

COVID-19 accelerated digital transformation: The case of Meituan

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ABSTRACT

The outbreak of the COVID-19 pandemic caused disruptions in supply chains. While most existing research suggests ways to improve organizational resilience, our research raises the question of whether the pandemic has accelerated digital transformation at the organizational level. Using the case of Meituan in China, we investigate the supply chain disruptions caused by COVID-19, the strategies taken by Meituan to address the problems and their strategic implications. Starting as a fast food delivery company, Meituan has developed into a leading online shopping platform in China specialized in using digital technologies to provide on-demand delivery services. Our research on Meituan during COVID-19 shows that companies can leverage emerging technologies to improve business models and deliver long-term strategic benefits through digital transformation, rather than focusing solely on improving organizational resilience to reduce uncertainty risk.

Keywords: e-business, electronic commerce, q-commerce, real-time commerce, digital transformation, resilience, supply chain management, COVID-19 pandemic.

INTRODUCTION

The breakout of the COVID-19 pandemic has disrupted the flow of goods in the food supply chains globally and locally. Governments, companies and individuals were forced to cope with the disruptions and challenges due to the novelty of the coronavirus and the lack of an effective mechanism for the unpredictable and unfamiliar crisis, especially at the initial stage of the breakout of COVID-19.

COVID-19 has propelled companies to improve organizational resilience to reduce uncertainties. But the measures to improve organizational resilience are often associated with increased costs. There is a lack of empirical studies of the strategies that companies took in the real world to mitigate the risks and survive when the pandemic and resulting economic fallout have caused significant hardship.

Some research suggests that COVID-19 led to social distancing, lockdown and the new normal, which has profoundly accelerated digital transformation as one solution to avoid a total economic collapse (Soto-Acosta, 2020). The pandemic set the restrictions that have forced companies to adapt to a technology-intensive operational model and achieve digital transformation (Kudyba, 2020). But there is no consensus on whether COVID-19 accelerates digital transformation. Wade and Shan (2020) argue that digital transformation projects have a higher than usual failure rate, which means that companies are more likely to get into more trouble to solve problems caused by COVID-19. Their research suggests that as high as 70% of the projects fall significantly short of their objectives, owing to unrealistic expectations, limited scope, poor governance and underestimated cultural barriers (Wade and Shan, 2020).

This paper is an explorative study to address whether and under what conditions COVID-19 can accelerate digital transformation. Meituan, a leading on-demand delivery platform in China, was chosen to be our focal case. We investigate the challenges Meituan has faced during the COVID-19 pandemic in terms of supply chain management, because supply chain disruption is one of the key challenges caused by COVID-19. Instead of simply mitigating the risks, Meituan shows how companies may leverage the strengths of digital technologies and ride on the opportunities to achieve digital transformation, which can not only mitigate the negative impacts of COVID-19 but also create competitive advantages in the long term. We will also summarize the factors that lead to Meituan's success in accelerating digital transformation during the pandemic.

LITERATURE REVIEW

We will review the literature in terms of supply chain disruptions caused by the pandemic, organizational resilience and digital transformation.

Supply Chain Disruptions Caused by COVID-19

Most of existing studies of the disruptions to supply chain management focus on the global value chains (Miroudot, 2020; Phillips *et al.*, 2022; Gereffi *et al.*, 2022). The strategies companies can take to address the vulnerabilities and risks associated with the pandemic differ across industries. For example, some companies can buffer stocks, use different sourcing strategies

with in-built supplier redundancies (Phillips *et al.*, 2022) and rely on small-scale local production to enable decentralized design and manufacturing to address urgent needs (Kapletia *et al.*, 2019). Owing to supply chain disruptions, the pandemic can lead to reduced labour supply, reduced use of production capacity and shortages of parts and intermediate goods, while demand suffers from expenditure and consumption reduction (OECD, 2020).

In food supply chains, the disruptions caused by COVID-19 can be grouped into the supply side, the demand side and food security. The pandemic has a negative impact on food supplies, because of increased worker morbidity, supply chain disruptions and restrictive measures and individual governments' efforts to restrict food exports to meet national needs (Espitia *et al.*, 2020). The pandemic has also caused labor shortages, disruptions to transportation networks and the difficulties of moving goods across different areas (Hobbs, 2020).

The demand-side shocks also have an impact on food supply chains, including consumer panic buying behaviors with respect to key items and the sudden change in consumption patterns away from the food service sector to meals prepared and consumed at home (Hobbs, 2020).

Food security also becomes one of the key challenges of COVID-19. The food security issues, which are made worse by the pandemic, include inadequate food supply (availability), the difficulties for people to gain access to food supplies, inadequate nutrient intake and unstable food supplies (Laborde *et al.*, 2020).

Organization Resilience

Resilience refers an organization's ability to plan, absorb, sustain, and adapt to disruptions and unexpected crisis (Pettit *et al.*, 2010). With the ability "to anticipate potential threats, to cope effectively with adverse events, and to adapt to changing conditions" (Duchek, 2020), organization resilience enables a company to successfully confront the unforeseen (Michelman, 2017).

Organization resilience has long been recognized not only as a source of sustainable competitive advantage (Sheffi, 2007) but also a determinant of organization success (Coutu, 2002). Resilience focuses on a company's ability to resume business during disruptions, and the related organization robustness is a company's ability to go back to normal business operations after the pandemic (Miroudot, 2020). After the breakout of the pandemic, resilience has gained increasing importance as a key pillar of a company's strategies.

Existing literature has suggested the following ways to strengthen organization resilience in supply chain management to cope with the supply chain disruptions caused by the COVID-19.

First, a company can increase redundancy to give more breathing room for businesses to work after a disruption, such as holding more inventory, having more suppliers from different regions, building additional production capacity and so on. But this is an expensive and temporary measure due to extra costs of holding extra inventory, redundant production capacity and higher labor costs. In the long term, redundancy can inhibit a company's ability to improve efficiency (Choi *et al.*, 2020).

Second, a company can increase organizational resilience by building organizational flexibility (Choi *et al.*, 2020). For example, manufacturers can have interchangeable and generic parts, identical production facilities and systematically trained workers, which enables a company to quickly respond to a disruption by reallocating resources. Companies may also build up close supplier relationships by aligning suppliers with its procurement strategy. An intimate relationship with a small group of suppliers allows the company to monitor its suppliers and quickly detect potential problems. It is also more likely for the company to work closely with its suppliers to find a solution in unforeseen crisis situations. Alternatively, companies may choose an extensive supplier network to make its supply chain more resilient and responsive to the market.

Third, a company can build a corporate culture to help itself recover quickly and return to profitability (Choi *et al.*, 2020). A company can share their corporate goals, business strategies and operations with employees through effective and continuous communications. Employees have a good idea of the company's operations and make decisions when a disruption occurs unexpectedly. Frontline employees can take necessary measures in a timely fashion to avoid further damages. With the passion for work, employees feel happier and are more motivated to solve the problems.

In terms of supply chain management, resilience actions to cope with the pandemic have been categorized into four groups, including systems (structures, resources, capacities, interactions), process (distribution, transportation, procurement, production, resources allocation, flexibility), control (inventory control, sourcing control, manufacturing control, resilience as KPI in optimization models) and recovery (manufacturing production, human labor, transportation network, suppliers, production flexibility). (Queiroz *et al.*, 2020)

However, resilience studies have focused on reducing uncertainties and risks, which may overlook opportunities created by uncertainty. Individuals and organizations may not simply aim to reduce uncertainties. Griffin and Grote (2020) argue that individuals do not simply seek to reduce uncertainty, but sometimes create uncertainty which is functional and adaptive for themselves and others. They suggest that on the organizational level, the company may be regarded as an information-

processing agent acting in an endogenous context and embedded within a wider exogenous context of economic, social and environmental conditions. In other words, in the case of the COVID-19, companies may not only want to reduce the risks and uncertainties, but also want to consider its own social context and take actions, such as using digital technologies to improve business operations, which may create new uncertainties and generate strategic benefits.

Digital Transformation

Digital transformation is defined as “a process where digital technologies create disruptions triggering strategic responses from organizations that seek to alter their value creation paths while managing structural changes and organizational barriers that affect the positive and negative outcomes of this process.” (Vial, 2019) Most digital technologies are referred as SMACIT, that is, the technologies related to social, mobile, analytics, cloud and the Internet of Things (Sebastian *et al.*, 2017).

Digital transformation involves disruptions to the existing business processes which will change the existing value chain. Digital transformation will bring out changes to existing business models or ways of operation. Since the COVID-19 pandemic has caused supply chain disruptions, coping with the disruptions requires organizational changes anyway. Therefore, it is possible to align the strategies of coping with COVID-19 with the objectives of digital transformation efforts. But it should be aware that digital transformation itself will also bring positive and negative outcomes to the company.

Digital transformation is often driven by technological advancements, changing customer behavior and intensifying industry competitions (Verhoef *et al.*, 2021). The breakout of COVID-19 has not only changed customer behavior but also changed the business environment and competitive landscape, so the crisis has the potential to drive digital transformation.

Organizational research suggests that companies invest in and/or use digital technologies are twice more likely to have a higher revenue than their peers (LaBerge *et al.*, 2020). A number of studies have suggested that digital transformation strategies can help to cope with the pandemic at all levels. In Saudi Arabia, the Saudi Vision 2030 framework released in 2017 which paved the path for digital transformation, was promoted and tested during COVID-19 (Hassounah *et al.*, 2020). On the city level, research suggests that a virtual online food resilience and contingency hub can shorten the city’s food supply chain to improve disaster response, resilience and contingency-planning agenda (Reis *et al.*, 2022). Other research has suggested that COVID-19 has shortened the process of using computers in companies and universities.

However, there is a lack of empirical studies on the corporate level regarding to whether COVID-19 can accelerate companies to carry out organizational change and achieve digital transformation with the potentials to bring long-term strategic benefits to the businesses.

RESEARCH METHODOLOGY

We chose to use case study because the case method is suitable for studying “a real-life, contemporary bounded system.” (Creswell, 2013). Yin (2003:13) defines case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.”

Using the case method allows us to investigate what strategies companies used to cope with the COVID-19 pandemic in the real world. We want to find out whether COVID-19 can accelerate digital transformation on the corporate level. As discussed in the above literature review section, there is a lack of empirical studies on the organizational level focusing on using digital technologies to improve business performance. Therefore, our research is explorative in nature, and we only need to identify a company to show that it is possible that COVID-19 could accelerate a company’s digital transformation process under certain circumstances.

We choose one single case instead of multiple case studies because a single case study is the best choice when we want to study one single issue (Yin, 2003), that is, whether the COVID can accelerate digital transformation. A single case allows researchers to get a deeper understanding of the issue (Dyer and Wilkins, 1991), while multiple case studies are more suitable for comparing the results across situations (Yin, 2003) in order to clarify whether the findings are valuable or not (Eisenhardt, 1991).

We chose Meituan as the focal case for the following reasons. First, we need to choose an industry which was still operating during the pandemic. Some industries, such as theatres and amusement parks, had to close down when the pandemic was at its peak and the most stringent period of epidemic prevention measures were implemented. They had to stop operating or changed their business nature during the pandemic. Survival is of the utmost importance for them. As our research focuses on whether the use of digital technologies to cope with the pandemic and to facilitate business growth, our focal company needs to continue operating in the same business area. This makes Meituan a good choice to achieve our research objective. Meituan is engaged in the on-demand logistics and delivery industry, and the pandemic had a noticeable impact on the industry in terms of supply chain disruptions.

Second, Meituan is a leading on-demand food delivery online platform, therefore technology is playing an important role in its business operations. Thus Meituan is more likely to leverage digital technologies to improve their business than companies in other industries. Meituan can provide a good opportunity for us to study their IT strategies during the pandemic.

MEITUAN

Meituan was established by Wang Xing in Beijing, China in 2010 and was listed in 2018 on Hong Kong Exchanges. Meituan has grown from a group-buying website into China's leading e-commerce platform over the years, offering a wide range of local lifestyle services to customers, including food and grocery delivery, travel and hotel services, online reviews and transportation services.

Meituan's mission statement is "We help people eat better, live better" by focusing on the "retail + technology" strategy, working with merchants and business partners to provide consumers with a quality life. Leveraging on its technological strengths, Meituan promotes the digital transformation of commodity retailing and service retailing on both demand side and supply side.

In January 2019, Meituan launched the "Meituan grocery shopping" app to serve community residents. Community residents living in a surrounding area of a designated community can place orders to buy groceries using this mobile app, and pick them up at community service stations or have the goods delivered to their homes. Meituan Grocery Shopping focuses on offering carefully selected high-quality products at highly competitive prices with punctual and fast delivery services to customers. During the initial testing period, the goods could be delivered as fast as 30 minutes, and Meituan showed its ability to provide fast and convenient service to people.

In China, the on-demand economy has grown very fast in recent years, which has facilitated the growth of the on-demand food and grocery delivery industry. The market size of China's on-demand economy grew from RMB 1,292.4 billion in 2017 to RMB 1,711.8 billion in 2021 (Huaon.com, 2022). Meituan has become the world's largest on-demand food delivery service provider. In December 2021, Meituan Delivery had 62.64 million monthly active users (MAU), compared to rivals Ele.me (58.07 million) and Baidu Delivery (8.91 million) (Thomala, 2022). In 2021 financial year, Meituan's total revenue reached RMB 179.728 billion, a year-on-year increase of 56%, of which the delivery business revenue was 96.312 billion, a year-on-year increase of 45.3% (Huaon.com, 2022). In the first quarter of 2022, the number of active merchants using Meituan increased 26.6% year-on-year to 900 million. The annual average transaction frequency of active users increased by 21.9% year-on-year to 37.2 transactions. In terms of expenses, costs related to food delivery increased by RMB 1.8 billion to RMB 17.2 billion, in which R&D expenditure increased by 40% year-on-year to RMB 4.9 billion, accounting for nearly 11% of revenue. (Yicai, 2022)

SUPPLY CHAIN CHALLENGES TO MEITUAN DURING THE COVID-19 PANDEMIC

The challenges Meituan has faced during COVID-19 can be summarized into four aspects, including sudden surge in demand, demand shocks, social distancing measures and supply shocks.

Sudden Surge in Demand

The pandemic caused a sudden increase of customer demand for delivery services. The breakout of the pandemic significantly boosted up the demand for online grocery shopping due to lockdown measures, consumers' panic buying and social distancing intent. In 2021, the per capita consumption expenditure of online food delivery in China reached RMB709.6, a year-on-year increase of 49.6%, accounting for 21.4% of the per capita consumption expenditure on catering (Huaon.com, 2022). In the first two months of 2022, especially during the Spring Festival, Meituan increased the number of merchants offering New Year Eve dinners to broaden consumption choices as more people chose to stay locally to celebrate the Chinese New Year, instead of going back to their hometowns, so the proportion of orders with high order prices in the total order volume increased.

Demand Shocks

It is difficult, if not impossible, to predict the ebb and flow of demand due to the pandemic. Between March and June 2022, due to the impact of the pandemic and the control measures in some areas, many businesses were suspended and many riders were quarantined. As such, the food delivery business was largely affected by supply constraints and contract performance constraints. In Shanghai, for example, the number of orders went down 90% than before. Due to the higher risk of contagion, this outbreak was different from the outbreak in early 2020 and had a different impact on business. According to Wang Xing, the CEO of Meituan, in view of the pandemic, the growth of orders in the second quarter of 2022 will slow down compared to the first quarter (Yicai, 2022).

Epidemic Prevention Measures

During the pandemic, many communities implemented very strict epidemic prevention measures, such as community access control, road blockade measures and so on. Riders were no longer able to enter into communities freely, which undoubtedly had a negative impact on Meituan's business. Moreover, in some areas with severe COVID-19 outbreaks with strict lockdown measures, people were not allowed to move around and had face-to-face contacts. These measures made it difficult for Meituan to deliver goods to customers on time.

Supply Shocks

There was a shortage of labor supply during the pandemic for a number of reasons. Riders could suddenly get sick and have to stop working immediately. Some riders may live in the restricted areas and are not allowed to leave or move around due to the

sudden outbreak. Some riders may pass or deliver goods to areas with a sudden outbreak, and they must be quarantined and unable work for a period of time. Additionally, the pandemic also makes it more difficult to recruit and train new riders.

MEITUAN'S STRATEGIES

Autonomous Driving Vehicles

Faced with the situation that many districts were closed and under control and people were not allowed to move around in those areas during the pandemic, Meituan launched new technologies including unmanned automatic delivery vehicles to solve the problem of timely delivery of goods. For example, Meituan dispatched autonomous delivery vehicles to Shanghai to provide contactless delivery and boost capacity. Between 1st April and 24th May, Meituan autonomous driving vehicles delivered a total of 703,000 orders (Yicai, 2022).

Drone Delivery

In 2021, Meituan opened the first drone delivery business district in Galaxy World in Longgang District, Shenzhen, Guangdong Province. This is the eighth route opened by Meituan drones in Shenzhen in 2021 and the first pilot operation in business district.

Meituan has carried a set of intelligent meal recognition algorithm on the drone in order to prevent overloading. They put a number of QR codes on the ground at the take-off point to provide the drone with the identification information of the airport, so that the drone knows where it is and where it is going.

To complement the operation of UAVs, Meituan has developed an unmanned aerial vehicle (UAV) planning dispatching system, and the background automatically sends instructions to the UAV to indicate the route. Meituan also designed a space-time capsule for drone operation. The virtual capsule can show how the location of the drone changes over time. If several drones are operating at the same time in the same area, as long as the capsules do not touch each other, there is no operational risk.

The drone carries SIM cards of multiple operators, so that through a set of autonomous switching algorithms, the drone knows which operator has a better signal. The drone will land on the community service station developed by Meituan itself, and the lunch box will automatically enter the pickup cabinet. The customer will receive a password in the registered mobile and use this password to take out the lunch box from the pickup cabinet.

Community Order Collection Service

During the lockdown period in Shanghai in early 2022, a community order collection service was launched for residents under lockdown. Meituan launched a community group meal buying model to supplement the traditional takeaway model, providing more than 400,000 group meals to about 9,000 communities. In Beijing, Meituan has increased its rider capacity to 30% and offers long-distance deliveries in light of the ban on eating out and dine-in since 1st May. The launch of the city-wide takeaway service has driven a surge in demand for high-priced, long-distance orders. (Yicai, 2022)

New Rider Training

Facing the shortage of manpower during the pandemic, Meituan has launched a three-piece package to give a helping hand to new riders on 14 July 2022. The first one is a one-to-one helping scheme, with experienced riders guiding new riders. It has helped new riders improve their delivery skills and earn higher incomes. As some orders are more difficult than others to deliver and fulfill, Meituan has prepared a "novice checklist" to allocate easier tasks to new riders. Finally, Meituan has developed a "novice waiver card" that provides additional waiver opportunities to new riders. After introducing the three-piece package to new riders, the job satisfaction rate of new riders improved 13.5%. This package not only gives more time for new riders to improve their delivery skills but also attracts more people to join Meituan as riders.

Improved Logistics System

Facing the increasing demand for Meituan grocery shopping during the pandemic, Meituan is building up its own logistics system. At present, Meituan grocery shopping has established at least 15 front warehouses, of which there are 8 in Beijing alone.

Meituan launched the "unmanned micro warehouse" plan, which helps implement Meituan's front warehouse plan. Meituan's front micro warehouse is measured between 50 to 200 square meters each. These unmanned warehouses can handle orders 7 times faster than traditional picking warehouses. Meituan's unmanned warehouse has reduced the industry's best sorting cost (RMB 1.5 per order) by 50%.

Moreover, Meituan has integrated warehousing, sorting and distribution and set up community service stations. After the community customers within the service scope can place orders to buy food on the app, and they may choose to pick up the goods from the community service station or have the goods delivered by the community's full-time Meituan delivery staff.

Table 1: Summary of Meituan's Strategies

Meituan's Strategies	Key Features	Solutions to COVID-19 Problems	Strategic Benefits
<i>Use of Autonomous Driving Vehicles</i>	Unmanned vehicles Contactless delivery	Epidemic Prevention Measures Demand and supply shocks	Timely delivery Increased labour supply elasticity
<i>Drone Delivery</i>	Unmanned vehicles	Epidemic Prevention Measures Demand and supply shocks	Timely delivery No road traffic uncertainties Increased labour supply elasticity
<i>Community Order Collection Service</i>	Mobile ordering Group meal buying	Epidemic Prevention Measures Sudden surge in demand Demand shocks	Economy of scale Increased service supply capacity Increased profit margins
<i>New Rider Training</i>	Three-piece package: One-to-one help Novice checklist Novice waiver card	Supply shocks	Rider recruitment Rider training Rider retainment
<i>Improved Logistics System</i>	Micro unmanned warehouse	Supply shocks Sudden surge in demand	Faster order handling speed Lower sorting costs Higher profit margins
<i>Supplier Quality Control</i>	"Meituan Optimal" app Grocery Shopping app On-demand ordering Next-day delivery	Supply shocks Demand shocks	Demand forecast for suppliers Quality guarantee for customers More quality suppliers More satisfying customers

Source: This study.

Supplier Quality Control

In face of increasing demand during the pandemic, the choice of suppliers becomes critical. To attract more quality suppliers, Meituan allows supplier to apply using its app. Suppliers need to first download the "Meituan Optimal" app by giving the company name, main products and product categories and areas of origin in the information interface. Then, they need to upload their business license along with contact details, including the WeChat name, email address and phone number, to the system and submit to Meituan. If approved by Meituan, they can officially become a platform supplier.

Every morning, workers at the Meituan Select Vegetable Base come to the supplier's field early, pick the items ordered by customers and assemble them for delivery. Customers will receive their goods the following day. The whole process is managed and monitored by Meituan's system. This system gives Meituan a competitive advantage in the post-epidemic era, as it is expected that vegetable supply is increasingly relying on the Internet. Community e-commerce, represented by Meituan Grocery Shopping, is a kind of shopping method of "pre-purchase + self-pickup". This business model considers each community as a separate unit that allows customers to place orders online. Meituan Grocery Delivery's system features on-demand ordering and next-day delivery, and can also help suppliers predict the demand for their agricultural products and plan production based on the platform's accumulated order big data.

DISCUSSIONS

Our research shows that digital transformation can provide an opportunity for companies to perceive, seize and transform the supply chain disruptions into innovation opportunities by the use of emerging technologies. Facing the shortage of labour and the lockdown measures which caused supply chain disruptions, Meituan has changed the mode of delivery, using drones to deliver fresh produce to customers. This changes the existing mode of delivery, which mainly relies on riders. To smoothen the process of transformation, Meituan is also recruiting and training staff new skills to use drones. Therefore, the supply chain disruptions caused by the COVID-19 pandemic has become a driving force behind Meituan's digital transformation efforts.

Moreover, Meituan's use of drones to provide delivery services is a good example of how the pandemic has accelerated the company's digital transformation in its supply chain. Meituan was not the first to make logistics drones. Google's associated company Wing and Amazon's PrimeAir have been exploring logistics drones since 2012. It took Wing 5 years from its establishment to the completion of the first order in the real world, but it took Meituan only 3 years. Wing spent 9 years completing 100,000 real user orders, and Meituan is expected to take 5 years (Wei, 2021).

Sending out the first order might only be a technical exploration issue. But the difficulty lies in how to allow more people to use their services. It is a very complicated problem that needs to take into account urban environment, community living environment as well as user experience. The outbreak of COVID-19 stimulated customers' needs for fast and quality grocery shopping while keeping social distancing, which has given the incentives for customers to try out new services and accelerated the process of using logistics drones.

In the long term, the use of logistics drones may bring the following benefits to Meituan. First, the use of drones has transformed two-dimension logistics and delivery model into a three-dimension model. The delivery, for example, will no longer be delayed by traffic jams and other unexpected road accidents. Second, it can significantly improve customer experience and efficiency if using appropriately. Third, it can enhance Meituan's delivery capacities. Finally, it can significantly improve operational efficiency (Wei, 2021).

While COVID-19 has accelerated Meituan's digital transformation and brought the company long-term benefits, we argue that not all the companies are able to do what Meituan has achieved. We have analyzed and summarized the following enablers:

A Clear Objective of Digital Transformation

To ride on this opportunities, companies need to plan ahead and get prepared to use digital technologies. Meituan has been using digital technologies to build up its online ecosystem and improved delivery and customer services. The pandemic facilitated the process that Meituan used drones for delivery. It was very likely that it would not have happened so quickly because the outbreak of the COVID-19 pandemic immediately boosted up the market demand within a very short period of time. In the case of Meituan, the company had the plan of using emerging technologies, such as drones and unmanned autonomous delivery vehicles, and had been working on these plans before the breakout of COVID-19.

Even though the crisis may take place unexpectedly, the company should not wait until a crisis takes place to make a plan of digital transformation. Meituan started exploring the possibilities of using drones as early as 2017. The company started investing in developing drone technologies when Yinian Mao, the person responsible for developing drones, joined Meituan by the end of 2018. Mao led the team in Meituan to develop drone businesses. They carried out research in drone businesses, and all core components, from drones, automated airports to dispatch systems, were self-developed. Now Mao's team has more than 300 engineers.

Developing a fully automated system to dispatch a large number of drones to deliver food, we are facing the difficulties equivalent to climbing the Mount Everest in the field of drones. (Using drones) is very risky. As long as there is a complaint, it may be grounded and game over.

-Yinian Mao, Head of Drones, Meituan (Wei, 2021)

Despite such a huge investment, the underlying logic of Meituan's drones had not been disclosed and kept secret by the executives and even within the company until the company made a public announcement in July 2021. In Meituan's announcement, the goal of using drones is to build an urban low-altitude distribution network with a radius of 3 kilometers and delivery in 15 minutes, and shuttle between communities, office buildings and shopping malls (Wei 2021). Therefore, even before the breakout of the pandemic, Meituan has a clear vision of developing and using logistics drones. This finding echoes Wade and Shan's (2020) suggestion that the best starting point to avoid the failure of digital transformation projects is to make the objective of the transformation as clear as possible.

Risk Awareness and Management

While COVID-19 may accelerate the digital transformation process of a company, it has brought more unexpected risks and challenges due to the shortened preparation time. Therefore, companies should be prepared to cope with these risks and challenges.

In the process of using digital technologies, Meituan also faced such unexpected challenges. For example, nearby residents complained that community service stations were too noisy, and an increased level of delivery traffic brought new security concerns to the community. Residents also complained that using drones disrupted their midday nap, as a result Meituan decided that the drone had to veer off course.

IS projects have long been recognized as more difficult to manage than non-IS projects in terms of complexity, conformity, changeability and invisibility (Brooks, 1995). Therefore, companies need to consider technical and social technical changes associated with digital transformation. Digital transformation involves organizational changes, creating positive and negative impacts on companies. In order to successfully align the objectives of digital transformation with the objectives of solving supply chain disruptions, companies should be very careful to evaluate the negative impacts and get prepared to cope with the unexpected consequences (Wincewicz-Bosy *et al.*, 2022).

During the post-pandemic era, companies should be aware of the potential risks and challenges. As Wincewicz-Bosy *et al.* (2022) suggest, after supply chain disruptions, restoring the capacity and restarting the food supply chain is a complex, multi-faceted task that requires multi-directional actions in terms of management processes (organization, information system

supporting decision-making processes, procedures) and logistics (transport, storage, food serving, waste collection), manufacturing and technology (production, food processing), and relationships (partnership, trust, responsibility for safety, communication).

CONCLUSIONS

We use the case of Meituan in China to show that it is possible for companies to leverage digital technologies to not only solve the supply chain disruptions caused by the COVID-19 pandemic but also bring long-term strategic benefits by achieving digital transformation. The COVID has sped up Meituan's process of using drones and unmanned autonomous vehicles to deliver food and groceries to their customers. By analyzing the case of Meituan, we argue that companies need to have a clear objective of digital transformation and get prepared to cope with the challenges and risks associated with digital transformation if they want to ride on the opportunities of unexpected crisis situations, like the COVID, to accelerate digital transformation. Otherwise, considering the high failure rate of digital transformation projects, we believe that such projects might bring more uncertainties and unexpected problems than solving the challenges brought out by the COVID.

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