

The Digital Development Trends of Circular Economy in China

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Abstract: COVID-19 has become a global health crisis, influencing the development of all walks of life. The lockdown implemented to control the spread of the pandemic has led to the development of digital technology. As a country that has gradually recovered from the epidemic, China's circular economy development pattern has undergone some changes. This study indicates three significant digital development trends in the circular economy in the post-pandemic era. They are "New business models" of the digital economy are integrating into a circular economy, the digital governance capability of circular economy gains more traction, and the digitalization of waste sorting exemplifies the transitions accelerated by the pandemic." Despite the strong momentum of China's digital transformation, there are difficulties in determining data ownership and collaboration among stakeholders.

1. Introduction

The global spread of the COVID-19 pandemic has brought unprecedented shocks and challenges to the economic and social activities of countries around the world. The "black swan" effect of COVID-19 is accelerating the integration of digital technology into life and business. In China, new business models, represented by the online office, online education, and Internet medical care, have been implemented and are now being constantly updated. "No contact", "Homelife", "Consume online", "Virtual meeting", and "Shared virtual experiences" have become the new normal of more thoroughly digital life [1]. The Chinese experience reveals how the pandemic has effectively fast-tracked the important digital development trends in the circular economy and this study analysed these trends in detail.

2. The Digital Development Trends of Circular Economy

2.1. "New Business Models" of the Digital Economy are Integrating into Circular Economy

In the post-COVID-19 era, "new business models", catalyzed by the pandemic, became a popular topic in China and are came to be promoted vigorously by the Chinese government. It includes

"encouraging the development of convenient online office", "accelerating the pace of digital transformation of traditional enterprises", "creating momentum for shared production", and "exploring new modes of sharing production materials", etc. [2]. These new business models, directed by the concept of innovative, coordinated, green, open, and shared development, create a data-driven, resource-saving, and environment-friendly green economy, and are now deeply integrated with the development of circular economy.

The integration will alleviate the pressure of constraints of resources and the environment, and avoid oversupply. For example, product design can be improved by the analysis of electricity consumption big data, so that energy consumption at the source can be reduced; precise control of input and output can be reshaped through flexible production, personalized customization, and other production links to avoid resource waste caused by oversupply. In addition, new business models not only improve economic efficiency but also achieve cleaner production. For example, platforms, such as shared production and shared travel, unify the deployment of spare social resources through intensive sharing, which improves the efficiency of the use of stock resources. The popularization of online education, Internet medical, online office, and other applications has greatly reduced urban traffic and travel, forming a new green and sustainable digital life model.

The various transitions required for the "new normal" have been adopted rapidly during the pandemic and demonstrate that human beings can adapt to the transitions required for a low-carbon and green economy model. The new business models integrating online and offline will break traditional inertial thinking and become an important breakthrough in the transformation of circular economy and the promotion of reform and innovation.

2.2. The Digital Governance Capability of Circular Economy Gains more Traction

In view of the complexity of circular economy, digital big data provides unique conditions for the detection, inspection, traceability, and supervision of the entire process of circular economy, the realization of digital precision decision-making, and the development of platform models. The Chinese government intends to build a digital government that makes full use of modern information technologies such as the Internet, big data, cloud computing, artificial intelligence, and blockchain while conducting in-depth analysis and trace the full life cycle of the product based on massive data [3]. The COVID-19-related acceleration of digital development has increased the acceptance of the need for digital governance.

The government makes greater use of digital methods to make evidence-based decisions on the development of circular economy which reduces governance costs. As digital technology fully penetrates into production, logistics, consumption, and socio-economic fields, multiple subjects including ordinary citizens are increasingly participating in the process of digital governance of circular economy. In this way, all individuals become potential sources of decision-making data, and the volume of data continues to accumulate as individuals join. The massive data formed in this way also guarantees the credibility of the decision-making results to a certain extent.

Besides, driven by 5G, the Internet of Things, and artificial intelligence, platform governance is becoming a new model for circular economy governance, promoting the construction of a closed-loop supply chain effectively. Information sharing of orders, capacity, channels, and so on is realized to promote the coordination of upstream and downstream. The above information guarantees the stability of the industrial chain and supply chain of circular economy and improves the level of digital governance of circular economy.

2.3. The digitalization of waste sorting exemplifies the transitions accelerated by the pandemic

During the pandemic lockdown, the prevention and control of the pandemic in traditional

communities has exposed big problems. Due to closed management in many communities, the pressure on waste sorting increased sharply. And a great test of community autonomy is to enable residents to "eliminate waste" from the source to reduce the operational pressure of front-end waste sorting.

The pandemic fostered the introduction of both increased digitization and greater use of digital governance for decision making into the process of domestic waste sorting and treatment in China. Digital management of waste sorting means to use digital technology runs through the entire process of waste sorting and treatment, and realizes effective management through the application of modern technologies such as the Internet, big data, and artificial intelligence in waste sorting and processing.

For instance, a waste sorting cloud platform is constructed in Yuhang District of Hangzhou in China, which connects all the links involved in waste sorting and combines "Urban Brain Technology" to make real-time judgment in terms of classified delivery, collection and transportation scheduling, vehicle management, personnel management, appointment collection, and points conversion [4]. In this way, they can effectively manage the data at the front-end collection, mid-end collection and transportation, and end treatment of waste sorting, thus provide a reference for management decision by quantifying the classification results and tracing the root of the problem. This model, which uses the integration technology of the Internet of Things and the Internet, as well as data management, analysis, and decision-making, has achieved the traceability of waste delivery. It creates a model for future "Smart City", and plays a positive role in reducing the source of domestic waste.

3. Conclusions

The increased digitization and digital governance seen in China could point out the way forward for other countries planning their transition to a post-Covid-19 economy. Although the momentum of digital transformation is strong in China, there are also difficulties. One challenge is that data has the characteristics of intangibility, reproducibility, and shareability, which leads to great difficulties in determining data ownership, market pricing, and market transactions. Another challenge is that the various sub-sectors of circular economy industry are very different and so too are their breakthroughs of digital transformation, which prevents stakeholders from copying successful models directly. We need to work together globally to develop solutions to the challenges for fuller implementation of these digital developments into the circular economy.

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