Understanding logistics and distribution innovations in China

Introduction

Chinese logistics industry has played a significant role in China’s economy growth, because it not only accounts for around 6.8 per cent of the country’s annual gross domestic product (GDP) since 2000, but also supports and propels other industries. However, Chinese logistics industry continues to face a series of challenges. One such problem is inefficiency of logistics operations, which is reflected by the considerably higher percentage of logistics costs in China’s GDP than levels found in developed Western countries. Another challenge Chinese logistics industry faces is to keep up with the exploding logistics demand fuelled by population urbanization and the increasing prevalence of e-commerce. For instance, online retail sales in China totalled about $1.33 trillion in 2018, an increase of 23.90 per cent compared with 2017, according to the National Bureau of Statistics of China. In addition to substantial investments in improving China’s infrastructure, fostering and developing innovative logistics and distribution solutions presents an effective means to address these challenges. Not only are companies engaged in such effort, the Chinese government also plays a unique and active role in guiding and facilitating logistics and distribution innovations.

Service innovation refers to “the creation of new value propositions by means of developing existing or creating new practices and/or resources, or by means of integrating practices and resources in new ways” (Skålén et al., 2015, p. 137). As a special type of business service, logistics innovation has been defined as “a new, helpful idea, procedure, or practice in logistics operations that is different from a company’s current practice” (Daugherty et al., 2011, p. 26). Additionally, some scholars argue that logistics innovations can refer to a device, system, process, policy, program, product, or service as long as it is new to the adopting organization (e.g. Panayides and So, 2005). Until recently, Chinese logistics and distribution industry still mainly focussed on basic logistics services such as transportation, material handling, and warehousing. As logistics and distribution begins to emerge as a point of competitive differentiation, an increasing number of Chinese firms have emphasized developing value-added services. For example, leading Chinese retail and distribution organizations like Alibaba and JD.com have increased their focus on operational innovation to complement operational excellence. Hammer’s (2004) conceptualization of operational innovation proposes that in order to attain and maintain success in highly competitive markets, firms must build willingness and capability for developing and implementing innovative solutions that respond to rapidly changing customer needs. Busse and Wallenburg (2011) also contend that firms should adopt proactive approaches to logistics innovation by leveraging unique organizational and environmental resources for customized solutions. In this transformational process, a significant number of innovative practices have emerged. Partially due to the unique market environment in China, many of these logistics and distribution innovations are not only new to Chinese firms but also novel to other countries as well. Therefore, better understanding such phenomenon can have significant implications to both Chinese and foreign firms.

Summary of articles

Key to understanding emergent innovations in a market characterized by an institutional environment vastly different from the basis for existing research is through a combination
of case studies and empiricism (Habermas, 1989; Fawcett et al., 2017). Three articles in this special issue examine logistics and distribution innovations in China from different aspects.

In their conceptual article, Amling and Daugherty (2020) discussed the logistics impact of two mega trends: e-commerce and urbanization. The authors suggest that Chinese logistics and distribution innovations have been focused on speed, adaptability. New business models risen from these innovations are becoming increasingly relevant to companies in Western countries. For instance, China’s urban grocery delivery business models are far more advanced than those in the USA and Western Europe and proved instrumental for the sustenance of residents in cities locked down due to the outbreak of novel coronavirus (Kelso, 2018; Pailliez, 2020). Based on insight gathered from executives, the article attributes China’s recent success in logistics and distribution innovations to ubiquitous connectivity and applications, dynamic and low-cost labour environment, and government support.

To better understand the nature and process of logistics innovation in China, Falcone et al. (2020) conducted a case study on Chinese e-commerce giant Alibaba Group’s Cainiao network. The purposive selection of a logistics innovation exemplar allowed these authors to propose and validate an innovations-network-promotions framework through which logistics innovation in China is ideated, piloted, implemented, and ultimately promulgated. More specifically, their results suggest that innovative technologies enhance a logistic network’s reachability, richness, and receptivity, which in turn lead to superior firm performance. This study not only emphasizes the importance of technological innovations but also presents new venue to theoretical developments regarding logistics and distribution innovations in both China and abroad.

Giuffrida et al. (2020) focussed on a specific topic: selection of an appropriate logistics solution to cross-border B2C e-commerce to China. The authors utilize quantitative methods to develop an activity-based model to estimate logistics costs in a deterministic setting. In addition, this study incorporates simulations and probabilistic sensitivity analyses to evaluate the impact of uncertainty. The authors identified four main solutions to enter China based on international transport means (ship or plane) and the presence of a local bonded warehouses, and the selection of logistics solution is determined by value of the product, expected service level, demand level, transport cost, probability of regulation change, and parcel checks. Given the increasing popularity of omni-channel retailing and the proliferation of different forms of order fulfilment (e.g. white label goods, drop-shipping) from international origins, this study addresses an important void in existing literature by offering an innovative decision-making approach while taking uncertainty into consideration.

Collectively, these three studies show that logistics and distribution innovations in China are developing through a combination of institutional changes, market uncertainty, and the strategic choice of the firm. Further, these changes provide opportunities for firms to exploit inefficiencies that inevitably arise among both domestic and international firms, with implications not only for China but also abroad. For instance, Amling and Daugherty (2020) discussed how logistics innovations developed in directly response to increased urbanization and e-commerce can be adapted to serve developed Western economies. Falcone et al.’s (2020) case study on Alibaba Group’s Cainiao shows that logistics innovations in China are developing at a rapid pace that are exceeding their Western counterparts. Finally, Giuffrida et al.’s (2020) study examining optimal logistics solutions when considering various aspects of market and firm uncertainties highlights the fact that Chinese consumers traditionally relying on importers can now directly access suppliers overseas. An important theme can thus be observed: decades of economic development in China at a breakneck speed coupled with revolutionary advances in information technology had hatched logistical innovations that can be harnessed by both domestic and international firms for competitive advantage.
Implications for future research
We also strongly believe that recent logistics and distribution innovations in China present considerable academic research opportunities in Chinese contexts as well as for logistics and distribution innovation in general. We next discuss some of these research opportunities by focussing on theories that could be applied and topics that could be further examined. As researchers endeavour to better explicate innovative Chinese phenomena, Liu and McKinnon (2018) advocate that, theoretical significance should be balanced with practical relevance.

Application of theories
Researchers note the lack of a single encompassing theory for innovation research (e.g. Busse and Wallenburg, 2011; Wolfe, 1994). In order to stimulate theory-driven research, Busse and Wallenburg (2011) highlight several theories and conceptual frameworks that might be of particular relevance to research on logistics service innovation management: dynamic capabilities, resource-advantage theory, absorptive capacity theory, the paradigm of open innovation, and diffusion of innovation theory. While these theoretical lenses are undoubtedly valuable for examining and explaining logistics and distribution innovation related phenomena, consistent with Stock’s (1997) prescriptions, we also suggest that researchers may choose to look further when identifying appropriate theories. As Stock (1997) points out, much of logistics research has its roots in theories borrowed from the more established disciplines, and future logistics research can still benefit from the application of theories from disciplines like management, marketing, economics, anthropology/ psychology, sociology, political science, engineering, etc.

For example, in terms of logistics, China had been falling behind developed Western nations’ practices for decades. However, in recent years, China has pioneered numerous logistics and distribution innovations. When trying to explain such an intriguing phenomenon, multiple theories could be relevant and helpful. One such theory is institutional theory. Institutional theorists suggest that the institutional environment can strongly influence the development of formal structures in organizations and that innovative structures that improve technical efficiency in early-adopting organizations are legitimized in certain environments (Meyer and Rowan, 1977). Thus, examining environmental factors in the Chinese context (like government policies and market competitiveness) could shed light on catalysts behind the emergence of logistics and distribution innovations. Another potentially intriguing theoretical perspective could be utility theory from economics that emphasizes the utility maximization principle (Fishburn, 1970). The utility maximization principle could be applied to determine how Chinese retail and distribution firms identify and provide the highest utility (satisfaction) to consumers (decision makers for purchases) in the specific area of logistics and distribution service provision innovations.

When trying to explain whether and how Chinese firms use logistics and distribution innovations to establish and defend their competitive positioning in the market, Porter’s (1985) theory of competitive advantage can provide quite powerful theoretical support. Researchers can examine how Chinese firms align their logistics and distribution innovations with the three forms of competitive strategies identified by Porter (1985): cost leadership, differentiation, and focus strategy. For example, the Strategic Purity Framework was applied both motor carrier and collaboration contexts (Jin et al., 2017, 2019; Muir et al., 2019). The knowledge-based theory of the firm could also offer strong explanatory power from the perspective of knowledge as a critical firm resource (Grant, 1996a, b). For example, Esper et al. (2010) and Stank et al. (2012) draw upon the knowledge-based theory of the firm to conceptualize a supply demand integration framework. The development of innovative logistics and distribution processes and practices certainly requires purposeful and effective management of knowledge and employee skills within and across firm boundaries.
Yet, research that examines leveraging knowledge as a critical organizational resource in Chinese logistics and distribution contexts is relatively scarce. Finally, consistent with previous work in SCM contexts (e.g. Flint et al., 2005), organizational learning theory (Argyris and Schon, 1978) could also be very useful for examining how Chinese retail and distribution firms react and learn from other companies’ logistics and distribution innovations to stay competitive in rapidly changing commercial and regulatory environments.

Lastly, the impact of technology on supply chain processes is a well-studied phenomenon (e.g. Daugherty et al., 2005; Kros et al., 2011). However, recent research had indicated that the process of technology adoption and routinization requires social support (e.g. Sodero et al., 2019). Given the widely acknowledged cultural differences between Chinese and Western societies (Hofstede, 1991; Hofstede and Bond, 1988), it is apparent that Western firms seeking to replicate technology-driven logistics innovations in China may encounter substantial difficulties. Although recent studies have adopted socio-technical systems theory in examining how firms utilize technologies to enhance business processes (e.g. Closs et al., 2008; Kull et al., 2013), it remains clear that there exists substantial research opportunities in understanding cultural influence on how Western firms may adopt logistics innovations originated in China.

**Topics for examination**

Currently, logistics and distribution innovations in China are very exciting and are often inspirational to our field in general. For instance, the novel coronavirus (CoVID-19) presents a significant threat to the daily lives of cities subject to emergency quarantines. Yet, logistics innovations in China such as its robust grocery delivery service had enabled residents there to both comply with quarantines and avoid hoarding essentially supplies. These innovative operational advances provide an abundance of research opportunities for scholars who are interested in further evaluating developments in Chinese contexts as well as for those who are interested in improving current understanding of logistics and distribution innovations in general. Based on our contention that the two mega-trends of urbanization and ecommerce have the potential to reshape logistics practices around the world, the following topics are proposed as fertile areas for future research, particularly in Chinese logistics and distribution contexts: customer experience, supply chain relationships data collection and usage, the influence of logistics and distribution innovations on small to medium sized enterprises (SMEs) and talent acquisition.

**Customer experience.** Most companies realize that since customers trigger the entire supply chain, the natural move is for companies try to please customers through enhanced logistics and distribution services. Moreover, in the “The New Age of Customer Impatience” (Daugherty et al., 2019), customers are becoming increasingly demanding. Whatever customers wanted in the past, they want more – now. Customers tend to measure delivery times in hours rather than days and want to be informed about every step of the distribution process. More importantly, customers know they have the power to choose from multiple alternative sellers and providers – with products often just a few clicks away in an urban ecommerce setting. As pointed out by Hazen and Ellinger (2019), what was considered “good” logistics service in the past may not be sufficient anymore. Rather, companies must be responsive to changing customer needs and focus on creating superior customer experiences.

Providing high-quality customer experiences is a particular challenge for Chinese firms coping with fast-paced urbanization. Vast numbers of China’s rural population are migrating into the cities. On the one hand, this influx represents a significant new market and source of relatively low-cost labour. On the other hand, burgeoning urban populations make cities with limited space more crowded and migrants often do not have fixed addresses for deliveries. Thus, more research is needed to examine how companies are
utilizing innovative approaches to offer such customers high-quality service experiences in such challenging and rapidly developing markets.

Supply chain relationships. Fundamentally, supply chain management is about relationship management. A significant amount of logistics and SCM research examines the management of buyer-seller relationships. In particular, the integration of logistics innovation management and supply chain relationship management is a key research area (Pedrosa et al., 2015). This is because logistics and distribution innovations can result from interactions among supply chain partners (e.g. Robertson and Gatignon, 1998; Sivadas and Dwyer, 2000) and often span across firm boundaries, both of which require the collaboration of multiple supply chain partners (Pedrosa et al., 2015). Yet, depending on the nature of the solution and the resources required for its success, supply chain partners may choose to either limit their relationship commitment to the transactional level or expand it to be a long-term strategic alliance. Although the relationship between Chinese and Western firms can be strategic (e.g., Fuyao Glass as a tier-1 supplier to automakers), the vast majority remains transactional, which is not a fertile environment for the diffusion of innovative solutions.

In addition, increasing emphasis on speed and escalating customer expectations had yielded innovations such as ride sharing (e.g. Agatz et al., 2012) and crowd-sourced logistics (e.g. Castillo et al., 2018), creating a large “gig economy” in which distribution capacity is reliant on individual contractors who may choose to leave either a firm or the profession at will (Friedman, 2014). Questions remain whether these “flex” capacities are true replacements of more traditional sources of distribution capacity. Further, while some companies have begun testing the use of drones and driverless vehicles for delivering products (Fawcett and Waller, 2014), competencies needed for such capabilities can be difficult to acquire and may require firms to seek out external providers of these novel technologies. That is, firm seeking flexible distribution capacity that is already commonplace in China may need to look east-ward for answers. Indeed, DHL had partnered with EHang to launch its first urban drone delivery program in 2019 (Murison 2019).

Lastly, the purpose of any logistics and distribution innovation is to better serve the final customer. To that end, future research on logistics and distribution innovation cannot lose sight of the need to identify innovative practices for managing relationships with consumers. Already, scholars have started to examine how to better engage customers to foster emotional and psychological bonds between customers and the firm (e.g. Gill et al., 2017). Unfortunately, opportunities to engage consumers in person have been decreasing with the rise of e-commerce. Yet, firms have more ways to reach out and engage customers than ever before – such as the WeChat social media platform in China and Facebook, Twitter, and Instagram for the rest of the world. Thus, service provider online interactions with the final customer and better understanding business-consumer interfaces present avenues for future research on logistics and distribution innovations in multi-channel or omni-channel contexts (Melacini et al., 2018).

Data collection and usage. Rapid innovations in information technologies (e.g. mobile, e-commerce) have enabled companies to capture and analyse vast amounts of data about transactions and customers that were previously not available. While scholars have begun to examine the critical importance of Big Data and predictive analytics to today’s supply chain management (Richey et al., 2016; Sodero et al., 2019), we believe that better understanding of how to utilize these data remains vital to companies seeking to craft new logistics and distribution solutions. For instance, firms may attempt to simplify their data by aggregating them at different cross-sectional and temporal levels only to discover that this process may ultimately distort different measures of supply chain performance (Jin et al., 2015). Moreover, many firms may not even have the necessary data simply because they do not yet have existing logistics and distribution processes in place to generate and collect the data.
To gain a better understanding of how to properly utilize data generated by new logistics service processes, it is critical for both academics and industry to examine those already in place in China. In doing so, researchers may be able to better determine what customers really expect regarding logistics services, as well as what adjustments or innovations can be developed to address those needs along with their practical feasibility and implications. In addition, researchers have pointed out that there are significant risks associated with customer data storage and usage (e.g. Richey et al., 2016). Accordingly, assessments of how using data for logistics and distribution innovations impacts consumer privacy and confidence in provider firms appear to be warranted. For example, research that examines the extent that Chinese consumers are willing to sacrifice their personal information for conveniences provided by innovative logistics and distribution services would have great practical value.

The influence of logistics and distribution innovations on SMEs. Usually large companies (particularly China’s largest retailers like Alibaba and JD.com) play a critical role in developing logistics and distribution innovations. This is understandable given that these companies have large customer bases, possess substantial resources, and are the unquestioned channel captains in their respective supply chains (Ishfaq et al., 2016). However, SMEs may be at a disadvantage in many aspects of logistics and distribution service provision such as obtaining transportation services (e.g. Holter et al., 2008) and accessing necessary financing (e.g. Spyridon and Serrano, 2016). Thus, logistics and distribution innovations could be a double-edged sword for small to medium sized companies: Effective adoption of such innovations could help these companies be more efficient and competitive; however, technological and resource constraints may prevent SMEs from adoption these innovations, thereby placing them at a competitive disadvantage.

The conundrum faced by SMEs regarding logistics and distribution innovations are plentiful in China. For example, SMEs in China can enjoy Alibaba’s innovative logistics and distribution network, but they could also lose opportunities to differentiate themselves. This is analogous to the plight faced by many SMEs in the USA as they become part of an online retailer’s marketplace vendor (e.g. Fulfillment by Amazon). Another example is that Alibaba’s innovative Ant Microloans initiative was intended to help SMEs access needed supply chain financing (Ming, 2018), but it could also constrain these firms’ financial and operational flexibility. For instance, Apple’s low interest loan to GT Advanced Technologies both allowed them to scale up their production and ultimately pushed the firm into bankruptcy as Apple withdrew its support (Wakabayashi, 2014). Therefore, we call for more research on how SMEs may finance, develop, deploy, and sustain logistics and distribution innovations to survive and thrive in the age of customer impatience.

Supply chain talent acquisition and management. Continues to be a critical priority for logistics and distribution organizations in general (Scott et al., 2015). Yet, there is limited academic logistics research that is focussed on the crucial process of developing talented employees capable of managing diverse challenges within supply chains (Stank et al., 2011; Hohenstein et al., 2014). We contend that talent management is particularly important for leading Chinese firms whose innovative service delivery processes are responsible for tremendous growth and customer service-related differentiation. Such firms are making every effort to compete for the limited supply of technical experts and skilled workers that are adept with new technologies and applications such as artificial intelligence, robotics, autonomous vehicles, blockchain, big-data analytics and the internet of things.

At the same time, Chinese firms must also contend with new labour issues associated with logistics and distribution innovations. In some cases, these firms must plan for reduced needs for human labour for certain operations (such as automated warehouses or distribution centers). In other cases, they must use contractors and temporary workers to cope with the
-growing number of pick, pack and ship centers that are required to satisfy increasing demand. JD.com’s recent decision to turn its logistics network into a broader fulfilment and delivery service (Smith, 2018) is a recent example of a leading Chinese business with a pressing need to attract, train and develop employees to work with new logistics and distribution processes. While talent management is a crucial topic for logistics practitioners and researchers in many countries (Hohenstein et al., 2014), Chinese firms face some unique challenges in a fast-changing and extremely competitive market environment – especially with the many new logistics and distribution practices and processes that are constantly being introduced. Since there is little research on talent management in the Chinese context, we encourage future research that addresses this research void by examining relationships between talent management and logistics and distribution innovations.

Conclusion
This is truly an exciting time to be in the logistics and distribution industry – and to be a logistics practitioner or researcher. Logistics and distribution innovations in China are just part of multiple large-scale changes in the global logistics ecosystem. We hope the articles in this special issue will stimulate managers’ and academics’ interest in better understanding and implementing logistics and distribution innovations.

Haozhe Chen
Debbie and Jerry Ivy College of Business, Iowa State University, Ames, IA, USA

Yao Jin
Department of Management, Miami University, Oxford, OH, USA, and

Baofeng Huo
College of Management and Economics, Tianjin University, Tianjin, China

References


