

Viewpoint

Promotion of Chinese platform-based supply chains in the COVID-19 era

Yingjie Fu *

* Budapest Business School, Budapest, Hungary. Correspondence: fu.yingjie.51@unibge.hu

Abstract: This paper focuses on the ways COVID-19 has facilitated the development of platform-based supply chains. Platform-based supply chains are of great research value as a new direction for supply chain development, especially in China. The first part of the paper summarizes the characteristics of the COVID-19 era around the world, the second part points out the situation of platform-based supply chains in China, and the third part analyses the promotion effect of the epidemic. As platform-based supply chains are still at an emerging stage, there are very few analyses and theoretical studies on their operation models, and for this reason this paper lacks empirical data.

Keywords: platform-based supply chains; COVID-19; China

1. Introduction

The COVID-19 era has seen changes in the industrial structure of many industries, giving rise to many new operating models, of which platform-based supply chain is one. This paper proposes a new model of supply chain development in the COVID-19 era: the platform-based supply chain.

The first half of the paper presents the concept of the COVID-19 era through a literature review and summarizes the characteristics of the COVID-19 era, such as lockdown policy implementation living habit changing, economic downturn, and supply chain transforming. The second half of the paper suggests that the COVID-19 era is in line with the characteristics of platform-based supply chains, such as Light assets, Customer Oriented, Warehouse and distribution integration.

Through the PEST analysis method, we conclude that the COVID-19 era has contributed to the platform-based supply chain. The authors of this paper believe that a platform-based supply chain is a major trend in the future development of the supply chain industry, and the emergence and continuation of the COVID-19 epidemic have accelerated the realization of platform-based supply chain applications.

The platform will become the new trend of modern supply chain development (CBN Finance, Finance Review, 2021), and this study has certain forward-looking and research significance. Since the platform-based supply chain is still in the emerging stage of its operation, mode analysis and theoretical research related to this field are very scarce, and these present limitations in this paper.

2. Changes in the COVID-19 era

Since the outbreak of the coronavirus in Wuhan, China in December 2019, the epidemic has had a serious impact on modern human society. In this study, the COVID-19 era means that after the first outbreak of the coronavirus, governments and people began to realise that repeated epidemics are possible and adapted their lives to the new circumstances. According to the 16th edition of the World Economic Forum's Global Risks Report, the immediate human and economic cost of COVID-19 is severe: the epidemic increases the gap between the rich and poor, reduces social cohesion and globalisation, increases

Citation:

Fu, Y. (2022). Promotion of Chinese platform-based supply chains in the COVID-19 era. *Prosperitas*, 9(3), 1. Budapest Business School. https://doi.org/10.31570/prosp_2022_0020

History:

Received: 12 Apr 2022
Last Revised: 27 May 2022
Accepted: 14 Jun 2022
Published: 27 Jun 2022



Copyright:

© 2022 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY-NC) license.

unemployment, reduces social interaction and market interoperability, etc. (WEF, 2021). Below the typical features of the COVID-19 era are described.

2.1. The lockdown policy

Governments' management of COVID-19 has already changed as compared with the beginning of the COVID-19 era and governments' try to get used to COVID-19. From May 2021, countries are reducing their restrictions compared with previous periods. Some countries use the periodic limit control, i.e. lockdown by the seasonal variation of the degree of infection, such as the Islamic Republic of Afghanistan. The Afghan government progressively eased the lockdown from late May 2020, with most containment restrictions removed and businesses re-opened by end-August. Canada's policy shows periodic limit control more typically, The Prime Minister and Governors of Canada issued a joint statement on 28 April 2020, to support the economic restart; all provinces will reopen in May 2020. However, due to the rapid increase in the number of infected people in the autumn, when the weather turns cooler, many areas tightened restrictions from September 2020 until the spring of 2021 (IMF, 2021). This phased embargo policy, which always affects people's travels. Many countries and regions introduced digital verification codes for vaccination information, such as the extensively used EU Digital COVID Certificate, which serves as the official certificate for proof of vaccination in the EU region guaranteeing travel measures between EU countries as of the coming into force of the EU Digital COVID Certificate Regulation on 1 July 2021. The certificate becomes one of the necessary documents for EU citizens travelling and doing business in the EU in response to locked down restrictions (European Commission, 2022).

In China the lockdown rule is even stricter: many provinces, cities, and counties have introduced a "14-day + 7-day" or "14-day + 14-day" quarantine policy concerning the entry of people from high-risk areas (reasonable concentration and home quarantine). In addition, unlike the relatively free isolation policies of other countries, China's isolation enforces isolation and restricts personal freedom. This prevents frequent travellers from extensive travels. In addition, once a city becomes a high-risk area due to an increase in the number of infections, the transportation-supply chain within the area will be stopped due to the lockdown policy, and its normal trade with the outside world will also be cut off, just to maintain survival.

To supply chains, countries' lockdown policy causes severe disruptions to the normal functioning of all parts of global production, transport, exchange, and services. Restrictive travel policies are not only bringing factory production to a standstill, but trucks on the road are also causing massive delays due to strict entry policies, and global supply chains are operating at a near standstill, with goods not being sent out and demand not being met. This reflects a supply chain that is not globally resilient and is breaking down in the face of multinational disruptions, and gaps in supply chains and operations continue to create a high reliance on human resources. Leaders need to accelerate the adoption of agile ways of working and value chain transformation to help overcome uncertainty. This has also led to the need for platform-based supply chain operations, thereby increasing the flexibility of supply chain management (Accenture, 2022).

2.2. Living habits change

People accepted the COVID-19 to be a part of daily life. People got used to wearing masks and applying disinfection measures. Remote education and home office are getting popular and welcomed. At its peak, COVID-19 had led to the suspension of 1.58 billion students in 191 countries worldwide, representing 91.3% of the world's school population (Research Group of the Institute of International and Comparative Education of China & Wang Su, 2020). Studies have shown that school closures caused by COVID-19 can harm society as much as economic slowdown due to forcing the workforce out of jobs (Brodeur et al., 2021). The physical and psychological effects of COVID-19 are not negligible, either: according to a survey conducted by Education Week on 7 and 8 April, school closures are causing serious demoralization among teachers and students, and the distance learning model is widening educational inequalities (U.S. Department of Education's Office for Civil Rights (OCR), 2021).

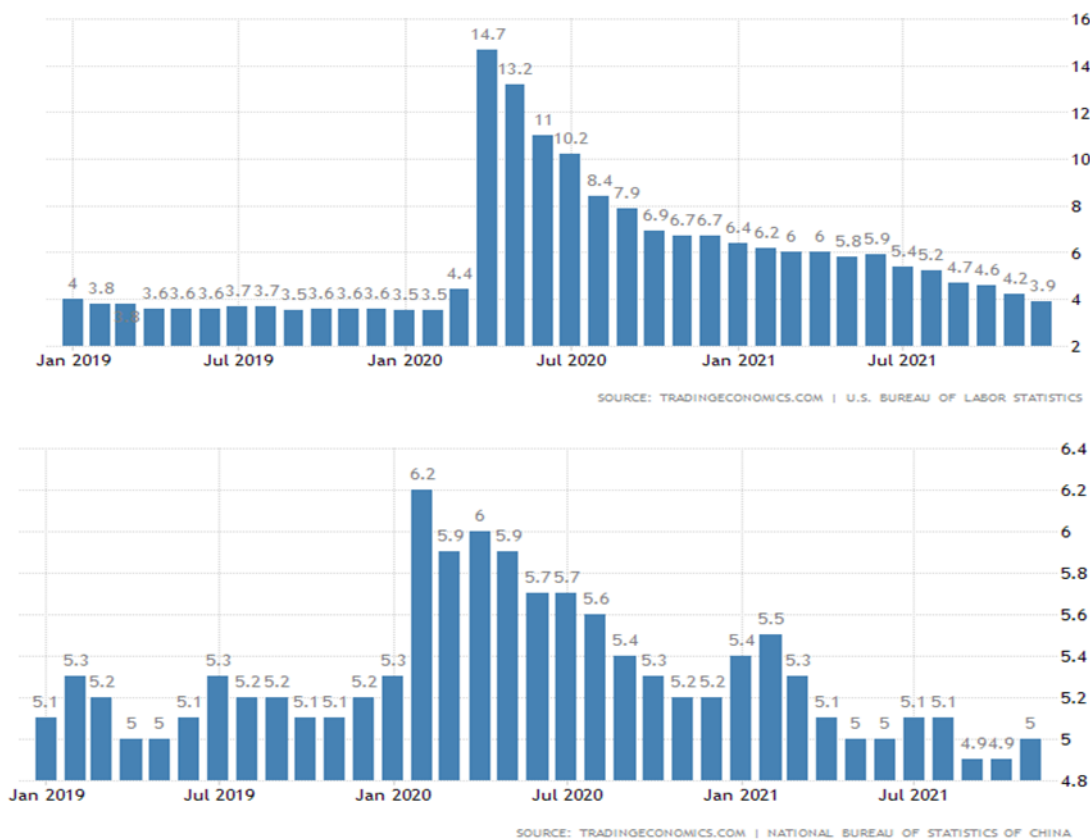


Figure 1. Unemployment rate in USA (top chart) and in China (bottom chart). Source: *Trading economics, 2022* [<https://tradingeconomics.com/country-list/gdp>]

The epidemic has caused many companies to close and factories to shut down, and unemployment rates spiked in every country in the world, including US and China, in early 2020. The U.S. and China’s unemployment rate rose respectively from 3.6 and 5.1 in the pre-epidemic November 2019 to 14.7 and 6.2 at the beginning of 2020.

As COVID-19 continues to be erratic and pervasive, with unemployment rates declining month on month in almost every country, telecommuting is another way of addressing the problem of rising unemployment. Surveys have shown that 37% of respondents changed from never working remotely to working remotely after the pandemic, compared to 15% of those who had home-office before COVID-19(Brynjolfsson et al., 2020). More and more businesses are making a shift in how they hire: moving toward remote work and potentially leading to a permanent shift lasting beyond the pandemic,

Thanks to China’s strict lockdown policies, people have begun to gradually return to their pre-pandemic lives. Even so, there are still some changes in living habits and mentalities, such as paying more attention to hygiene and disinfection, getting used to the cyclical fluctuations of the epidemic, and phased closure and isolation.

All of this indicates that people’s lifestyles have slowly embraced remote and technological collaborative working and living, which has indirectly led to changes in supply chain operations. As Gartner’s research on supply chains in the early days of the epidemic showed, changes in the way supply chains are taking place due to the fact that the epidemic can affect project delivery and demand and delivery information cannot be shared promptly, which results in inefficient supply chain management (Gartner, 2020). The company Gartner suggested that customer service and support leaders were to develop well-developed but flexible plans to address COVID-19, which is needed to address operational continuity, employee morale, and customer needs (Gartner, 2020). IFS also suggests that supply chain companies that actively and innovatively build resilient business models will become more competitive after COVID-19 ends (IFS, 2020). These all show that COVID-19 will drive the development of platform-based supply chains.

The COVID-19 outbreak has directly impacted the revenue of retail entities. Many restaurants, shopping malls, department stores, specialty stores, movie theatres, and tourism

companies are closed. Even though basic industries remain open to meet people's livelihood needs, passenger traffic has fallen sharply, and fixed operating costs such as labour, rent, and inventory are heavily burdened. Cash flow is under pressure and operating profit will drop significantly, directly challenging the survival of enterprises. In a March 2020 report on the economic impact of COVID-19, Deloitte noted that COVID-19 would affect the economy through three channels (Bachman, 2020:1) export and production difficulties in the world's major production locations due to the outbreak in China; 2) slowdown in economic activity and transport restrictions in affected countries may have an impact on the production and profitability of selected global companies, particularly in manufacturing and raw materials used in manufacturing, which may cause a breakdown of supply chains and markets; and 3) the lack of protection for companies' normal business and production activities, causing stock markets and corporate bond markets to fall sharply.

However, in spite of the March forecast, economies are recovering quickly, and, in terms of GDP data, the January 2021 values have largely increased around 3% to 9% in average compared with value of the December 2020 levels in Table 1.

Table 1. Statistics and historical data charts of GDP in 11 countries. Source: Trading economics, 2022 [<https://tradingeconomics.com/country-list/gdp>]

Country	Last	Previous	Reference	Unit	growth rate
United States	20937	21433	Dec/20	USD Billion	2.37%
China	14723	14280	Dec/20	USD Billion	-3.01%
Euro Area	13011	13407	Dec/20	USD Billion	3.04%
Japan	4975	5149	Dec/20	USD Billion	3.50%
Germany	3846	3888	Dec/20	USD Billion	1.09%
UK	2708	2831	Dec/20	USD Billion	4.54%
France	2630	2729	Dec/20	USD Billion	3.76%
India	2623	2870	Dec/20	USD Billion	9.42%
Italy	1886	2005	Dec/20	USD Billion	6.31%

This fast recovery is due to the booming e-commerce led online economy under COVID-19. The epidemic triggered a further shift to online by retailers, while companies strategically contracted their offline presence to improve overall performance and efficiency. E-commerce is growing rapidly across regions, for example, the epidemic revolutionized the path of e-commerce in the US: its e-commerce penetration rate soared to 21.3% from 14.3% before the epidemic, and annual US e-commerce sales in 2020 were US\$861.12 billion, up 44% year-on-year and three times the increase in the same period in 2019 (Hebei Network Television, 2021). The share of online retail sales in China increased from 19.4% to 24.6%. Online retail sales in Kazakhstan increased from 5% in 2019 to 9.4% in 2020. From January-May 2021, Amazon added 295,000 new sellers globally (UNCTAD, 2021). It seems likely, though this is yet uncertain, that an accelerated trend toward e-commerce seen during the pandemic will be sustained during recovery (Vereinte Nationen, 2021). Enterprises with fragile operations will be hit harder, while those with high-margin categories and early online businesses will cope comfortably. Strong brands and big platforms will take advantage of the opportunity to expand their market share and attract the customers, talents, shops, suppliers, and other resources of small and medium-sized enterprises. At the same time, Strong brands and big platforms will accelerate the acquisition and integration of small chains and independent brand shops in a platform-based model, a feature also reflected in supply chain enterprises.

In the context of the epidemic, consumer awareness of food, hygiene, safety, and health has increased significantly and more and more people are choosing to buy online for safety reasons (Wen et al., 2021). In the economic development under the epidemic, due to the growth of consumer demand for online products and distribution services, the trend of supply chain integration, socialization, synergy and platformisation has accelerated, making the supply chain coordination system a new driving force and an inevitable trend in the development of consumer retail industry.

2.3. Application of digital technology

Based on the Industrial Development Report 2020, a comparison of industrial development in the world published by the United Nations Industrial Development Organization (UNIDO) as, we can conclude that industrialization in the digital age of 2020 is expected to be developed and applied effectively in the light of the epidemic.

The role of technology in the fight against the epidemic has become increasingly evident. Compared to many sectors affected by the epidemic, the technology sector has been less affected, and many companies have even been given more growth opportunities. For example, in its study on the possible impact of the COVID-19 crisis on the future of science, technology, and innovation (STI) and its policies, the OECD suggests the adoption of digital technologies and claims that the use of tools for STI is accelerating across all sectors. (OECD, 2021). Online education, online healthcare, and online lifestyle services are seeing unprecedented market demand, with consumers paying more attention to health management and healthcare awareness, including private doctors, private psychologists, and various “online” counselling services. In addition, the role of technology in empowering the pharmaceutical and health industry is becoming increasingly evident. Faced with the impact of the epidemic, traditional industries are also accelerating their transformation and are upgrading to create new business models (How COVID-19 Catalysed Digital Health Trends, 2020).

The Industrial Development Report 2022 states that digital technologies enable businesses to continue to operate remotely and maintain their consumer base, enabling digitally advanced companies to better withstand the impact of a pandemic and adapt to the new normal, and that investments in digital technologies are an important part of initiatives to mitigate the impact of the new coronavirus epidemic on companies and industries. Digital technology has been playing a key role in helping companies shift to remote and hybrid working models. It is expected that more manufacturing companies will embark on digital transformation and create smart manufacturing factories to improve the quality and efficiency of their production (Industrial Development Report 2022 - Overview, 2022).

China's digital economy such as online transactions, e-commerce, telemedicine, and online entertainment has flourished, and it has played a major role in the prevention and control of the epidemic and the resumption of work and production in the post-epidemic period, effectively promoting China's social and economic recovery. Macro data from the Chinese government's Statistical Office website shows that the scale of China's digital economy has reached 39.2 trillion yuan in 2020, accounting for 38.6% of its GDP. The growth rate of the digital economy is more than three times that of GDP, becoming the key driving force and new engine for stabilizing my country's economic growth.

Digitalisation processes in the supply chain are also accelerating, with the strong rise of high-tech industries such as unmanned retail and unmanned delivery; various delivery platforms, and door-to-door service platforms offering same-city logistics, customized food, and beverage delivery and errands are becoming increasingly recognized. At the same time, with the rise of new technologies and industries such as artificial intelligence, big data, 5G, and blockchain, the digital development of the supply chain significantly improved during the epidemic, which brought technical support to the development of the supply chain platform.

3. Platform-based supply chain development

3.1. Platform-based supply chain features

With the Internet era, collaboration between human beings has slowly become a possibility through the medium of the Internet. Many traditional operation models have gradually broken through a closed organization, and people have used Internet thinking and Internet tools to continuously innovate and create a new business form beyond a single company. As platform-based supply chains are still in the mapping phase, there is currently no clear academic definition, in my opinion, whether the platform supply chain is a product of Internet thinking. A platform-based supply chain is not necessarily online, it is a kind of cognition, a kind of collaboration, and a platform for a larger supply chain. The platform-type supply chain generally uses information technology as a means and a very critical linking tool, and the platform economy is a supply chain interaction model that relies on platform transactions. The charm of the platform-based supply chain lies in the cohesion of resources. By surpassing the traditional supply chain type of upstream, middle and downstream organizations, it reconstructs the supply chain ring chain around the platform economy.

The following are the key characteristics of platform-based supply chains, derived from looking at the companies that have developed platform-based supply chains in this stage.

Light assets

The asset-light supply chain has always been an important concern for supply chain managers when operating their businesses, and platform-based supply chain companies have such characteristics as "asset-light". The difference between a platform-based supply chain company and a traditional supply chain company is that the former hardly involves the large-scale fixed assets of traditional logistics companies and traditional warehousing companies, such as trucks and warehouses, and the management of personnel is mostly solved through outsourcing. For some platform supply chain companies with their warehouses, due to the extremely high warehouse turnover rate, the inventory that once occupied the cash flow of the traditional supply chain has also become asset-light under the operation mode of the platform supply chain.

Its operation mode is mainly based on the platform as a carrier, which connects customers and orders with different needs to existing supply chain resources, and – through the rational use and allocation of existing resources – forms a supply chain solution to meet customer needs. The supply chain company operating on a platform is not unique in terms of the customers it connects to, and the logistics companies it cooperates with are also not unique but are regrouped and reallocated through orders on the platform based on existing resources.

Customer oriented

As the platform-based supply chain company coordinates the relatively conflicting interests of both sides of the platform through the platform-based operation mode (For example, the supply chain provider needs to coordinate orders, achieve batch arrangements, and improve the internal value chain as an important purpose, while the supply chain demand side needs to achieve fast delivery of units to save time and cost), the customer's demand and the supply chain provider's capability are considered comprehensively, and the optimal supply chain is formed with limited resources. This determines whether the platform-based supply chain needs to lead the supply chain solution.

This solution needs to take the customer's needs as the main starting point and coordinate all the resources of the platform in the process of order delivery. This coordination process needs to be completely based on the customer as the main beneficiary of resources, and the platform needs to carry out individual programmed design and KPI management for each project and each order.

Warehouse and distribution integration

Warehouse and distribution integration is a supply chain platform company in the form of a logistics third party to undertake the whole process of warehousing and distribution. Compared with traditional warehousing, platform logistics companies can provide loading and unloading, inspection, shelving, storage, sorting, packaging, inventory, reprocessing, delivery on behalf of delivery, distribution, after-sales, and a full set of other logistics services required by e-commerce enterprises. Warehousing and distribution integration companies centrally store goods through order management, maximize the use of warehouse area, software and hardware facilities, manpower, logistics and other resources, and can achieve economies of scale that integrate warehouse distribution. In this case, the unified distribution cost of goods out of the warehouse is lower than the unified delivery of goods from a single warehouse; in addition, through the warehouse logistics network, it can be uniformly transported to the central warehouse, which can reduce the cost of collection and transportation.

In the case of warehousing services, the platform-based supply chain can be divided into two different types: long-term warehousing services (finished goods or semi-finished goods that leave the factory line and are warehoused) and short-term warehousing services (finished goods that are warehoused after the actual order is placed or after the forecast order is placed). The difference between these two forms is that the former fully undertakes the warehousing and OEM functions of product suppliers, providing supply chain efficiency through front-end production and warehousing management. The latter temporarily undertakes warehousing services before product supplier distribution, improving the throughput rate of warehousing through order allocation and order forecasting, optimising the platform's inventory and warehousing costs, and improving supply chain efficiency.

Digital sharing platform

In the digital age, platform-based supply chains link consumers and supply chain service providers to form a high-speed operational ecosystem that needs to maximize the value of digitalisation.

Within the platform, the operational ecosystem can be realized through digital technology, with collaborative software that seamlessly connects all aspects of the platform and enables effective communication and sharing of information. The emergence of a platform-based supply chain transforms the relatively closed information transmission between the upstream and downstream of the traditional supply chain into internal openness, enabling visibility and coordination between the upstream and downstream of the platform, effectively controlling risks and improving the transparency of the entire supply chain.

Outside the platform, the operational ecosystem can provide real-time feedback on corresponding information and unexpected problems to customers or upstream suppliers, and upstream suppliers cannot only establish a close partnership with customers (or even customers' customers) by communicating with them promptly to quickly solve their problems and improve customer satisfaction, but the digital supply chain can also tap into the trend of customer demand changes through big data, and then combine it with global marketing strategy. The digital supply chain can also be used to proactively perceive customer demand and suggest customer order quantities through big data, combined with external factors such as global or regional economic development and changes in consumer preferences to increase the company's dominance in the transaction process with customers.

3.2. The development of platform supply chain in China

Platformisation is a relatively new concept, which came from the digital economy, and is quickly developing in China. When I searched for relevant documents, I found that there is very little research on platform supply chain on the Internet or in books and journals, and the academia is still in the early stage of wait-and-see concerning the phenomenon. The Journal of Modern Supply Chain Research and Application will hold a seminar entitled "Managing Platform-based Supply Chains in the Digital Era: Lessons after Post-Pandemic in the First Half of 2022 in China", which also reflects the platform-based supply chain as the possibility of post-pandemic supply chain development. Trends are of great research value. The seminar divides the platform into a market model and a resale model based on the difference in sales methods and research technology applications (application of blockchain), proposing that the outbreak of COVID-19 has had a significant impact on supply chain members, and the

platform. The mode of use requires optimising operational decisions. This way of thinking is more like using a platform-based supply chain as an e-commerce sales method and does not show value in supply chain order delivery or operations.

Due to the rapid development of China's e-commerce economy in the 2010s, supply chain operation has become a key concern among e-commerce companies. Since 2013, the concept of platform supply chain has been widely mentioned. With the increase of order demand, it has become the main solution for the insufficient supply chain operation capacity of e-commerce enterprises in the Internet economy.

Alibaba and JD.com are the first companies to try a platform-based supply chain. Both have their e-commerce platforms and order sources. The difference between them is that Alibaba is mainly a trading platform and cannot provide supply chain services by itself. Therefore, Alibaba's solution to this problem was to establish a new supply chain company called Cainiao, form a courier alliance with many basic logistics companies in the market to coordinate the distribution of platform orders, and gradually form a platform-based supply chain development (Fan et al., 2021; Yun et al., 2020). JD.com not only has an e-commerce platform but also has its warehouse. However, because JD's self-operated distribution service only accepts orders from JD Mall, the coverage is not sufficient, the order quantity is not high, and the loss is serious. Given this, in the later stage JD Group will separate the logistics part and cooperate with other logistics companies. Together, they have enriched their channels and scale, gradually accepted orders from other companies in terms of marketing, and gradually formed the initial operation models of a platform-based supply chains (Fan et al., 2021; Li et al., 2021). In addition, the home appliance and furniture industry is also the birthplace of platform-based logistics: manufacturers in this industry generally use direct-operated stores as their main sales model, and later with the development of e-commerce, sales channels have gradually expanded. To meet the product circulation between stores and manufacturers, manufacturers generally establish their own internal logistics systems - mainly responsible for logistics services from factory to store, factory to warehouse, warehouse to store, and store to store. Later, they encountered the same problem as Jingdong Logistics- due to the high cost of a single business, it was difficult to achieve high profits.

4. Analysing the facilitation effect of the epidemic on China's platform-based supply chain through the PEST method

4.1. Analysis background

E-commerce transactions in China reached \$1.3 trillion in 2020 and are expected to grow to about \$2 trillion by 2025 (Buchholz, 2020) due to the huge size of China's e-commerce economy and the obvious trend toward platform-based logistics. Therefore, this paper focuses on the development of the epidemic and the current situation of platform-based logistics in China through a PEST analysis.

PEST analysis is a basic tool for the analysis of the external environment of a strategy. It analyses four factors – political, economic, social, and technological – to grasp the macro environment in general and to evaluate the impact of these factors on the strategic objectives and strategy formulation of a company. This paper will analyse the impact of the COVID-19 era on the platform-based supply chain through four aspects of PEST.

Figure 2 below provides a selection of data tables on the value-added of the transportation, warehousing, and postal industry from 2011 to 2021. From the line graph, we can see that after ten years the value-added of the supply chain industry in China has grown to more than double the amount in 2011, which is in line with the trend of the development of China's e-commerce economy. The only decrease is between 2019 and 2020, where it is easy to see that this decrease is due to the strict restrictive policies enacted by the Chinese government following the COVID-19 outbreak in China in the first half of 2020, which indicates that the epidemic had many negative effects on supply chain development. However, the figures for 2021 show that not only the negative effects of the outbreak were mitigated, but the Chinese supply chain also developed faster than before.

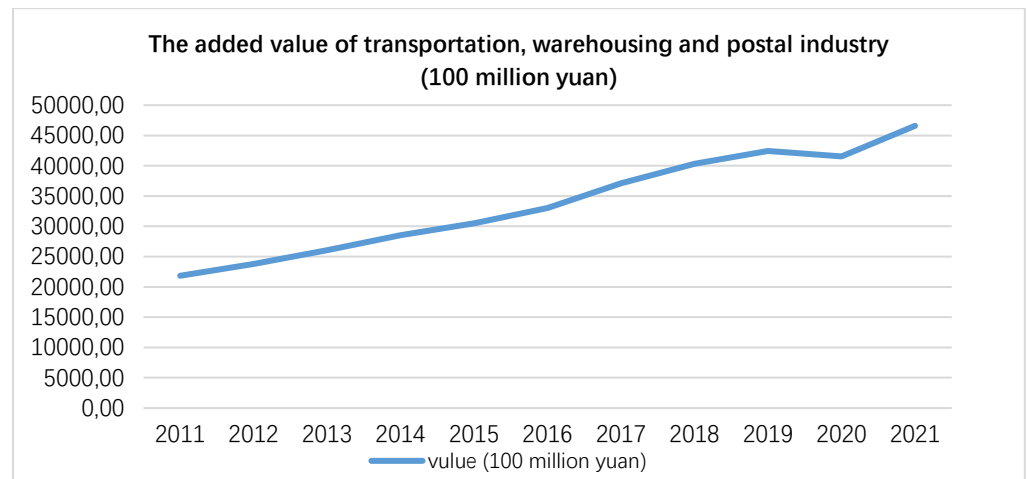


Figure 2. Added value of transportation, warehousing, and postal industry from 2011 to 2021. Source: National Bureau of Statistics of China, 2022 *

* Note: The added value of transportation, warehousing, and postal industry refers to the final result of all resident units of a country (or region) engaged in the production activities of transportation, warehousing, and postal industry within a certain period at market prices. Source: Heads of relevant departments of the National Bureau of Statistics of China interpret the main economic data for the whole year of 2021. [http://www.gov.cn/xinwen/2022-01/18/content_5669005.htm]

Supply chain breakdowns under the epidemic and the emergence of extreme problems such as lack of resources exacerbate the shortcomings of traditional supply chains (Chowdhury et al., 2021; El Baz & Ruel, 2021; Matt Leonard, 2020). This has forced traditional supply chains to accelerate their upgrade to new tracks, and platform-based supply chains are one of them.

4.2. PEST analysis

Based on the main changes during COVID-19 analysed in the first section of the paper, we can see the main political, economic, social, and technological macro-contexts at the time of the epidemic (Table 2). These are supplemented by the author concerning each section.

Political influence

Due to strict embargo measures, it became extremely difficult to move logistics shipments between cities, and traditional supply chain networks were cut off by the restrictions of the embargo. In this situation, many traditional logistics companies formed alliances or merged and acquired each other to jointly allocate logistics resources such as warehousing, trucks, and logistics networks to combat risks posed by COVID-19. Under the epidemic, many traditional small and medium-sized logistics companies have become part of platform-based logistics through alliances or mergers.

Economic influence

As mentioned above, the declining GDP (Figure 3) and rising unemployment rate (Figure 4) due to the impact of the epidemic are gradually improving as the industry upgrades and transforms. Now, the economy under the epidemic has undergone a different transformation than before: capital is increasingly turning to self-digital platforms, software and other intangible investments (such as NFTs), rather than tangible assets and traditional industries (Ip, 2020), and platform-based supply chains are favoured by capital.

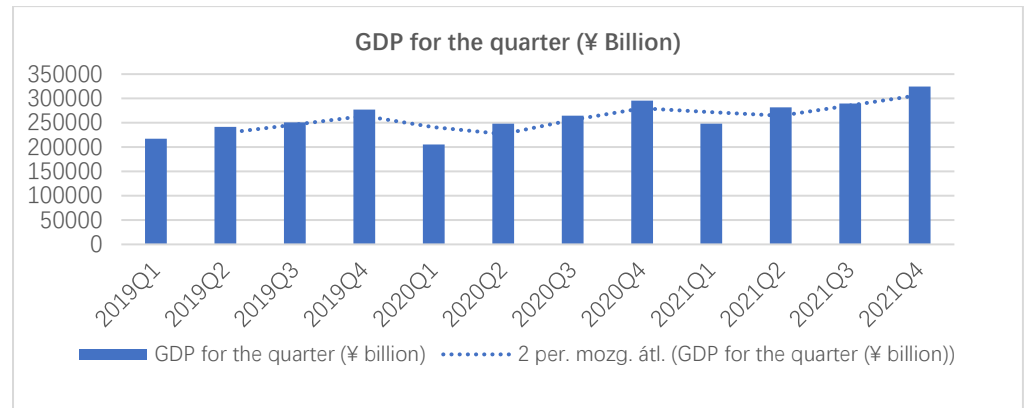


Figure 3. GDP broken down by quarters between Q1 2019 and Q4 2021 (¥ Billion). Source: National Bureau of Statistics of China, 2022

For supply chain companies, the repeated COVID-19 and restrictive policies imposed to combat the epidemic have made not only the supply chains of industrial manufacturing companies extremely challenging, but the supply chain industry has also suffered a bump. These include poor warehouse goods turnover and cash flow problems; loss of logistics staff due to restrictions on resumption of work; and higher supply chain costs due to changes in order delivery conditions caused by the epidemic or national policies. Traditional supply chain companies are also considering the transformation to light assets while improving their resource utilization colleagues. As a result, the platform-based supply chain has developed rapidly with the support of both capital and supply chain enterprises, and many platform-based logistics companies were born amid the epidemic.

Table 2. PEST Analysis of COVID-19 influence on supply chain. Source: own work.

Political	Lockdown restrictions
	Restrictive access policies whether intra- or inter-country
	Mandatory documents
	Digital vaccine certificate, or COVID-19 test certificate as proof of movement of persons
Economic	Import and export testing of goods more stringent.
	GDP-COVID-19 dropped sharply in the beginning, then recovered quickly and improved, see GDP table
	Unemployment rate
Social	COVID-19 dropped sharply in the beginning, then recovered quickly and improved, see unemployment rate in Figure 4.
	Online shopping increasing
	COVID-19 dropped sharply in the beginning, then recovered quickly and improved, see Cumulative growth in the online retail sales in Figure 5.
	Remote working and learning
Technology	Gradual integration of remote tools into life and society's acceptance of the new ways of life that technology has brought to people during the epidemic
	Digitalisation
	Data sharing platform built to link upstream and downstream of the supply chain to keep it running during the epidemic
	Artificial intelligent
	The Internet of Things is being implemented in large numbers due to the epidemic labour shortage, with the increased use of unmanned trucks, automated terminals, and smart warehouses, thereby improving supply chain efficiency and data transparency

Society and technology

If the power of science and technology is used in life, it will change people’s living habits, and if it is used in the industry, it will bring about changes in production methods. The social and technological aspects of COVID-19’s facilitation of platformed supply chains is almost similar.

Due to the epidemic, it is difficult for people to work and live in the same way as before, so they need or prefer to use technology to achieve their goals. The epidemic has forced people to limit their lifestyles and travels, which has placed higher demands on supply chain delivery, most notably by increasing the volume of orders and expanding the areas of demand for orders, which poses a problem that requires the coordination of more supply chain resources and the power of platforms.

Logistics is a labour-intensive industry, and although it is gradually developing into a high-tech industry, development is typically slow. Apart from some large companies that can apply digitalization to upgrade their supply chain management, companies that are not well capitalized, are often less motivated and more willing to use manual labour instead than small and medium-sized logistics companies. The emergence of the epidemic has left a serious gap in manpower, and companies have had to resort to digitalization and AI robots to ensure the normal operation of their companies. The use of digitalization and AI robots include the following: digital collaboration platforms, unmanned trucks, automated terminals, and automated warehouses, all of which are needed for a platform-based supply chain.

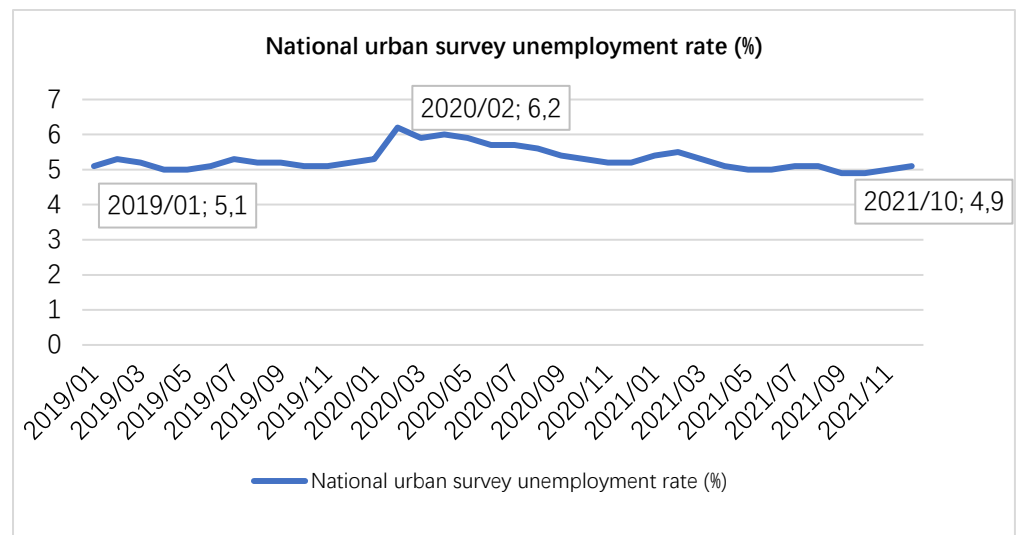


Figure 4. National urban survey unemployment rate (%). Source: National Bureau of Statistics of China, 2022



Figure 5. Cumulative growth in online retail sales (%). Source: National Bureau of Statistics of China, 2022

5. Conclusions

COVID-19 has had a lasting and far-reaching impact on our lives. Not only is our way of life-changing slowly, but COVID-19 has also prompted many industries to transform and upgrade. The emergence of the epidemic has played a crucial role in upgrading the supply chain. China's newly promulgated 14th Five-Year Plan puts forward the concept of "Digital China", and Li Mingtao, President of the Research Institute of the China International E-Commerce Centre, Ministry of Commerce, also said in his speech on the forecast of the future of supply chains that phantomsation will become the new trend of modern supply chain development. The above all show the potential of a platform-based supply chain as the future direction of supply chain development, which is of great research significance (CBN Finance, Finance Review, 2021).

Platform-based supply chain is a product of e-commerce economy and a combination of Internet thinking and supply chain. However, as platform-based supply chain companies are still in an emerging stage, analysis and theoretical research on its operation mode are very scarce, and research concerning this topic is somewhat forward-looking. For this reason, this paper also lacks empirical data, which is also one of its limitations.

Funding: This research received no external funding.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Accenture (2022). *State of Supply Chains*. Supply Chain Disruption & How to Respond. <https://www.accenture.com/us-en/insights/consulting/coronavirus-supply-chain-disruption>
2. Bachman, D. (2020, March). *The economic impact of COVID-19 (novel coronavirus)*. Deloitte Insights.
3. Brodeur, A., Gray, D., Islam, A., & Bhuiyan, S. (2021). A literature review of the economics of COVID-19. *Journal of Economic Surveys*, 35(4), 1007–1044. Scopus. <https://doi.org/10.1111/joes.12423>
4. Brynjolfsson, E., Horton, J. J., Ozimek, A., Rock, D., Sharma, G., & TuYe, H.-Y. (2020). *COVID-19 and Remote Work: An Early Look at US Data* (No. w27344; p. w27344). National Bureau of Economic Research. <https://doi.org/10.3386/w27344>
5. Buchholz, K. (2020, November 13). *Infographic: How Big is Social E-Commerce in China?* Statista Infographics. <https://lb-aps-frontend.statista.com/chart/23492/monthly-active-users-on-selected-chinese-social-e-commerce-platforms/>
6. CBN Finance, Finance Review (2021, June). Experts discuss the new engine of China's digital economy Open supply chain platforms will play an important role in the digitization of the industry. http://finance.cnr.cn/2014jingji/djbd/20210621/t20210621_525517661.shtml
7. Chowdhury, P., Paul, S. K., Kaisar, S., & Moktadir, M. A. (2021). COVID-19 pandemic related supply chain studies: A systematic review. *Transportation Research Part E: Logistics and Transportation Review*, 148, 102271. <https://doi.org/10.1016/j.tre.2021.102271>
8. Economic Information (2021, May). *Thrasio, a new business model of 'acquisition + operation', will bring golden development opportunities for Amazon's e-commerce*. http://www.ijckb.cn/2021-05/08/c_139932151.htm
9. El Baz, J., & Ruel, S. (2021). Can supply chain risk management practices mitigate the disruption impacts on supply chains' resilience and robustness? Evidence from an empirical survey in a COVID-19 outbreak era. *International Journal of Production Economics*, 233, 107972. <https://doi.org/10.1016/j.ijpe.2020.107972>
10. EU Digital Covid Certificate | European Commission. (n.d.). Retrieved 12 January 2022, from https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/safe-Covid-19-vaccines-europeans/eu-digital-Covid-certificate_en#documents
11. Fan, D., Li, X., & Zhang, J. (2021). Comparative study on strategic modes of e-commerce platform between Jingdong and Alibaba. *E3S Web of Conferences*, 275, 01028. <https://doi.org/10.1051/e3sconf/202127501028>
12. Gartner (2020, March). *Coronavirus Impact on Service Delivery Continuity, Employees and Customers*. Gartner. <https://www.gartner.com/en/documents/3982025/coronavirus-impact-on-service-delivery-continuity-employ>
13. IFS Blog (2020, May 15). *How Remote Assistance Helps Service Delivery & Supply Chain Disruption*. <https://blog.ifs.com/2020/05/Covid-19-managing-service-delivery-and-supply-chain-disruptions-with-remote-assistance/>
14. Leonard, M. (2020, February 20). *Coronavirus: A lesson in supply chain risk management*. Supply Chain Dive. <https://www.supplychaindive.com/news/coronavirus-supply-chain-risk-management/572670/>
15. Li, L., Dai, Y., & Sun, Y. (2021). Impact of data-driven online financial consumption on supply chain services. *Industrial Management & Data Systems*, 121(4), 856–878. <https://doi.org/10.1108/IMDS-01-2020-0025>
16. OECD (2021, June). How will Covid-19 reshape science, technology, and innovation? [OECD Policy Responses to Coronavirus (COVID-19)]. <https://www.oecd.org/coronavirus/policy-responses/how-will-Covid-19-reshape-science-technology-and-innovation-2332334d/>
17. Research Group of the Institute of International and Comparative Education of China & Wang Su. (2020, 08). *Global online education: The need for warfare The opportunity after the epidemic* [China Education and Research Computer Network]. China Education and Research Computer Network. https://www.edu.cn/info/zt/fk/202006/t20200608_1732126.shtml

18. The Medical Futurist (2020, November 19). *How COVID-19 Catalysed Digital Health Trends*. <https://medicalfuturist.com/how-Covid-19-catalysed-digital-health-trends/>
19. Trading Economics (n.d.). 20 million indicators from 196 countries. Retrieved 11 January 2022, from <https://tradingeconomics.com/>
20. UNCTAD (2021, March). *How COVID-19 triggered the digital and e-commerce turning point*. <https://unctad.org/news/how-Covid-19-triggered-digital-and-e-commerce-turning-point>
21. United Nations Industrial Development Organization (2022). *Industrial Development Report 2022*. UNIDO ID/450. ISBN: 978-92-1-106457-5 <https://www.unido.org/idr2022>
22. Vereinte Nationen (2021). *COVID-19 and e-commerce: A global review*. United Nations.
23. Wen, J., Kozak, M., Yang, S., & Liu, F. (2021). COVID-19: potential effects on Chinese citizens' lifestyle and travel. *Tourism Review*, 76(1), 74–87. <https://doi.org/10.1108/TR-03-2020-0110>
24. Youth Today's REPORT LIBRARY (2021). *Education in a pandemic: The disparate impacts of Covid-19 on America's students—Youth Today*. (2021, June). <https://www2.ed.gov/about/offices/list/ocr/docs/20210608-impacts-of-Covid19.pdf>
25. Yun, J. J., Zhao, X., Park, K. B., & Shi, L. (2020). Sustainability condition of open innovation: Dynamic growth of Alibaba from SME to large enterprise. *Sustainability*, 12(11), 4379. <https://doi.org/10.3390/su12114379>