track their packages, inquire about delivery timetables, and even provide feedback about the product delivery experience.[48] The AI element of this software allows for conversation to take place—customers can speak with the bot and receive human-like responses. Not only does this technology encourage a conversation about the last mile between transport companies and end-consumers, it also highlights another B2C application for AI, automation, and real-time data. Being able to incorporate cutting-edge technologies gradually into every stage of the supply chain will be key in maintaining an adaptive business model geared towards a more profitable and efficient last mile.

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[42] "Vision Picking at DHL - Augmented Reality in Logistics." DPDHL, www.dpdhl.com/en/media-relations/media-center/videos/dhl-vision-picking-pilot-project.html.

[43] Interview with Matthias Heutger, Senior Vice President, Global Head of Innovation & Commercial Development at DHL Customer Solutions and Innovation

[44] "Gap Tests New Virtual Dressing Room." *Gap Inc.,* corporate.gapinc.com/en-us/articles/2017/01/gap-tests-new-virtual-dressing-room.

[45] "How These Retailers Use Augmented Reality to Enhance the Customer Experience." Retail Marketing Blog - Retail News, Trends, Store Tips, and More by Shopify, www.shopify.com/retail/how-these-retailers-are-using-augmented-reality-to-enhance-the-customer-experience.

[46] Internal expert interview

[47] "Oct 04, 2017: New Delivery Robot Helps Mail Carriers Make Their Rounds." DPDHL, www.dpdhl.com/en/media-relations/press-releases/2017/new-delivery-robot-supports-mailmen.html.

[48] https://package.ai/

How evolving technologies are utilized matters

On an industry level, the increasing penetration of mechanized labor is driving humans to adapt by seeking out "new roles" as noted by a World Economic Forum study on robot labor.[49] The report estimates that more than half of workplace tasks will be fulfilled by robots by 2025, consequently changing the roles people will play from more mechanical and redundant tasks to those requiring more complex and creative problem-solving abilities and human qualities such as empathy. In the logistics realm, the innovative technologies described above have complemented human labor rather than phase it out (improved warehouse management through real-time data use or courier assistance for real-time mapping, for example) and have helped industry players keep up with urban consumer demands by filling gaps left by labor shortages.

All elements considered, there is no universal technology solution that applies to all urban environments. Several primary functions along the delivery cycle are still human-run, but the supply chain is still increasingly leaning on data from the cloud, AI algorithms for route planning, and adaptive robotics for inventory management. All these technologies and data applications feed into transforming the last mile; Mei Yee Pang, DHL Head of Innovation, Asia Pacific DHL Customer Solutions and Innovation, reiterated the "importance in enabling a data driven approach in servicing customers."[50] All of these technologies will continue to play an expanding role in winning over the last mile. Should the outlook for the industry incorporate the use of aerial drones, self-driving vehicles, and highly advanced technological enhancements, these will only truly succeed if they aid in making transport operators more flexible in their approach to the final mile.

As transport operators look to the future, delivery options need to become more predictive and transparent. With innovative technologies increasingly influencing industry practices—artificial intelligence, enhanced infrastructures to facilitate IoT practices and robotic enhancements—DHL is working to establish a vision for how these changes will bring the industry closer to meeting new expectations of modern-day urban consumers via the last mile.

[49] "Machines Will Do More Tasks than Humans by 2025: WEF." *Phys.org - News and Articles on Science and Technology*, phys.org/news/2018-09-machines-tasks-humans-wef.html.

[50] Interview with Mei Yee Pang, DHL Head of Innovation, Asia Pacific DHL Customer Solutions and Innovation

4. THE FUTURE OF THE LAST MILE

Urban consumers will continue to demand solutions that make their lives easier—convenience, flexibility and costs are all themes that have emerged as relevant to both e-commerce players and transport operators. According to Katja Busch, Chief Commercial Officer, DHL and Head of Customer Solutions and Innovation, the industry is moving towards a greater local presence, developing alternative delivery models, pushing for digitization in fulfillment and delivery, incorporating robotics to aid its workforce, and more.[51] Making adjustments to meet these requirements, however, will need to be pursued incrementally to keep a balance with cost and quality considerations.

What needs to be done?

The necessary success factors to improve last-mile operations evolve in tandem with the urban consumer. Capturing delivery segments, aggressive management of expenses while operating under slim margins, utilizing technology whenever possible, and pursuing alternative labor models are all potentially decisive measures.[52] If the industry is to follow through with these strategic shifts in the future, certain success factors need to be considered by all players. The industry first needs to sustain cost-efficiency in the e-commerce fulfillment field—maintaining profitability always has been a challenge and will continue to remain so.[53] Service quality from leading industry players as well as service partners will also need to be monitored, without adding additional stress on staff by expanding their responsibilities.

To absorb these adjustments and market shifts in the last mile while mitigating potential costs, it is critical to have an appreciation of the role played by automation, real-time data prediction and management, as well as flexible delivery networks. However, there is no one-size-fits-all solution, as infrastructure, regulations and business environments vary significantly from market to market. The FAD triangle, or Flexible Networks, Automation, Data Prediction and Management model, provides a framework from which to assess the most efficient route in adjusting to the logistics market of the future. The model describes three focus areas in which logistics operators should develop their operations to increase their competitiveness in last-mile delivery:

- (F)lexible or more elastic transport networks can include the more efficient use of available transport capacity in a market, to achieve higher load factors, bring down costs, connect more quickly to end customers, and reduce environmental impact, but can also imply the ability to move shipments more easily between different modes of transport such as bicycles and vans to improve connectivity.

- (A)utomation can include a higher level of automated processing at fulfillment centers, but also the deployment of autonomous vehicles and robotics to bring down labor costs, increase productivity, and enhance services.

- (D)ata management enhancements allow retailers and their logistics operators to better forecast and position inventory to reduce waste within their supply chain and achieve better availability of stock. It also provides greater visibility on inventory and transport flows, allowing logistics operators to more effectively manage routing and exceptions, and providing tracking to enhance the customer experience.

Effectively, not all three elements need to be managed as actively or invested in as equally. Different markets, commodities and operating environments, as well as competitive pressures, may require prioritization of one particular focus area over the others, or more substantial investment in certain focus areas at the expense of others. For example, if courier shortages are the most pressing issue for one company, that company would need to funnel resources into making its networks more flexible and likely consider automating some of its processes as well. However, another company may be facing increasing pressure from its customers to narrow the delivery timetables offered to them, incentivizing management to consider investing in a data system with AI capabilities to help predict the most efficient windows.

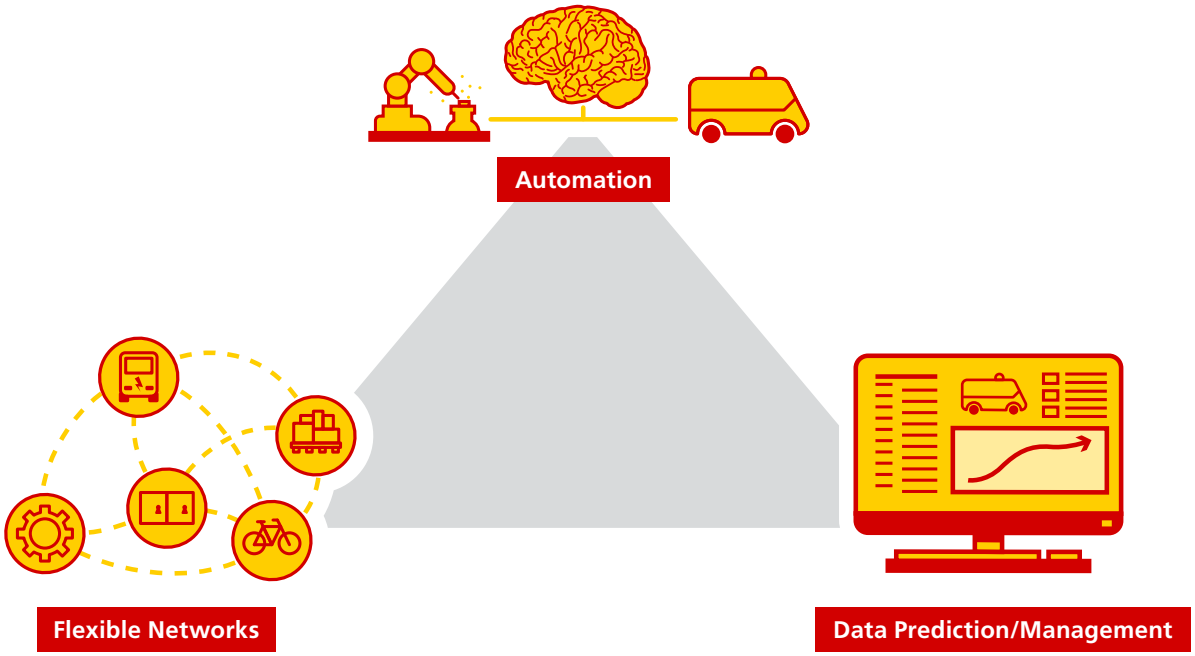
Urban environments in more developed markets may encourage a higher level of automation, and even the deployment of autonomous transport, than in less developed countries that lack the necessary infrastructure or regulatory environment. It is also possible that the factor

[51] Interview with Katja Busch, Chief Commercial Officer, DHL Customer Solutions and Innovation

[52] Internal expert interview

[53] Interview with Lee Spratt, CEO DHL eCommerce Americas

THE FUTURE OF LAST MILE LOGISTICS: A RACE TO THE URBAN CONSUMER



The FAD Triangle describes three focus areas for logistics operators to increase their competitiveness in last-mile delivery.

cost of labor in those developing markets is still sufficiently low so as to undermine the business case for technology investments. Regardless of market realities, the universally shared goal from this framework is to demonstrate that everybody can refocus resources and efforts to increase competitiveness over the last mile, as well as address the challenges posed by the trends discussed earlier. By increasing levels of automation, flexing their transport networks, and more effectively harvesting and using data, logistics operators can significantly increase their performance, raise productivity, and better manage their costs.

Contributing more to the delivery cycle of tomorrow

Ultimately, parcel delivery is going to grow alongside rising sales in internet retailing, more digital connectivity, and an evolving urban environment. Adapting to all these trends has been at the forefront of discussions within the DHL network. The FAD framework lays out the foundations of potential initiatives, such as sharing fulfillment centers and logistics spaces, and generally freeing up space for the last mile.[54] Developing consumer relationships by partnering with big brands and e-retailers in helping them develop a global B2C environment to further facilitate a direct relationship with the urban consumer was also highlighted. Another suggested tactic is replacing fixed assets with more elastic ones to better manage resource mobility, as this will improve the ability of transport players to weather seasonal spikes in fulfillment orders. An agreed-upon long-term goal is driving synergies across DHL's global network so that the push to innovate absorbs rapidly, shifting preferences from varied backgrounds.

Amidst this discussion, Lee Spratt, CEO DHL eCommerce Americas, was asked what he believed the logistics and e-commerce industries would look like in fifteen years. His answer offers a succinct insight into the dynamic way in which e-commerce is reshaping transportation—particularly over the competitive battlefield of the last mile—and what online retailers and their transport partners will have to do to survive and prosper in future:

"We may not even be certain of where the industry is going to be in months, let alone years. What is more critical to our future is being more agile in adjusting to market trends, maintaining an openness towards learning and reinvention, and promoting a newfound flexibility as a baseline for the transport industry."[55]

[54] Interview with Katja Busch, Chief Commercial Officer, DHL Customer Solutions and Innovation

[55] Interview with Lee Spratt, CEO DHL eCommerce Americas

5. APPENDIX

5.1 DEFINITIONS

E-Commerce (Internet Retailing): Sales of consumer goods to the general public via the internet. This includes sales through mobile phones and tablets. Internet retailing includes sales generated through pure e-commerce web sites and through sites operated by store-based retailers.

E-Commerce Retailers (Pure-Play): Retailers which sell only through the internet.

E-Commerce Retailers (Brick-and-Click): Retailers which sell through both the internet and brick-and-mortar stores.

Omni-Channel Retail: Online-offline integrated approach to the sale of goods that incorporates both online and brick-and-mortar retailing.

Micrologistics: Operational components of logistics cycle, such as transportation procurement, inventory control, data, freight tracing, and financials.

Internet of Things (IoT): Internet-based multi-connection of computing devices found within household and pedestrian devices, enabling exchange of data.

Cloud Computing: Use of a network of internet-connected remote servers to process, hold, and share data.

Artificial Intelligence (AI): Theoretical use and application of computer systems to perform tasks conventionally performed by humans, such as speech comprehension, visual recognition, and other decision-making activities.

Blockchain Technology: Decentralized technology linking records (i.e. blocks) of information and data using cryptography.

5.2 METHODOLOGY

Desk research: The scanning of published sources to assess contemporary trends and insights that are already available in the market as well as to form a starting point for in-depth primary research. The applications of this type of research include but are not limited to:

- Updating background information for e-commerce and logistics;
- Extracting up-to-date case studies and examples from industry players; and
- Understanding recent government legislation relevant to the scope of research.

Euromonitor International's Passport: A database consisting of statistics, market volumes, values, market shares, and other pivotal data related to retailing and other industries. This input was critical for gauging the growth prospects of the industry, from a global as well as country-specific perspective.

Trade interviews: In-depth trade interviews with DHL executive stakeholders across multiple functions and departments to obtain key insights on both qualitative and quantitative elements of the research. Information gathered from the desk research phase and internal discussions with the project team were used to develop a discussion guide geared towards framing the conversation. These open-ended questions generated dialogue to validate preliminary trends, as well as extract deeper insights and examples.

Industry expertise: Interviews with external experts involved in multiple parts of the supply chain were used to obtain an independent, DHL-external perspective on the scope and objectives of the white paper.

5.3 SOURCES

The sources used to execute the research consist of both primary and secondary categorizations, and are described as follows:

- Secondary resources: Open-source publications, trade press, syndicated reports, industry/player publications, and Passport databases (Digital Consumer, Retailing, Countries and Consumers, Cities, Syndicated Lifestyles Survey).

- Primary sources: DHL executive interviews, industry expert interviews, and internal EMI industry team insights.

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