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The Geography of E-Commerce

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Abstract

E-commerce has grown to enormous proportion, disrupting entire industries. Far from being virtual, e-commerce has a huge physical imprint and features a "mountainous" geography. Its uneven diffusion is driven by political, social and economic factors. All other things being equal, people buy more online in wealthy, well-connected countries, regions and communities. The case of China, by far the leading country for e-commerce and M-commerce, is unique: large parts of the country have "leapfrogged" from poverty straight into the digital economy. The geographic versatility of e-commerce is challenging public regulations: online retailers seek to avoid taxes on sales and income, and the growth of Web-based, customer-to-customer hospitality has got out of control in many cities, driving a backlash from local governments. Logistics is the cornerstone of e-commerce and the most visible part of its value chain. Major online retailers operate huge networks of warehouse and drive the growth of parcel express carriers such as FedEx, UPS, and DHL. Fast, reliable delivery is the critical part of the business, notably the final leg or 'last mile' to customers' homes. E-commerce is often made the scapegoat for the crisis of the retail industry which has materialized in store and shopping mall closures, and the bankruptcy of famous retail chains, notably in the U.S. However, experts and scholars consider that "physical" and virtual commerce are converging – rather than colliding – toward "omnichannel" models. In rural areas, e-commerce may drive the decline of small stores, but also play an inclusive role, connecting consumers and local producers to the global economy.

Keywords

E-commerce, retail, marketplace, logistics

Introduction

Electronic commerce has grown today to enormous proportions, "disrupting" entire industries such as book and music publishing and retail, travel agencies, taxis, and hospitality. On September 4, 2018, Amazon.com, Inc. became the second company in history after Apple, Inc. to hit one trillion dollars of market capitalization.¹ In China, e-commerce may have captured about 28 percent of the global retail market.² From its beginning, e-commerce has attracted the attention of geographers (Leinbach and Brunn 2001, Wilson 2000, Couclelis 2004, Murphy 2007), although its geographic dimension is uneasy to capture. For centuries, stores, street markets, shopping malls, and "big box" supermarkets, have been instrumental in the design, growth, and social life of cities. However, since goods and services can be purchased on computers and smartphones without regard on time and location, and delivered at home a few days or even a few hours later, the value chain of e-commerce has lost most of its geographic significance in the eyes of the public. To some extent, e-commerce is subjected to the "death of distance" or "end of geography" fallacies which have, from the beginning, biased the comprehension of the digital economy (Malecki and Moriset 2008). Therefore, the primary purpose of this chapter is to show that e-commerce does have a geography, and to explore this geography.

To understand the geographic features of e-commerce, one needs to comprehend the fundamentals of its business models, presented in section one. The second section explores the regional idiosyncrasies of e-commerce. The world map of e-commerce diffusion is uneven. It is dictated by purely geographic features such as distance to market and population density, and by economic, social and political factors, such as age structure, purchasing power, tax regimes and regulation of commerce, and the degree of information technology diffusion (IT-readiness). Section three is dedicated to the critical link between e-commerce and logistics. The delivery of goods to customers represents most of the physical presence of e-commerce, and the major part of its environmental footprint. Therefore, it is the overarching geographic issue of e-commerce. Section four investigates the local implication of e-commerce growth, in urban and rural environments.

1. Definitions and business models of e-commerce

E-commerce describes "sales of goods and services where the buyer places an order, or the price and terms of the sale are negotiated over an Internet, mobile device (M-commerce), extranet, Electronic Data Interchange (EDI) network, electronic mail, or other comparable online system. Payment may or may not be made online" (U.S.Census Bureau 2018). In the largest meaning, e-commerce may span a wide spectrum of IT-intensive activities such as finance, telecommunications, software

¹ <https://money.cnn.com/2018/09/04/technology/amazon-1-trillion/index.html>

² <https://www.statista.com/statistics/379087/e-commerce-share-of-retail-sales-in-china>;

and computer services (Leinbach and Brunn 2001). The present paper focuses on activities which are close to "commerce" in the common sense, in particular wholesale and retail trade.

The main categorization of e-commerce used in the literature is based on the legal statuses of vendors and buyers (Figure 1). Trade between professionals or firms, notably wholesale operations, is said "business-to-business" (B2B). Sales by professional vendors or commercial enterprises to individual, end-customers fall in the category of "business to customer" (B2C), or e-retail. The intermediation power of Web platforms has allowed millions of individual demands and offers to meet together, giving birth to the concept of "consumer-to-consumer" (C2C) e-commerce. "Consumer-to-business" (C2B) is a less common occurrence which is considered when individuals sell goods and services to a firm, by posting them on blogs, social networks or dedicated portals. For example, people can post photos on Adobe Stock, where they can be purchased by professional users such as advertisement agencies and magazines.

Other classifications are sometimes used. "Business-to-government" (B2G) describes transactions between private firms and public agencies or departments. The Internet is now widely used by governments throughout the procurement cycle at both national and local levels and requests for proposal are commonly posted on public agencies' websites. "M-commerce" describes online transactions made through smartphones and other mobile devices.

Figure 1. E-commerce categorization and examples of firms (in italics)

Vendor	Buyer (company, professional)	Business (company, professional)	Customer (individual)
Business (company, professional)	B2B <i>Amazon,</i> <i>Alibaba.com</i> <i>Made-in-China</i> <i>Tradeindia</i>	B2C <i>Amazon</i> <i>AliExpress</i> <i>T-Mall</i> <i>JD.com</i>	
Customer (individual)	C2B <i>Google AdSense</i> <i>Adobe Stock</i> <i>Jobster</i>	C2C <i>Taobao</i> <i>eBay</i> <i>Airbnb</i>	

Logically, the attention of the public and scholars has been caught by B2C e-commerce, or e-retail, which has entered our everyday lives. Meanwhile, B2B has remained in the shadow (Lilien 2016), because people usually ignore value chain operations which occur between the factory and the store. The procurement chain

that is necessary to the production of final goods and services is an increasingly globalized flow of intermediary goods, parts, and business services, which requires an endless series of commercial contracts, mostly hidden to consumers. Because the total of sales in a given value chain exceeds by far the final value-added and the price charged to end-customers, it is unsurprising that global B2B sales are much bigger than B2C. Statista (2017) estimates that the worldwide B2B e-commerce market in 2017 was worth 7.7 trillion dollars, to compare with B2C (e-retail) global sales of US\$ 2.3 trillion. It is often uneasy to disentangle B2B and B2C e-commerce. For example, major online retailers such as Amazon and Alibaba also operate as neutral platforms for inter-firms transactions.

Electronic platforms and business models of e-commerce

The critical role of Web-based platforms derives from their limitless capacity of switching and disintermediation. The "miracle" of Airbnb, eBay and the likes, is that billions of people in the world can get the information that your apartment in Paris will be available for rent during the next holidays, that your lawn mower is for sale, or that you offer some seats in your car for a given trip against a modest fee³. Disintermediation occurs when incumbent firms and institutions such as hotel chains, travel agencies, taxi companies, and music labels, are squeezed out or "uberized" by Web platforms through which individuals and small firms do business directly. Similarly, traditional retailers may be passed over by commercial websites, which play the role of the sole intermediary between manufacturers and consumers.

In the early years of e-commerce, online stores were trading like traditional merchants, buying goods wholesale and reselling them to customers with a profit margin. Amazon and its followers such as Alibaba have later implemented a dramatic business innovation, the opening of their platforms to third-party merchants and sellers. In this "pure marketplace" model, the platform does not get ownership of the goods at any point of the trading process, but charges a fee on the transaction. This model is dominant within Alibaba's ecosystem (T-Mall, Taobao, AliExpress). The presence on leading marketplaces carries two main advantages for small and medium-sized enterprises: increased commercial visibility, and the access to global logistic systems (we elaborate on this topic below).

The difference between online merchants and mere marketplaces (Amazon is both) makes the interpretation of sales data a tricky exercise. There is a huge difference between the "revenue" (total of sales) of a given company and the "gross merchandise volume" (GMV) actually exchanged on its marketplaces. Alibaba Group revenue (about 40 billion dollars in 2017) is mostly made of fees charged on transactions made by third-party sellers. It pales in comparison to its global GMV, that surpasses those of Amazon by a wide margin (Table 1). The comparison with JD.com, China's second e-retailer is revealing: like a supermarket chain, JD.com

³ As a matter of fact, the "miracle" is about search engines, algorithms, and computing power.

buys wholesale and resells in retail. Said flatly, JD.com sells merchandise, while Alibaba sells trading services. To add to the complexity, some firms have a proportion of non-trade activities: Amazon's subsidiary Amazon Web Services is dedicated to cloud computing and data storage services.

Table 1. Amazon, Alibaba Group, and JD.com main data in 2017 (source: Amazon.com, Inc. 2018, Alibaba Group Holding Ltd. 2018, JD.com, Inc. 2018.). Data for the fiscal year ended December 31, 2017 (Amazon, JD.com) and March 31, 2018 (Alibaba Group). Financial data in billion U.S. dollars.

	<i>Amazon.com, Inc.*</i>	<i>Alibaba Group</i>	<i>JD.com, Inc.</i>
Gross merchandise volume (GMV)	300 ? (estimation)	768.4**	199.0
Annual revenue	177.9	39.9	55.7
Cost of sales	111.9	17.1	47.9
Income (loss) from operations	4.1	11.0	(0.128)
Net income (loss)	3.0	9.8	(0.02)
Active consumers	-	552 million	292 million
Growth of revenue 1997-1998	30.8%**	58.1%	40.3%
Brands	Amazon, Amazon Fresh Amazon Go, Prime Pantry, Prime Now, Whole Foods	Taobao, Tmall, AliExpress, Alibaba.com	JD.com, Yihaodian

* Includes results of Whole Foods Market from the date of acquisition by Amazon, August 28, 2017.

** Chinese market only

Economies of scale and network effects: a "winner-take-all" economy

The economy of digital platforms shows "winner-take-all" features (Kenney and Zysman 2016) to a degree unseen since Andrew Carnegie and John D. Rockefeller.⁴ It was first epitomized by Microsoft's and Intel's dominances. It is today illustrated by the meteoric rise to near monopoly status of Google and Facebook. The supremacy of Amazon and Alibaba, the successes of Uber and Airbnb, tell a similar story. This tendency stems from two intertwined features of Web-based economic models: economies of scale and network effects.

⁴ Founders, respectively, of U.S. Steel and Standard Oil, which held a virtual monopoly on the U.S. steel and oil industries at the beginning of the 20th Century

Economy of scale – a fundamental concept in microeconomics – predates the digital economy. It occurs when costs of operation within a company are constant or rise at a slower pace than the final output and the volume of sales, leading to increasing margin and bigger return on capital. That explains the race for size common in all industries. In the sphere of e-commerce, the rule of economies of scale leads to a Darwinian process of selection and concentration. For example, a commercial website at the startup stage should "burn" huge amount of money in advertisement campaigns, while its competitors do the same. Only a few will sustain the process, achieve commercial success, and capture the market share of those who have failed (Noe and Parker 2005). For surviving firms, the sales/cost of ads ratio will increase and profitability will be in sight. Other effects of scale are seen in fulfillment operations such as warehousing and delivery.

Network effects are a complement of economies of scale. The "Metcalfe Law" says that the value of a network is theoretically proportionate to the square of the number of its users (Metcalfe 1995). Getting more visitors and shoppers on a commercial website makes it possible to offer a larger catalog and to attract more third-party vendors who offer new goods and services, and fuel the attractiveness of the platform, with self-reinforcing, systemic effects.

The intermediation power of the Internet has given birth to a "sharing economy", sometimes called a "wikinomics" (Tapscott and Williams 2006), which can be identified in all four categories of e-commerce. These concepts are linked with the idea of "open innovation" (Chesbrough 2003). Rising complexity, and the shortening of product lifecycles and time-to-market delays, have become definitive features of the digital economy. In this context, large firms must look outside the silos of their internal creative resources (for example R&D and design labs). In diverse industries such as aircraft and automobile manufacturing, or software, major companies have open dedicated platforms to third-party firms, private and public labs, and even individuals. For example software applications ("apps") for Apple's iPhones are sourced to millions of firms and individuals worldwide. On June 1, 2017, Apple announced that App Store, the platform on which iPhone users connect and download applications, has generated a global revenue of 70 billion dollars since 2008.⁵

2. The uneven diffusion of e-commerce

A retrospective view is necessary to comprehend the magnitude of change driven in the recent years by the growth of e-commerce. E-commerce made timid debuts in the pre-Internet era with the French Minitel in 1982) and Thomson Holidays, a travel agency, which experimented electronic sales through the a TV screen and a mini-computer interface (Palmer 1988). Modern e-commerce began in the early 1990s in

⁵ <https://www.businesswire.com/news/home/20170601005532/en/Developer-Earnings-App-Store-Top-70-Billion/> (accessed 04 October 2018)

parallel with the diffusion of the Internet. Amazon was founded in 1994. Much hype followed. The promise of the "death of geography" attracted thousands of entrepreneurs and inflated the "dot.com bubble", notably in the U.S. However, most of the web-based ventures had underestimated the requirement of fulfillment – customer support and logistics – and collapsed in the "dot.com bubble bust" of the earlier 2000s (Day et al. 2003, Indergaard 2004, Zook 2005). In 2005, B2C (retailing) e-commerce market share in the U.S. amounted to a mere 2.4 percent, up from 1.1 percent in 2001.⁶

Today, e-retailing can by no means be regarded as a marginal phenomenon, with market shares exceeding 10 percent in many countries, and reaching an astonishing 28 percent in China (Table 2). Worth noting is the dramatic growth of sales made through mobile devices, mainly smartphones, or M-commerce. According to eMarketer, it is projected to reach 40 percent of online sales in the U.S. in 2018, and 75 percent in China – worth one trillion dollars.⁷

Table 2. Retail e-commerce figures in selected economies, estimations for 2018⁸

	Sales 2018 (billion dollars)	Percentage of total retail sales	Main local e-commerce brands
China	1530	28.6	<i>Tmall, Taobao, JD.com</i>
USA	526	10.0	<i>Amazon</i>
UK	126	21.5	<i>Tesco, Asos, Argos</i>
Japan	122	9	<i>Rakuten</i>
Germany	71		<i>Otto, Zalando</i>
South Korea	50.5	11.3	<i>Gmarket, 11Street</i>
France	44	7.0	<i>Cdiscount, Vente privée,</i>
India	32.7	2.9	<i>Flipkart, Snapdeal</i>

The recent growth of e-commerce has been driven by the coming to maturity of the digital society, or "IT-readiness": mass diffusion of the Internet, powerful connected devices, reliable online payment services and digitally-enhanced logistics solutions. The uneven development of e-commerce is explained by other local idiosyncrasies

⁶ Source: U.S. Census Bureau, <https://www.census.gov/mrts/www/data/pdf/06Q1.pdf>

⁷ <https://retail.emarketer.com/article/do-mobile-transactions-dominate-mix/5af217b5ebd40003a0c2468e>; <https://www.emarketer.com/Article/New-eMarketer-Forecast-Sees-Mobile-Driving-Retail-Ecommerce-China/1016105>

⁸ Source of data: <https://www.emarketer.com/content/retail-and-ecommerce-sales-in-china-2018>; <https://www.statista.com/statistics/379087/e-commerce-share-of-retail-sales-in-china>; <https://www.emarketer.com/Chart/Top-10-US-Companies-Ranked-by-Retail-Ecommerce-Sales-Share-2018-of-US-retail-ecommerce-sales/220521>; <https://www.emarketer.com/Report/UK-Retail-Ecommerce-eMarketers-Updated-Estimates-Forecast-20162021/2002188>; <https://www.statista.com/statistics/289736/japan-retail-e-commerce-sales-figures>; <https://www.emarketer.com/Article/Retail-Ecommerce-Germany-Top-65-Billion/1016261>; <https://www.statista.com/statistics/289745/south-korea-retail-e-commerce-sales>; <https://www.emarketer.com/Report/Retail-Ecommerce-France-Europes-Third-Largest-Market-Posts-Steady-Gains/2002099>; <https://www.emarketer.com/content/india-s-ecommerce-market-continues-to-surge>

such as geography (density, percentage of urban population, transportation infrastructures), age structure (the elderly usually trade less online), and, above all, purchasing power: in 2018, B2C e-commerce sales in India (1.3 billion people) were smaller than France's (67 million).

Local regulations and commerce history matter. For example, the UK has a well-established tradition of mail-order sales, with a high degree of customer protection. That explains, in part, the high market share of e-commerce over global retail sales, which is second only to China.

However, every country pales in comparison to China in terms of e-commerce volume, market share, and speed of growth. In the last decade, China online sales surged from near zero to worth 1.5 trillion dollars, about three times those of the U.S. This achievement has been driven by a bundle of factors: the meteoric economic growth of the 2000s and 2010s, the tech-oriented consumption appetite of a young and newly enriched, urban middle class, and the innovative effort of local IT companies such as Alibaba Group and Tencent which have developed versatile mobile payment solutions such as Alipay and WeChat Pay.

The rise of China's e-commerce ecosystem is a textbook example of "leapfrogging." In Western countries, people have got a car, and used to live near a shopping mall well before having a PC and an Internet connection, not mentioning a smartphone. At the startup stage, Amazon and other e-merchants have had to compete with a dense physical retail infrastructure, and a tradition of going shopping to the mall strongly anchored in the society. For its part, China jumped straight from mass poverty into the Internet era. Chinese citizens shop massively online because so many of them do not own a car to load at the nearest supermarket. And they use M-commerce because they often do not have a PC or a fixed line Internet connection, although nearly everybody, urban or rural, does have a smartphone.

Tax regimes and the geography of e-commerce

With the growth and rising sophistication of e-commerce, sales and profit taxation has become a serious issue for governments, notably in decentralized systems such as the U.S. or the European Union. E-commerce and other digital industries do not have the monopoly of tax avoidance and tax sheltering practices. But the fuzziness of e-commerce's geography and its ability to ignore political borders compound the problem governments are facing with. Tax regimes and jurisdictions are slow to follow the fast pace of growth and innovation in technology and marketing. As wrote Tarantola (2015, p. 316) "this new electronic frontier has grown from its infancy to an economic heavyweight in such a relatively short period of time that the legal framework simply has not had time to catch up."

This evolution has resulted in huge tax losses for governments. Estimates of sales tax loss for the U.S. states in 2017 range from 8 to 33 billion dollars (SCOTUS 2018). The impotency of governments to collect properly corporate taxes and sales taxes on

e-commerce operations results in market distortion and penalizes traditional businesses.

In the European Union, Ireland and Luxemburg are notoriously acting as tax heavens for IT-companies. Apple and Facebook have headquartered in Ireland, where the corporate tax rate of 12.5 percent is half the average of the other European countries. Amazon has headquartered European operations in Luxemburg, where the standard tax rate on commercial activities is about 29 percent while the tax on intellectual property income and royalties amount to a mere 5.7 percent. Therefore, Amazon has created in Luxemburg a financial holding which charges its main operating business with more or less fictitious intellectual services. In the words of M. Vestager, the European Commissioner for Competition, Amazon's holding is "an empty shell." In the end, Amazon was ordered by the European Commission to repay Luxemburg 250 million euros in back taxes (European Commission 2017).

In the U.S., the decision of the Supreme Court in *South Dakota v. Wayfair Inc.* (June 21, 2018) should be regarded as a decisive turn in the history of e-commerce taxation (Liptak, Casselman, and Creswell 2018). Up to now, the U.S. jurisdiction of e-commerce taxes was stating that sales in a given State should not be submitted to taxes until the vendor shows locally some "significant" physical presence, such as stores, supermarkets, and warehouses. In the 2018 decision, the Court considered that under the current conditions of e-commerce operations, "the physical presence rule is artificial in its entirety" (SCOTUS 2018, 14). The majority in the Court said that the existing tax regime based upon the 1992 decision was creating "market distortions" (10), "a tax shelter", and "an incentive to avoid physical presence in multiple States" which would deprive local communities of "storefronts, distribution points, and employment centers that otherwise would be efficient or desirable" (13).

From the geographer point of view, the most interesting point in the 2018 decision is the smart and pragmatic analysis of today's e-commerce geographic reality. The Court stated that consumers' PC and smartphones that host data and cookies resulting from transactions with online merchants are today as much significant as warehouses for the definition of business presence in a given area.

A company with a website accessible in South Dakota may be said to have a physical presence in the State via the customers' computers. A website may leave cookies saved to the customers' hard drives, or customers may download the company's app onto their phones. Or a company may lease data storage that is permanently, or even occasionally, located in South Dakota (SCOTUS 2018, 15).

Actually, Amazon will not be hurt by the recent decision, given it already collects sales taxes in the 45 states that have such taxes in place.⁹ The company has been quarrelling for decades with state governments over the sales tax issue, sometimes threatening to close fulfillment facilities in states which tried to levy taxes on Amazon sales. However, since Amazon has turned to a behemoth, with over a

⁹ Alaska, Delaware, Montana, New Hampshire, and Oregon, do not have sales taxes.

hundred of physical locations (office, contact centers, and warehouses) throughout the U.S., it has to comply with local taxing jurisdictions.

Dissenting voices among the Court say that the burden of new sale taxes will fall mainly on "mom and pop" businesses, which could not meet the requirements of the thousands of different taxing jurisdictions in the U.S. However, to relieve the tax pressure on small businesses, many states have implemented a no-tax floor.

3. Logistics reigns supreme

Scholars have early recognized that logistics is the critical link within the value chain of e-commerce, and the most visible part of its geographical dimension (Anderson *et al.* 2003, Murphy 2003, 2007). J. Bezos, founder and CEO of Amazon, had understood from the beginning that, in the absence of physical sale outlets, the key challenge was the management of "the flow" to customers – hence the name of the company (Dodge 2001).

The absence of physical stores has huge implications on the retailing process, notably on the creation of trust. Consumers cannot touch and try their purchases, and cannot immediately take and carry them back at home. That does explain why e-commerce, when in the infancy, turned to standardized goods such as books and CDs from which few bad surprises are expected. Once the payment is processed, the commercial chain is invisible and out of touch: wait for days, hope that the good will not be damaged, lost, or stolen, pray that it will work or fit your body, nobody and nowhere to complain face-to-face. Sophisticated web interfaces, efficient customer support centers, and trustworthy payment systems, have been instrumental in the growth of e-commerce. But fast and secure delivery is the linchpin of e-commerce. Said simply, it is a battle against time and space.

The importance of logistics can be read in data on shipping costs and warehousing capacity disclosed by major online retailers. In a tremendous effort to reduce time of delivery, Amazon has so far prioritized investment over profitability. In the recent years, warehousing, transportation and delivery costs have grown faster than sales. Between 2015 and 2017, Amazon's fulfillment expenses grew from 12.5 to 14.2 percent of net sales. Shipping costs nearly doubled from \$11.5 billion to \$21.7 billion, while sales rose "only" by 62 percent, from 99 to \$160 billion¹⁰ (Amazon.com, Inc. 2018). By the end of 2017, Amazon was operating worldwide 19.4 million square meters of fulfillment facilities, a floor area equivalent to 800 Walmart superstores. JD.com, China's second largest e-retailer, covers the country with 486 warehouses in 78 cities, with an aggregated area of 10 million square meters (JD.com, Inc. 2018). Wang and Xiao (2015) show the much differentiated geography of e-commerce logistics in China. Customers in coastal China and main cities in the interior benefit from free and fast delivery solutions, but in the other

¹⁰ Excluding sales by Amazon Web Services (AWS), mostly cloud computing and storage services.

parts of the country, accessibility to market is much unequal, and customers have to choose between heavy delivery fees or longer delays.

The results of Amazon's logistics effort are impressive. Sisson (2017) reports that half the U.S. population is now living within 20 miles of an Amazon warehouse. In a letter to shareholders (April 18, 2018), the company says it has exceeded 100 million "Prime" subscribers who are eligible to free two-day shipping on 100 million items. The service Prime Now" offers same-day delivery on one millions items in 50 cities and nine countries worldwide.¹¹

Last generation warehouses are huge and highly automated, hosting hundreds of robots and miles of conveyor belts. However, warehouses and sorting facilities do not solve the "last mile" issue, or the last leg of delivery to customers' home. In "physical" commerce, customers use to carry their shopping basket back at home by their own means. Therefore, shelf replenishment materializes in huge packages and full pallets of goods like soft drink bottles, nutella jars, or the last best-seller edition, which are delivered from central warehouses at the back of supermarkets by heavy trucks. And "big box" stores or suburban shopping malls are often located close to an expressway. On the contrary, online retailers must deliver small packages and parcels, directly to the consumer door, in the narrow – sometimes pedestrian – streets of downtown, or in the labyrinthic residential suburbs. Allen *et al.* (2018) explain that last mile delivery materializes in a growing flow of vans and light goods vehicles such as UPS' iconic "package cars", which adds to the existing urban road congestion and pollution. The issue is made worse by the frequent stops made at the curbside. This trend conflicts with urban planning policies seen today in city centers which favor public transportation, cycling and walking.

The use of individual mail boxes is possible for very small parcels only. During opening hours, couriers cannot expect the presence of customers and their relatives at home. To solve this problem, e-retailers and third-party parcel express carriers such as FedEx, UPS, and DHL resort to pick up solutions. For example, DPD has deployed in Europe a network of 37,000 pick up stations – often managed by small neighborhood stores – and 2,260 lockers, used by 5600 online merchants.¹² Amazon is implementing its own network of lockers located in easily accessible spots such as transportation stations or supermarket entries (photo n° 1). On 20 June, 2018, the French Railway Company announced it had contracted with Amazon the fitting of 1000 lockers in its stations.¹³

¹¹<https://blog.aboutamazon.com/company-news/2017-letter-to-shareholders>. Prime subscribers pay a \$99 fee or the equivalent annually. Same-day delivery is possible for orders passed before noon.

¹² Formerly Deutsche Parcel Dienst, now a subsidiary of Groupe La Poste (France), <https://www.pickup.fr/qui-sommes-nous/chiffres-cles.sls>

¹³ https://www.gares-sncf.com/sites/default/files/field_files/2018-06/cp_amazon_sncf_gares_connexions_amazon_lockers_20.06.2018.pdf

Photo 1. Amazon lockers at the door of a French supermarket. Photo by the author, October 19, 2018.



4. When e-commerce shapes local economic landscapes

The disruption of retail

The fate of Randall Park Mall in North Randall (near Cleveland, Ohio) epitomizes the cross destinies of physical and electronic retails. Once one of the largest shopping malls in the U.S. (opening August 11, 1976), it was demolished in 2015 after a long decline and the closure of tenants such as Sears and Macy's. In fall 2018, Amazon opened on the site one of its largest and most advanced fulfillment center. Despite being highly automatized with robots and 26 miles of conveyor belts, the 200,000 square meters facility is likely to employ near 2000 people. A recruitment that is much welcomed in a community severely hit by the industrial decline.¹⁴ Amazon's location choice is not fortuitous. Thanks to its central location within the country's transportation system, Ohio hosts so many warehouses that it can said the U.S. "e-commerce capital" (Reagan and Korber 2016).

In a paper on online travel sales, Wilson (2000) wrote about the "fall of the mall". As a matter of fact, travel agencies have almost entirely been "uberized" by e-commerce and have disappeared from the urban landscape. So, the impressive growth of e-

¹⁴ <https://www.cleveland.com/expo/news/erry-2018/08/4a6d12c4917317/amazon-plans-midseptember-open.html>

commerce rises a critical issue: should we forecast the complete collapse of "main street" and shopping malls, with dramatic consequence on cities urbanity and liveliness, without mention of the loss or displacement of millions of jobs?

The traditional retail industry is actually in deep trouble, notably in the U.S. In the recent years, chains like Macy's, Office Depot, J.C. Penney, Hancock Fabrics, American Apparel, Kmart, and Sears, among others, have closed stores by the thousands. Toys "R" Us went bankrupt in September 2017 and ceased operations during the summer 2018. Sears, the country's most iconic department store, filed for bankruptcy on October 15, 2018, after having shuttered 2800 stores over the past 13 years.¹⁵ The rout of these famous brands leads pundits to question the very survival of shopping malls (Guedim 2018). According to a report published in 2017 by Cr dit Suisse (a major international bank), one out of four shopping malls in the U.S. could close by 2022.¹⁶ "Retail apocalypse" and "dead mall" are now entries in Wikipedia.

Toward multichannel and omnichannel commerce

E-commerce is often made the scapegoat for the crisis of the retail industry. But the glut of commercial property, and the competition with low-cost supermarket chains and warehouse clubs must be mentioned as majors factors. In the end, traditional retail will not disappear, but it is submitted to a high degree of disruption (Grossman 2016) and must reinvent itself.

To compete with e-commerce, physical stores and shopping malls must capitalize on their main asset: the potential for providing customers with an enjoyable living and socializing experience. Small and medium-sized malls and main streets in small, remote communities are likely to get into trouble. Meanwhile, shopping malls in tier-one cities are getting bigger and smarter, offering a wide range of integrated services, entertainment and sport facilities, free wifi and dedicated apps, and cultural events such as live music or dance performances, wine testing or culinary demonstrations.

There are several indications that e-commerce and physical retail, rather than colliding, become complements in a "brick and click", multichannel commerce (Currah 2002, Steinfield 2004). Evidence of the convergence is given by the tendency of major online merchants to seek for physical stores. In November 2017, Alibaba Group invested \$2.9 billion to purchase a stake in Sun Art Retail Group Ltd., a major hypermarkets chain in China under the brands Auchan and RT-Mart. In January 2018, Tencent, China's largest Internet-based company, and JD.com, participated in a \$5.4 billion investment in Wanda Commercial, China's leading operator of shopping malls.¹⁷ Amazon has shown a similar tendency to go physical with the acquisition in 2017 of Whole Foods Market Inc., a grocery store chain, and the development of Amazon Go, a concept of automated grocery stores. Competition

¹⁵ <https://www.nytimes.com/2018/10/14/business/sears-bankruptcy-filing-chapter-11.html>

¹⁶ <https://money.cnn.com/2017/06/02/news/economy/doomed-malls/index.html>

¹⁷ <https://www.bloomberg.com/news/articles/2018-01-29/tencent-leads-5-4-billion-investment-in-wanda-commercial>

with e-commerce pushes traditional supermarket chains to a symmetrical move: in 2016, Walmart (the world biggest retail company by revenue) acquired Jet.com, an online seller, in order to improve its e-commerce operations.

To put emphasis on complementarity and combination, rather than mere juxtaposition, Verhoef, Kannan, and Inman (2015) consider the existence of omnichannel forms of retailing, or versatile combinations in time and space of electronic and physical operations. As a matter of fact, "click and collect" commerce has become increasingly popular, creating a new marketing and planning challenge for retailers (Kirby-Hawkins *et al.* 2018). Auchan, a French hypermarket chain pioneered the "drive" service in 2000; Walmart followed in 2014. Customers order on the web and later get their basket of goods loaded in their car at the nearest store. This recombination of shopping practices is much suitable to the life in large cities, where time may be more precious than money. Pouyleau (2018) reports the example of FNAC (France's leading chain store of cultural goods and consumer electronics) whose outlet in *La Gare du Nord*, a major railway station in Paris, makes about 40 percent of its sales through articles purchased on www.fnac.com. New combinations of commerce practices are also found in the blogshop phenomenon, which has become much popular in Singapore. Blogshops are "niche markets of fast fashion" (Yeung and Ang 2015, 93) led by young entrepreneurs who have started a commerce – often of apparel and accessories – on a blog, with minimal initial funding. Once they have achieved some commercial success on the Web, many blogshops have established a physical store. Blogshops are a much informal model of commerce, driven by a community of "millennial" shoppers and sellers, auto-regulated through social networks.

E-commerce and rural areas: from digital divide to economic inclusion

When the digital economy was in the infancy, many had thought that information technology would act as the great leveller of geographic inequities in terms of accessibility to goods and services. Said flatly, this utopian vision did not materialize. On the contrary, an enormous literature shows that the domination of large cities over the surrounding areas has increased over the past three decades. In particular, cities play a unique role in creative and innovative activities (Florida *et al.* 2017).

In the field of e-commerce, the domination of cities over rural areas is driven by several factors. The persistence of a "digital divide" (Warf 2010, Salemink *et al.* 2017) is often mentioned: lack of an adequate Internet connection, lower diffusion of digital devices. However, it is difficult to say if rural dwellers, all other things being equal, shop online more or less than people living in large cities, because social and economic factors (income, education, age) are more important than geography per se (Clarke *et al.* 2015). De Blasio (2008) on Italy, and Farag *et al.* (2006) on the Netherland come to the conclusion that rural dwellers are intensive online buyers of much standardized goods such as books and CDs, because of the remoteness of stores.

In China, the remoteness from urban shopping malls and supermarkets may be an incentive to shop online. Fan (2016) finds evidence that people in small cities spend online a share of their revenue which is slightly bigger than those living in tier-one and tier-two cities. The access to a larger variety of goods is an important factor of the growth of e-commerce in rural China, which lacks from a dense networks of retail outlets. Major online retailers such as Alibaba and JD.com have contracted with rural communities to develop the production of high value-added products – for example organic food – and to sell it online to urban customers through their marketplaces. Most of these new agricultural ecosystems are known as Taobao Villages, from the name of Alibaba's main retail platform (Lin *et al.* 2016). As of 2017, Alibaba had developed a network of 70,000 clusters of farmers and local online vendors throughout the country.

In rural areas, low density and the lack of adequate transportation infrastructure may inflate delivery costs. In rural China, where 600 million people are living, online merchants are facing a big challenge. In the mountainous countryside of Sichuan, Shaanxi and Jiangsu provinces, JD.com is now routinely operating a flotilla of drones that supply isolated settlements (*The Economist* 2018). According to the company, each drone can carry 15 kg of packages, over 50 kilometers. Aircraft land in a dedicated area close to the houses; "village promoters" pick-up the payload and distribute the packages to customers. As of May 2017, JD.com said it had about 300,000 village promoters nationwide, and was planning the implementation of one-ton load heavy drones.¹⁸

Conclusion

This chapter provides evidence that electronic commerce, far from being purely virtual, does have an original physical imprint, and features a mountainous geographic and economic landscape. As write Wrigley and Currah (2006, 340) "place, space and embeddedness continue to matter in the 'new e-economy' of multi-channel distribution."

The rise of B2B e-commerce has been instrumental in the emergence of a more global economy, based on fast supply chains and global outsourcing (Peck 2017). Some e-commerce firms have become corporate behemoths, whose office buildings, warehouses, and van flotillas are the tangible manifesto of their contribution to local economies. In this regard, the obsession of media and local policymakers around Amazon's 2017 request for proposals for the location of a new headquarters (said HQ2) has been revealing. The decision issued in November 2018 to locate in New York and Arlington, VA , a suburb of Washington, D.C., shows that urban buzz and face-to-face contact remain critical to business operations, even in a world of e-commerce.¹⁹

¹⁸ <http://corporate.jd.com/whatIsNewDetail?contentCode=6IhXLeeSAFLjLLlyuZatDA==>

¹⁹ <https://www.nytimes.com/2018/11/16/technology/week-in-tech-amazon-hq2.html>

One cannot neglect the dark face of e-commerce. The flow of goods and packages adds to urban congestion, pollution, and greenhouse gas emission. Warehouse workers and online food couriers are often described as the galley slaves of the digital economy. In major tourist cities, the dramatic growth of Airbnb lodging has become controversial. It is accused of accelerating the displacement of middle-class households from the center to the periphery. To tackle this problem, many municipalities like Paris or New York have implemented coercive regulations.

However, e-commerce potential for growth remains enormous, even in rich countries. In an interview given to *Forbes* (September 30, 2018), J. Bezos, Amazon's CEO, said that the market size of the company "is unconstrained."²⁰ He was arguing on the fact that Amazon has so far captured a mere five percent of the global U.S. retail market. Such a grand vision, as we write above, does not predict the "fall of the mall." Apple Stores are getting larger, smarter, and are regarded among the most profitable stores in the world's retail industry because they provide customers with discovery and learning experience through human interaction (Gallo 2016). From the geographer and planner point of view, the main problem could occur in small towns and rural regions, where Apple and its fellows will never locate stores. As a key component of the digital economy, e-commerce fuels the obsolescence process which is threatening some local business ecosystems and their communities. But e-commerce may also have some inclusive virtue, for example when it helps communities of Chinese farmers to connect to the global economy.

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²⁰ <https://www.forbes.com/sites/randalllane/2018/08/30/bezos-unbound-exclusive-interview-with-the-amazon-founder-on-what-he-plans-to-conquer-next/#572ec7fc647b>

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