

# Logistics and distribution innovation in China

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## Abstract

**Purpose** – The purpose of this paper is to explore how two mega-trends, e-commerce and urbanization, have the potential to reshape logistics practices around the world. Primary focus is on how Chinese business practices and logistics innovations are increasingly relevant to the USA and other western countries.

**Design/methodology/approach** – Experience-based thought piece focusing on specific Chinese logistics innovations centering on speed, adaptability and new business models.

**Findings** – The Chinese economy has played a key role in providing support and enabling logistics innovations in China. Key enablers include the ubiquitous connectivity and applications availability, the dynamic low-cost labor environment and government support for the Chinese logistics industry.

**Research limitations/implications** – This study suggests new areas for research.

**Practical implications** – This study provides insights into the potential value associated with adopting innovative Chinese logistics practices.

**Social implications** – This study provides suggested areas of attention to help focus on logistics operations on key societal trends.

**Originality/value** – Our paper provides insights into the potential value associated with adopting innovative Chinese logistics practices. We believe this represents a significant contribution as little coverage of the topics have been noted to date in leading logistics/supply chain journals.

**Keywords** Urbanization, E-commerce, Chinese logistics practices, Logistics innovations, Logistics profit centres, Pan-industrial firms

**Paper type** Conceptual paper

Two mega-trends, e-commerce and urbanization, are on a collision course that will reshape logistics practices around the world. E-commerce turns what used to be multi-package shipments to retailers into individual shipments to consumers. Consider that a shipment of ten cases, each with ten boxes of shoes, can now become 100 separate shipments to individual consumers. This is a 10x increase in shipments assuming no retail growth. Couple this with more and more people moving to crowded urban centers and a world class traffic jam on the horizon becomes clear. The way urban logistics is done in the USA today will simply not be sustainable in the future.

Thus, we offer a preview of what will impact the USA and western countries over the next decade. For insights, we need to look no further than China where these mega-trends have been accelerating for the last 20 years. Our discussion centers on the USA and other western countries. Undoubtedly, the comments may be applicable to a wider array of countries. Our paper is intended as a thought piece meant to stimulate the consideration of what can be learned from the examination of logistics and distribution innovation in China.

China's online retail sales had year-over-year growth of 34 percent approaching \$1t in 2017 (Teo *et al.*, 2017). Urbanization, the growth in the proportion of the population living in urban areas (Chen, 2007), and the associated economic and social changes, have added to the dynamism of the market. China's urban population grew from 172m in 1978 to 771m in 2015. At the same time, the corresponding rural population declined from 790 to 603m (Guan *et al.*, 2018). Some have referred to this change as the greatest human resettlement experiment ever



(Guan *et al.*, 2018). To put this in perspective, the population of New York City in 2018 is 8.5m. China's fifth largest city, Chongqing, has a population more than triple that of New York City.

The combination of e-commerce and urban growth has required Chinese e-commerce providers and logistics companies to develop innovative solutions to meet consumer demands. Giuffrida *et al.* (2017) summarized the response succinctly: "In an e-commerce environment, the quality of service is getting increasing importance and is often stimulating attention to performances and push to innovation [...]" (p. 791).

The purpose of this paper is to motivate logistics practitioners and academics to explore innovative logistics practices in China. Innovative logistics practices may represent solutions that could be applied in the western world. A broad definition of innovation is used here that includes not only new technologies, but also new services, processes and business models (Schumpeter, 1934). Logistics innovation can refer to any logistical service that is new or valuable to a particular audience (Grawe, 2009; Flint *et al.*, 2005). Improving logistics is important because it has been shown to be a key driver of firm competitive advantage and increased market share (Daugherty *et al.*, 1998). This is particularly true with respect to e-commerce. As noted by Jiao (2013), "With the increasingly intensified competition in the e-commerce market, logistics has become one of the core competitive factors [...] hence more and more e-commerce service providers began to offer logistics services (in China)" (p. 131).

A customer-centric (or consumer-centric) supply chain is one that "is structured to meet the ever-changing needs of customers" (Melnik and Stanton, 2017, p. 31). Much of the logistics innovation in China is being driven by e-commerce leaders as part of a consumer-centric commerce ecosystem. While there are over 35,000 logistics providers in China, JD.com and Alibaba create the core logistics ecosystem. However, controlling the logistics ecosystem is different than controlling the logistics assets which support that ecosystem. For example, China's largest parcel carrier is ZTO Express. Over half of ZTO Express' parcel volume comes from Alibaba e-commerce platforms, which is coordinated through Alibaba's Cainiao Network (note: in May 2018 Alibaba led investment to buy 10 percent of ZTO Express). Further, 70 percent of the 42m daily packages delivered in China are processed through the Cainiao data platform (Cainiao, 2016).

What should concern western logistics companies is that the core business of JD.com and Alibaba is not logistics. In e-commerce, logistics is a natural extension of the retail value proposition, the equivalent of a great in-store checkout experience. Because these companies are focused on the consumer, they are in a great position to expand the services provided to the consumer. Western logistics companies are typically more focused on the seller (shipper) because that is who pays them. They usually have comparatively little information on the consumer, which makes it unlikely logistics companies could become retailers. This asymmetric access to information gives retailers a decided advantage in a world of increasingly demanding consumers. JD.com and Alibaba have leveraged the direct consumer feedback to make logistics part of a larger ecosystem geared toward faster deliveries, highly adaptable systems and new business models.

Considering the current business environment in China, we propose that logistics innovations related to e-commerce and urbanization in China can be grouped into three categories: speed of delivery, adaptability and new business models. Our discussion will also detail these innovations and some of the underlying characteristics of the Chinese economy that enable the innovations. Logistics innovations that could make their way to the west as well as future research needs will be discussed.

## **Logistics innovations in China**

### *Speed*

The consumer-centric logistics innovations in China embrace speed as a defining competitive characteristic. Yet, quick delivery and low cost are tough equations. Same day

or next day delivery reduces opportunities to consolidate volume, one of the traditional levers to control delivery cost. Chinese logistics providers are innovating to overcome this challenge and committing to consumer-centric logistics solutions that embrace quick delivery. In Alibaba Executive Chairman Jack Ma's 2017 *Letter to Shareholders*, he set a goal of delivering within 24 h anywhere in China and 72 h anywhere in the world (Ma, 2017). Alibaba's competitor JD.com promises consumers who order by 11 a.m. will get delivery by 11 p.m. and any orders before 11 p.m. will get delivered by 11 a.m. the next day. During the 2017 shopping holiday in China called Singles' Day, JD.com's packages arrived within 2 h after consumers placed orders in 312 cities, within 1 h in 60 cities and 0.5 h in 18 cities (Staff, 2017). Many logistics providers are accomplishing this by operating their hubs in a continuous fashion vs the specific sort times typical in the west. Consequently, Chinese logistics centers can run four waves of couriers to and from the centers four times per day. Some providers are even eliminating the use of hubs for sorting local volume.

The service levels and speed involved are impressive considering the volume of sales. Sales for 2018 Singles' Day were \$30.8bn. This compares to Amazon 2018 Prime Day sales of \$4.2bn.

Tapping into the "gig economy" or temporary workers to make quick deliveries in urban areas is also a logistics staple in China. These crowdsourcing business models vary, but they follow a process similar to ride-share services like Uber. A customer or retailer places an order on one of the delivery company's apps, typically via smartphone, and the delivery is assigned to an available courier. Courier's near the pickup location is notified and can accept the delivery. Most often these pickups and deliveries are on-demand for quick delivery. When delivery is confirmed, the courier receives payment.

Just like ride-sharing services could one day be replaced by autonomous vehicles, these on-demand urban deliveries may one day be replaced by autonomous delivery vehicles. JD.com recently raised \$2.5bn for their logistics subsidiary earmarked for automation, drones and robots (Woodhouse, 2018). At the same time, Alibaba's Cainiao is working with state-owned automaker FAW Group Corporation and autonomous technology company RoboSense to develop an unmanned delivery vehicle (Cainiao, 2018). While the speed of delivery has been a staple of the new logistics in China, the speed of economic change has been a constant challenge, requiring highly adaptable organizations.

### *Adaptability*

Logistics firms often must sacrifice adaptability to create more efficient, cost-effective networks. Innovative logistics firms in China have often succeeded in doing both by using new technology in new ways. Consider the innovation of "pop-up stores." In the USA, companies like UPS and FedEx have invested substantial capital into establishing a fixed network of packaging and shipping stores to improve the convenience of their services. Together with over 30,000 US post offices, they total more than 37,000 physical locations. However, the massive physical infrastructure is an expensive way to provide convenience. In China, some couriers have set up pop-up stores to collect packages; integrated GPS and messaging apps allow shippers to know where delivery drivers are. SF Express couriers, for example, may set up multiple pop-up stores throughout the day. Shippers can be alerted to the nearby pop-up store through the SF app. SF Express not only enables full track and trace from China's most popular messaging app WeChat, but they also allow users to reserve a pickup time on WeChat. Upon pick up, the couriers print waybills from portable printers attached at their hips. Customers can also request a push notification of the courier's photo to enhance safety for both pickup and delivery. The use of technology to create pick-up locations based on demand vs static physical locations is a digital economy innovation.

Another innovative take on a current logistics solution is delivery lockers. While delivery lockers are not new, these systems are much more prevalent in China than in other countries. More importantly, the innovative use of delivery lockers in China is also an

enabler of highly adaptable networks. Consider the use of mobile lockers in Hong Kong, where the fixed-location model does not work because real estate is so expensive. In cities like Shanghai, couriers may even take the delivery locker up elevators in high-rise buildings to each floor and call or text the consignee to open the locker.

Hive Box is another great example of innovation (Yang, 2017). This delivery locker company is jointly owned by multiple courier companies in China and is an open network available to any courier. Because it is an open system, it creates a virtuous circle. With more couriers using the lockers, the increased volume translates to a need for more locations. This contrasts to the current locker models in the USA that are owned locations by individual firms. In the USA, the boxes can only be used by the owner. This makes more sense in the USA since there are fewer courier firms delivering a large portion of the packages, but this dynamic is changing, especially in the cities.

Perhaps, the greatest innovation is how open locker systems unlock old-fashioned entrepreneurial innovation with the couriers. Hive Box payment is linked directly to the couriers' personal account. Couriers make decisions on a daily basis as to whether to drop a package in a Hive Box and pay for it or take the time to deliver the package to the consignee. While they pay to drop a package in a Hive Box, they can deliver more, which means more revenue. Some couriers will even pre-book locker space on peak days. Some of these lockers have over 100 percent utilization, meaning that more than one delivery and pickup is made in a single day. This represents a new spin on a current western logistics solution and helps to create a new business model.

#### *New business models*

Three innovative business models emerging in China include logistics profit centers, pan-industrial firms and online to offline.

*Logistics departments becoming logistics profit centers.* Companies such as JD.com and Alibaba have developed deep logistics expertise for their respective retail businesses and are now offering those sophisticated logistics platforms to third parties. JD.com set up JD Logistics as a stand-alone business in 2017 and, in the same year, Alibaba took a majority ownership position in Cainiao, the logistics company they founded in 2013 with a consortium of other investors. While JD logistics is primarily an in-house network with a crowdsourced delivery division, Cainiao uses advanced digital networks connecting disparate logistics providers into an integrated network. Alibaba's Cainiao has over 90 logistics partners connecting over 2m warehouse and delivery personnel to serve 224 countries and regions and 2,800 districts and counties in China (Cainiao, 2016). Both JD Logistics and Cainiao are investing capital to build on the competitive advantage of their logistics. JD logistics closed a \$2.5bn funding round in 2018 to grow their network and in 2017 Alibaba announced their intention to invest \$15bn in its global logistics capabilities over the next five years.

Extending in-house logistics capabilities to the third parties is not limited to JD.com and Alibaba. For example, retailer Suning.com has extended their internal expertise in the delivery and installation of large items like furniture and home appliances to companies such as Alibaba. Haier group also established a logistics service company RRS.com to serve the group's business and serve the external market with the same logistics requirements as Haier. Similarly, contract manufacturer Foxconn launched e-Hub in 2001 to manage their global logistics operations and now uses that network to serve customers of their manufacturing services such as Apple, Cisco, Amazon and Google with full supply chain solutions from manufacturing through delivery. The growth of this business model may put added competitive pressures on logistics-only companies. The industrial-era conglomerate structure is being remade for the digital economy.

*Pan-industrial firms.* One of the structural innovations is to create multiple revenue sources that can “prop up” the logistics operations. In the USA, a company like UPS or FedEx invests in their logistics operations knowing that they need to derive a return on that investment from those same logistics operations. A pan-industrial company like JD.com or Alibaba has revenue streams coming from multiple areas including retail, financial, cloud services, payment services and messaging services. Pan-industrial firms play by a different set of economic rules, subsidizing bets on their logistics future using non-logistics revenue streams unavailable to traditional logistics companies. They are unlike the conglomerates of old in that each business is built around the consumer and can be complementary to the other businesses.

Operating a pan-industrial firm has been enabled by advances like big data analytics, cloud-based mobility, machine learning and sensor-based networks (e.g. IoT) to help manage the complexity of multiple businesses and enable economies of scope (D’Aveni, 2017). This is not unlike Amazon, who has invested billions of dollars to date in their logistics operations. In 2017, Amazon generated \$4.3bn in operating income from their cloud-based web services vs a net loss of \$225 m in all their other businesses (Amazon Annual Report, 2018, p. 26). These pan-industrial firms are a serious threat to traditional logistics companies that must justify capital expenditures based on logistics revenues and profits.

Even more important may be the increased access to information. Recently, Alibaba introduced a “unified ID” to enable data on individuals to be collected across Alibaba’s many businesses (Takada, 2012). For example, a consumer purchasing on Alibaba’s Tmall allows Alibaba to understand their purchase behaviors and preferences as well as capturing their payment information through Alipay and logistics information through Cainiao. Consequently, they have earlier and broader access to information about current and future transactions (shipments) than logistics-only providers. This 360-degree view of both demand and supply may give pan-industrial firms like Alibaba a distinct advantage in the design of logistics networks and logistics execution.

*Online to offline.* The counterintuitive innovation of integrating online and offline retailing through digitization (O2O) is also reshaping urban logistics in China. An example is the Ling Shou Tong, a partnership program between Alibaba and independent convenience stores in China (Coresight Research, 2018). The participating stores process orders through the Ling Shou Tong mobile app which provides the stores access to a consumer analytics platform provided through Alibaba that they otherwise would not have access to. Ling Shou Tong centralizes all the inventory for participating stores, reducing their need to deal with multiple distributors while expanding Alibaba’s distribution business as they become the exclusive supplier. In the future, these stores could become drop-off locations or fulfillment centers for last mile delivery.

Alibaba rival JD.com is also embracing O2O, setting up a chain of offline “experience centers” with prices synchronized with their online offerings and deals. Additionally, JD.com has partnered with internet company Tencent to secure a total 11 percent stake in the 592 retail stores of BBK Commercial Chain Co. Ltd. These moves signal an accelerating trend toward the integration of online and offline retail channels, creating more opportunity to drive logistics efficiencies.

Local food delivery is a key driver of O2O. For example, Ele.me, a leading company that operates in over 260 cities in China, has a customer base of over 40m users, and relationships with over 300 restaurants. Consumers can order food through their website and mobile app, and food is picked up from a restaurant and delivered by one of Ele.me’s over 3m scooter-riding couriers. In 2017, the company accounted for 53 percent of China’s \$30bn O2O food ordering market (Alibaba, 2018; iiMedia, 2018). Alibaba took a controlling stake in Ele.me in 2017, valuing the company at \$9.5bn (Alibaba, 2018).

In a different approach to O2O, SF Express is launching a mini-franchise program that turns their independent couriers into small business owners. The program is essentially a

traditional offline food vending offering that allows couriers delivering same-day shipments for SF Express to identify points in their delivery area that would be good locations for open-shelf vending locations. The courier stocks the location with drinks and snacks that people can grab and pay for through WeChat. The courier then replenishes the shelves on route, earning extra money from the sales generated at each location.

### **Enablers of logistics innovation in China**

Logistics innovations in China are made possible because of unique environmental characteristics. Three of those are discussed briefly.

#### *Ubiquitous connectivity and applications*

The wide adoption of mobile devices and ubiquitous commerce-enabling applications make many of the logistics innovations possible. WeChat and AliPay (Alibaba) are omnipresent in the major cities where most people control their life on their smartphone. While similar communication and payment platforms are available in the USA and Europe, it is not the same seamless experience. For example, in Europe, the payment process will typically route the user to a separate website for authentication. These commerce-enabling applications in China are supported by heavy investment in cloud-based big data solutions such as SF Express's Data Beacon Project, JD.com's Logistics Cloud and Alibaba's Cainiao Network.

#### *Dynamic, low-cost labor environment*

As noted earlier, the rural population moving to cities is creating in-country immigrants seeking employment. Migrants provide a massive labor force all connected with smart phones embedded with messaging and payment applications. The technology-empowered gig workers create a social network for logistics that can be accessed on an as-needed basis. Further, many of these logistics innovations are enabled by an entrepreneurial mindset in the immigrant population. Interestingly, the core driver of much of this logistics innovation in China could be the capitalist ideology of Adam Smith's "invisible hand," which holds that individuals laboring to maximize their personal wealth collectively also benefit society at large, even though this was not their intention (Smith, 1980).

An added benefit of this increase in urbanization from a logistics viewpoint is density. In the logistics business, density creates opportunity. For logistics companies like UPS, small changes in delivery density (packages/stop and distance between stops) driven by population density have large impacts on delivery costs. In China, this benefit has extended beyond package delivery to people delivery (e.g. public transportation), enabling heavy investments in projects like high-speed rail.

#### *Government support*

Government support for the logistics industry and specific enabling technologies may also promote logistics innovation in China. The General Office of the State Council released guidelines in 2017 to encourage smart supply chain innovation across China (Zhang, 2017). The guidelines include administrative reforms, tax relief for logistics vehicles and consideration of the need for logistics support in rural and urban development planning.

An example of government support of a specific technology is the preferential status given to Tencent to enable WeChat to become a ubiquitous messaging application. WeChat has been subsidized by the government since its creation in 2011. In contrast, non-Chinese companies are at a competitive disadvantage. For example, foreign competitors Facebook Messenger has been censored since 2009, South Korean owned Line app was blocked in 2015 and WhatsApp was banned in 2017 (Liao, 2018).

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## Discussion

Certain innovative logistics practices in China may be valuable indicators of future practices in the western world as e-commerce and urbanization become more prevalent. In terms of speed, the demand for fast delivery is growing. A recent report by Forrester Research found that over 56 percent of North American internet users aged 16–27 said same-day delivery would make them more loyal to a retailer's brand (Brozek, 2017). While continuous operations of urban sorting facilities could be adopted by western logistics companies in some areas, the ability of Chinese companies to deliver same-day is greatly enhanced by the advantage of dynamic, low-cost labor. A few logistics companies dominate the delivery market in the west; China has over 35,000 delivery companies battling for packages (Takada, 2012) and a large contingent of temporary workers.

The new business models prevalent in China – logistics profit centers, pan-industrial firms and online-to-offline – are not as common in the west. Amazon is a notable exception. Like JD.com and Alibaba, Amazon has extended their internal logistics capabilities to their customers with great success. Amazon has also the advantage of being a pan-industrial firm, allowing them to subsidize investments in their logistics network with profits from other Amazon businesses. They are also aggressively innovating in the O2O market with their cashier-less Amazon Go stores and the acquisition of Whole Foods.

It should also be noted that the drivers of China logistics innovation, JD.com and Alibaba, are making their way to west. JD.com is launching its e-commerce and delivery platform in Europe in 2019 (Woodhouse, 2018). However, Alibaba's attempts to establish a beachhead in the USA also highlight the difficulty for Chinese companies to replicate their success outside of China. Alibaba subsidiary Ant Financial which offers the ubiquitous AliPay service in China failed in their most recent bid to acquire the US company MoneyGram International. After a year-long effort, Ant Financial was unable to convince the US Committee on Foreign Investment to approve the transaction (Lin, 2018).

We propose that much can be learned from China's innovative logistics practices; however, that is not meant to imply that US companies have not already recognized that changes are needed to address new market demands. As in China, much of the change is prompted by the growth in e-commerce and urbanization. While the US companies may not have support that is equivalent to businesses in China, examples of new approaches are noted which focus on building flexibility and new offerings through access to resources (either owned or outsourced). We offer the following as the examples of changing business practices in the USA.

A notable example is Amazon's Delivery Service Program. The program focuses on the ever increasing demand for home deliveries by "recruiting" from a new transportation and delivery supply base. Amazon has ordered 20,000 Mercedes Benz Sprinter vans (Amazon, 2018). The vans will be available for lease to small businesses with third-party fleet management companies overseeing day-to-day business. Amazon provides "discounted vehicles, fuel, insurance, uniforms and access to delivery technology" for their service partners. The program gives Amazon more control over customer service/customer experience and expands their service delivery capacity. Amazon claims that successful owners can earn as much as \$300,000 in annual profit (Belanger, 2018).

Similar to Amazon's Delivery Service Partners program, Aldi is partnering in the USA with Instacart on home deliveries (Melton, 2018). Online ordering will be supported with nationwide coverage via Instacart. Pilot tests have been conducted in Los Angeles, Atlanta and Dallas, and further expansion is planned. Kroger is already doing home delivery using Instacart.

Another example centers on temporary or “pop-up” stores. Harry and David announced plans to open 20 pop-up stores for the 2018 holiday season (Thompson, 2017). The intent is to increase their retail footprint in time for the biggest gift-giving time of the year. It has long been a common practice for vendors to utilize temporary distribution or fulfillment space, i.e., spot stocking or pop-up DC’s, prior to peak demand periods. Temporary capacity is secured without long-term capital investment.

As a final example, consider Jet.com (which is owned by Walmart). Jet.com is attempting to leverage its brand to cater to affluent, urban consumers (Stambor, 2018). Their e-commerce site features images and products tailored to the location and preference of customers. Their intention is to build relationships with their customers and foster “brand love.” They have selected city dwellers as their primary target with a goal of being the first online retailer to successfully sell both food and general merchandise.

Just as in China, sticking to traditional logistics and distribution practices will not help companies’ pursuit of competitive advantage. The examples provided illustrate innovative business reaction to consumer trends. They also represent important managerial implications for business and considerable potential for academic research.

We close with suggestions for research topics and encourage further examination. Little is known about the innovative new approaches and business strategies – what works and what does not, the implications of do-it-yourself vs outsourcing/partnering, etc. Potential topics include, but are not limited to, the following:

- Collaborative distribution – with the emphasis on speed and escalating customer expectations, is ride sharing (combining shipments) a good option?
- Customer experience – e-commerce make it easy to attract customers, but it is just as easy to lose them. Online access makes it easy to shop around and switch.
- Customer impatience – whatever customers wanted in the past, they want more now. This particularly relates to communication (adequate information and quick answers), but it relates even more to speed. Today’s customers measure delivery times in hours rather than days.
- It all comes back to relationships – a significant amount of logistics and supply chain management research has examined buyer–seller relationship, but it is almost universally centered on business-to-business relationships. Sellers cannot ignore the ultimate consumer. This opens many avenues for B-2-C research such as the relative importance of different dimensions of customer service in an e-commerce environment.
- How can big data/analytics be used to better understand consumer responses and expectations and to better predict what is ahead?
- Big retailers are aware of and focusing on e-commerce customers and creating a relationship, etc. But what about small-/medium-sized businesses? Will they be able to meet the new market demands – or will they be significantly disadvantaged?
- Last mile delivery has received attention by supply chain researchers; however, there is still much to explore including urban logistics challenges, the impact of new technologies and the influence of new transportation regulation.
- How can connecting technologies like blockchain coupled with new platform-based business models enable the integration of small logistics entities by digital entrants?
- Supply chain talent acquisition and management continue to be critical issues. How can companies most effectively use contractors and temporary workers?
- How can the traditional high efficiency, closed logistics ecosystems of the west adapt to the trend toward open systems that allow for great adaptability?



Undoubtedly, many other topics are relevant and more will emerge with on-going environmental and market changes. This is truly an exciting time to be in the logistics industry – and to be a logistics researcher. Forces like e-commerce and urbanization will continue to drive more changes in the global logistics ecosystem.

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