

Application of 5G Technology in Jingdong Logistics

—From a Management Perspective

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Abstract: 5G technology is widely applied in various domains and occasions nowadays. When regarding the aspect of financial economy, 5G is of paramount importance for the operation of modern logistics. As one of the most outstanding digital retailers in China, Jingdong has performed well in its logistics with the aid of 5G technology. More importantly, Jingdong has also demonstrated management ingenuity in its 5G operations. This essay explores the integration of 5G technology into Jingdong Logistics, emphasizing its impact on managerial tactics such as decision-making and technology entrepreneurship. By employing case studies and theoretical models, the analysis reveals how 5G enhances Jingdong's logistics efficiency through improved data connectivity and real-time decision processes. The strategic use of 5G, combined with IoT and blockchain, exemplifies technology entrepreneurship, driving Jingdong's sustainable growth and innovation in logistics management. The findings highlight Jingdong's role as a leader in digital transformation, offering insights for other corporations seeking to refine their logistics strategies through advanced technologies.

Keywords: 5G technology, modern logistics, digital management, decision-making, technology entrepreneurship.

1. Introduction

In response to the dramatic transformations in the digital economy and e-commerce landscape, contemporary logistics have been compelled to embrace more innovative approaches. In China, where online shopping is both widespread and dominant, there is a pressing demand for an advanced logistics infrastructure. Among its peers, Jingdong Logistics has distinguished itself as a frontrailer. Within its intricate logistics framework, Jingdong has astutely incorporated 5G technology, not only enhancing its technological capabilities but also refining its managerial strategies.

This essay will first explore the application of 5G technology within modern logistics, with a specific focus on Jingdong's practical implementations. Then, it will discuss how 5G is utilized in Jingdong Logistics and some related impacts. Through meticulous case studies, the discussion will be informed by the principles of technology entrepreneurship and an incorporate theoretical framework, decision-making process model to provide robust scientific substantiation. Through an in-depth analysis in the integration of 5G technology and Jingdong's smart logistics, how 5G technology serves as a driving force for Jingdong's intelligent logistics revolution will be revealed.

There is also a predisposition that other corporations requiring logistics support can be inspired by Jingdong's 5G adoption.

2. Background of 5G application and Jingdong's statement

The digital economy is sweeping the world. It is playing a pivotal role in promoting residents' multifaceted consumption of goods and services [1]. Gradually, with the linkage of digitalization and consumption upgrading, consumers' enthusiasm for online shopping runs high, which indirectly induces unprecedented transformations and revolutions in logistical industries. However, although the combination of various cutting-edge technologies allows improvements and optimization in many logistics processes, there are still some obstacles to advanced, stable real-time communication [2]. Under this circumstance, 5G, the fifth generation of Mobile Communication Networks, has the capability to fulfill these requirements and significantly facilitate the advancement of Smart Logistics.

Jingdong, one of China's leading e-commerce platforms, is characterized by its well-connected logistics network. Following the trend of digital transformation, Jingdong has extensively integrated 5G technology into its logistics system. With its high speed, low latency, and large connectivity, 5G has the potential to connect all aspects of Jingdong's logistics, thus effectively eliminating the latent information silos and enabling its instantaneous data transmission [3]. Regarding Jingdong's systematic operations, 5G technology is not only a bridge between the physical and digital realms but also a crucial catalyst for its development in intelligent logistics and organizational management [4].

3. Case study

3.1. Case description

Table 1: Financial highlights in Jingdong 2023 logistics

Jingdong Logistics 2023 Annual Report		
	Amount (billion)	Year-on-year Change (%)
Total Revenues	1,666,000	21.27%
Operation Expenditure	-1,539,420	-20.93%
Gross Margin	126,830	25.58%
Administrative Expenses - Research and Development Expenditures	-35,710	-14.36%

The information presented in Figure 1 provides a concise overview of the financial performance of Jingdong Logistics in 2023. The data reveals a remarkable financial performance by Jingdong in 2023, with the company achieving a staggering profit of 1.666 trillion RMB. This represents a significant 21.27% surge in its total revenue. Notably, Jingdong's commitment to innovation is underscored by its considerable investment in research and development, which has escalated by 14.36%. This strategic allocation of resources may be associated with Jingdong's adoption of 5G technology. In the operation of Jingdong Logistics, 5G technology has been proven to constantly enhance its connectivity and expedite its data transfer speed, thus contributing to a more efficient logistics network [5]. This consequence, in turn, facilitates a significant boost in Jingdong's total revenue.

From a technical perspective, 5G has been conclusively demonstrated to bridge the gap between the virtual and real world, gradually rendering Jingdong to make a profound difference in its logistics system and profitability. Nevertheless, combined with other advanced technologies like blockchain and the Internet of Things (IoT), 5G can effectively interconnect key subjects in the actual logistics and transportation processes, thereby fostering a network that is both internally coherent and systematically organized. As a result, 5G technology not only improves Jingdong's logistics

efficiency but also energizes the management approaches across various segments, providing users with a more satisfying experience and a higher level of security [6].

3.2. Case Analysis

3.2.1. Decision-making process & 5G's application in different segments

Inevitably, during the realistic operation of Jingdong Logistics, numerous decision-making aspects are involved, but the appropriate application of 5G technology can play an extremely critical role in these issues. 5G technology, extending through the full spectrum of logistics, has the capability to realize a comprehensive connection of massive data from upstream corporations to those end-users, and ultimately generate a well-structured map [7]. Thus, smart decisions can swiftly be interacted with and then transmitted to the data world. After elaborating analysis, these decisions will come into execution, which will possibly stimulate continuous innovation and improvement in the logistics design.

In traditional frameworks, the decision-making process is typically delineated into eight distinct steps. However, to more explicitly display Jingdong's wise utilization of 5G, it's better to consider the model proposed by Fleischmann [8], including collection, sort-test, and processing.

The Collection phase involves identifying specific problems and the corresponding decision criteria. Greatly leveraging 5G's velocity, Jingdong is prone to reach the users' information like precise addresses and personal preferences at a considerably fast speed. Immediately a customer completes a transaction, the related information will quickly be collected and uploaded to the upstream of the logistics network, poised for the subsequent stages of sorting and processing. This real-time data acquisition, powered by 5G, serves as a cornerstone for Jingdong's responsive and efficient decision-making apparatus within its logistics operations.

Jingdong's customer base encompasses the vast and diverse population of China, so it promotes the company to strategically establish independent-operating warehouses across a myriad of regions. This expansive approach, while advantageous, makes Jingdong confront the dilemma of deciding the optimal strategy when carrying goods. Nevertheless, during sorting phase, 5G technology can facilitate digitally driven, thus empowering Jingdong to analyse and select best logistical alternatives for different segments. For instance, based on buyers' actual position, Jingdong's 5G intelligent system can automatically sort goods from corresponding warehouses and schedule the most effective dispatching route. This intelligent planning greatly enhances the practicalities of Jingdong's transportation, ensuring that delivery effectiveness is optimized to its fullest potential.

After in-depth analysis, the brilliant decisions are ready for real-world implementation. In the processing phase, 5G technology can bridge all aspects of logistics, ranging from stocking to the final distribution. It is evident that 5G technology has linked the data from all logistical sections to bring about cost reduction, efficiency gains, and synergistic optimization [4].

It is clear that Jingdong's logistics framework is not only well-aligned with the decision-making process model but also serves as an exemplar of its application. The integration of 5G technology throughout the entire logistics process is poised to spark a revolution within the modern logistics industry, propelling it towards faster, more accurate decision-making capabilities.

3.2.2. Technology entrepreneurship & Jingdong's sustainable development via 5G

As one of the premier e-commerce companies in China, Jingdong is known for its high-tech approach to distribution and delivery. To maintain its leadership in the logistics sector, Jingdong must continually innovate, embracing a strategy of "technology entrepreneurship."

Initially, the concept of technology entrepreneurship was defined as the method by which entrepreneurs leverage resources and organizational structures to capitalize on nascent technological

opportunities [9]. However, through rigorous study, Bailetti emphasizes that although the ultimate purpose of creating value remains the same, technology entrepreneurship may pursue prompt research for a specific technology and try to introduce it to an advanced application [10]. Jingdong, by following this enlightened path, is well-positioned to ensure its ongoing growth and success through persistent technological innovation.

Within the array of technological ventures pursued by Jingdong, 5G stands as a typical example of its commitment to technology entrepreneurship. With the increasing maturity of 5G technology, numerous e-commerce enterprises are resorting to its capabilities. Hence, to be more competitive for promising revenues, Jingdong is experimenting with the convergent use of 5G and other emerging technologies, such as the Internet of Things (IoT), cloud computing, big data, artificial intelligence (AI), etc. The strategic fusion of these technologies exemplifies Jingdong's embodiment of technology entrepreneurship within its logistics operations, keeping it as the leader in the logistics field. For example, the combination of blockchain technology and 5G enables the visualization of logistics tracking, resulting in a logistics environment that is more secure, transparent, and efficient [5].

Technology entrepreneurship in Jingdong can also be demonstrated in its smart mobile warehouses, which is attributed to Jingdong Intelligent Logistics' digital transformation and 5G's multiple application scenarios. Specifically, the high-speed capabilities of 5G facilitate real-time interactions among various components within the warehouse ecosystem, significantly enhancing the deployment of intelligent robots for warehouse management. This technology, in the future, can support further development in unmanned logistics operations. Most importantly, Jingdong's integrated application in 5G, to some extent, marks a pivotal step toward a more efficient and automated supply chain.

4. Conclusion

In recent years, digitalization's impact on residents' consumption has fostered an integration of 5G technology and Jingdong Logistics. As indicated by its 2023 financial highlights, Jingdong has experienced a prominent increase in revenue and investment in research and development. This annual financial report is an evidence on the transformative power of 5G technology within Jingdong's practical operations. By bridging the virtual and physical realms, 5G has enabled Jingdong to optimize its decision-making process across collection, sort-test, and processing phases, thereby enhancing its logistical capabilities and customer satisfaction. Through the lens of technology entrepreneurship, Jingdong has combined 5G technology with other advanced technologies like blockchain and IoT, which facilitates Jingdong's operational efficiency and guarantees sustainable development.

Jingdong's example serves as an inspiration for other corporations, encouraging them to adopt 5G technology to refine their logistics and organizational management. Meanwhile, Jingdong's success reveals the significance of innovation in the digital economy and motivates other enterprises to follow the main digital trend. However, Jingdong is a top e-commerce company supported by a massive amount of capital; it is very difficult for those small or medium-sized enterprises to replicate its path to success. The situation needs to be analyzed on a case-by-case basis.

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