Chapter 3
Development Trends of Enterprises' Green Growth Model

Nengmin Wang, Meng Zhang, and Zhengwen He

Abstract The development of enterprises' green growth model is closely related to technological innovation and changes in the business environment. The rapid development and popularization of next-generation information and communication technology, emergence of new forms of industry and business models have encouraged enterprises to implement the green growth model. First, from the perspective of new technologies, this chapter analyzes the impact of the next generation Internet as well as the Internet of Things (IoT) on enterprises' green growth model. The next generation Internet helps enterprises implement the green growth model in three ways: reduction of transaction costs, accurate supply–demand matching, and value co-creation and sharing. The IoT makes it possible for enterprises to realize the entire life cycle of environmental management. From the perspective of new forms of industry, this chapter analyzes the impact of collaborative logistics, crowdsourcing design and manufacturing, networked collaborative manufacturing, and social community manufacturing on enterprises' green growth model. The advantages of such forms lie in reducing ineffective production capacity and wasted resources, meeting customers' demands, and realizing value co-creation, thereby providing new opportunities for enterprises to implement the green growth model. Finally, from the perspective of new business models, this chapter analyzes the impact of online and offline dual channels, closed-loop supply chain, platform economy, and energy performance contracting on enterprises' green growth model. The advantages of such models lie in improving operational efficiency, realizing resource recycling, and increasing energy efficiency, thereby providing new avenues for enterprises to implement the green growth model.

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3.1 New Technologies Providing Methods for Enterprises' Implementation of the Green Growth Model

3.1.1 Next Generation Internet

(1) Reduction of Transaction Costs

The development of next-generation information and communication technology such as the next generation Internet has profoundly affected and shaped the strategic, resource organization, operations management, and other aspects of enterprises. Communication between entities in the value chain has been streamlined, and the organizational structure has flattened, giving rise to a series of new forms of industry and business models. Next generation Internet technology facilitates information exchange throughout the value chain, consequently reducing transaction costs. Such technology also provides effective methods for resolving information asymmetry between multiple entities in the value chain.

Information asymmetry is one of the main contributors to high transaction costs. It hinders customers from understanding enterprises' actual states for implementing the green growth model, which results in the market phenomenon of "bad money drives out good," reflected in terms of some enterprises flooding the market with false green products. The next generation Internet technology provides a new method to address this problem. For example, blockchain technology can find applications in the anti-counterfeiting of products, market supervision, and other aspects. After the identification of "one code for one object," each link's information, from production to transportation to final sales, can be recorded on the blockchain, and the information cannot be tampered with, as shown in Fig. 3.1. The efficiency, transparency, and traceability of the trade can be reinforced by applying blockchain technology [1]. Therefore, the development of next generation Internet technology can effectively solve the problem of information asymmetry. Reducing transaction costs also implies

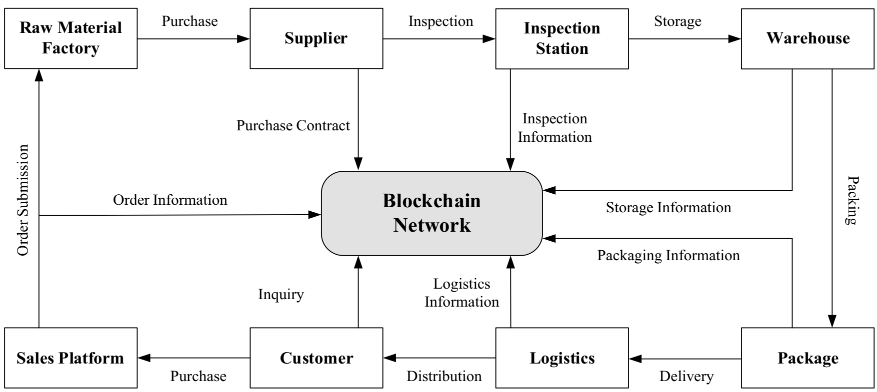

Fig. 3.1 Schematic diagram of blockchain technology

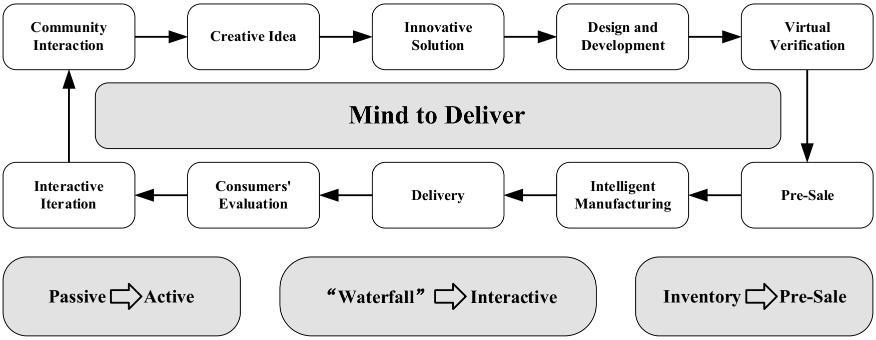

Fig. 3.2 Haier's "Mind to Deliver" model

increasing profits and ensuring effective implementation of enterprises' green growth model.

(2) Accurate Supply–Demand Matching

Whether supply and demand can be accurately matched is the key to the effectiveness of enterprises' green growth model. At present, supply exceeds demand, and the rapid popularization of next generation Internet technology has increased market transparency, resulting in increased competition and enhancing customers' negotiation ability. Simultaneously, an increased focus on the concept of green consumption has led to its growing demand [2]. Green has become an important component of enterprises' core competitiveness, necessitating that they meet the customers' demands for green to win the market.

Next generation Internet technology integrates customers' demands into the value chain actively or passively, provides platforms for customer experience, and creates a seamless, instant, and zero-cost virtual reality for customers. It also helps enterprises understand, forecast, and deliver on the personalized demands of customers more accurately and improve the adaptability of products in terms of green consumption demand. A benign system is formed in which demand leads supply and supply creates demand. Next generation Internet technology has also promoted the rapid demand-driven development of mass customization and manufacturing services [3, 4]. Through the innovation platform, fragmented and independent demands are integrated into the scenario, and supply-side resources, capabilities, and knowledge are incorporated into the platform to provide an agile and low-cost system solution. The evolution of demand from fragmentation to scale to platform and subsequently to ecosystem is realized, such that the contradiction between mass manufacturing and personalized customization can be coordinated and competitive advantage can be obtained.

Some enterprises have begun to rely on next generation Internet technology to adopt customized production as the core competency of enterprises. For example, Haier built the "Mind to Deliver" model with the support of next generation Internet

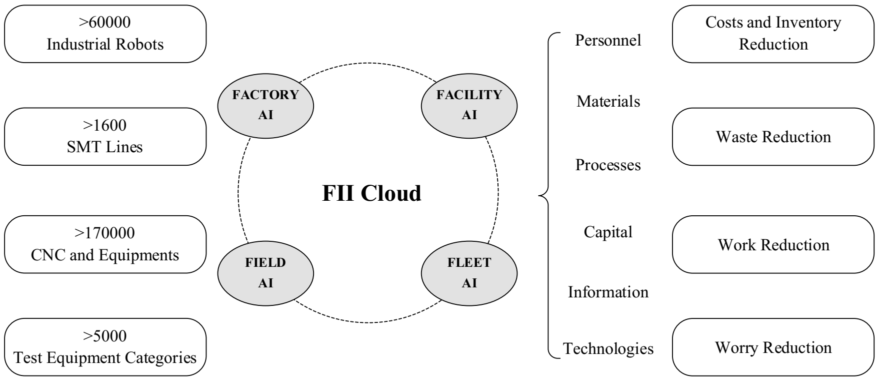

Fig. 3.3 Foxconn's FII platform

technology, as shown in Fig. 3.2.[1] It changed the traditional "product before market" operation into the "market before product" operation, effectively and accurately matched supply and demand, and realized mass customization to enhance competitiveness and improve resource utilization efficiency. According to Haier's Environmental, Social, and Governance Report 2020, it achieved a non-warehousing rate of 78%, ranking first in terms of global market share for healthy self-cleaning air conditioners.[2]

(3) Value Co-Creation and Sharing

The development of next generation Internet technology also provides new methods for cooperation and value creation and sharing between entities in the value chain, helping enterprises transform into "value centers." In the current business environment, enterprises reducing only supply-side costs can ensure limited profits. An enterprise can secure a competitive edge by adding value through cooperation between the entities in the value chain. Mass supply-side customization using next generation Internet can realize standardization, modularization, and serialization of the production process. Integrating piecemeal independent demands and aggregating all supply-side entities can achieve large-scale production, reduce costs across a wider range, and increase the supply-side value of all enterprises. Simultaneously, mass customization and production also help enterprises in the value chain integrate internal and external resources to reduce waste, such as the Foxconn Industrial Internet (FII) platform, which has the largest manufacturing capacity in the global 3C electronics industry, as shown in Fig. 3.3.[3] It integrates more than 3000 third-party participants to help manufacturing enterprises achieve customized mass production through data collection, analysis, and application, while reducing energy consumption by approximately 20%.[4]

[1] https://www.163.com/dy/article/DGGGF6DC0518QT7L.html.

[2] https://www.haier.com/csr/?spm=net.31741_pc.header_128850_20200630.3.

[3] https://www.fii-foxconn.com/.

[4] http://szsb.sznews.com/PC/content/202107/26/content_1067398.html.

On the demand side, next generation Internet technology can provide customers with experience and insights into demand, facilitate personalized, agile, and accurate service solutions to increase customer value, and enable customers to pay higher prices. Simultaneously, the concept of green has become a focal point for both enterprises and customers. The green efforts of enterprises enable customers to manifest greener behavioral intentions [5]. Next generation Internet technology provides convenient methods for enterprises to advertise their green efforts to customers. For example, the 7 Days Inn advertises its green concept online and highlights the hotel's business model of not providing disposable toiletries to promote customers to actively participate in green value co-creation and add demand-side value.[5]

Finally, the overall ecological sharing of revenue is guaranteed through a sharing mechanism and institutional innovation. On the supply side, for example, Huawei HMS, which covers more than 170 countries and regions, has distributed up to 90% of its revenue to third-party participants in 2020.[6] On the demand side, Shanghai VeChain records the energy savings of electric vehicle owners using next generation Internet technology and converts the relevant data into quantifiable carbon credits that can be used to purchase goods and services.[7] In summary, value co-creation and sharing not only integrates the internal and external resources of enterprises to reduce waste but also supports value addition and revenue sharing on both supply and demand sides, thereby guaranteeing enterprises' implementation of the green growth model.

3.1.2 Internet of Things

The Internet of Things (IoT) is an extension of the Internet and an emerging technology [6]. It combines various information-sensing devices with the Internet to form a huge network to realize the interconnections between people, machines, and things at any time and place. With the development of the IoT, remarkable changes have occurred in the sphere of environmental protection. The development and innovation of environmental protection technologies have a profound impact on enterprises' green growth model. The process of IoT and real-time data analysis make entire life cycle environmental management possible. Although the application of new technologies increases costs to a certain extent, these technologies also provide new methods for enterprises in terms of environmental protection and energy savings management.

Relying on the technical advantages of dynamic perception, real-time transmission, and automatic control of the IoT, as well as practical functions such as compatibility between devices and reliable processing of massive information and data resources, a complete, safe, stable, and expandable sound information and data system can be developed to realize the visual and intelligent dynamic supervision

[5] http://www.7daysinn.cn/pinpai.html.

[6] https://www.163.com/dy/article/F7ALA5PD05168K55.html.

[7] https://www.vechain.com/cn/solution/carbon.

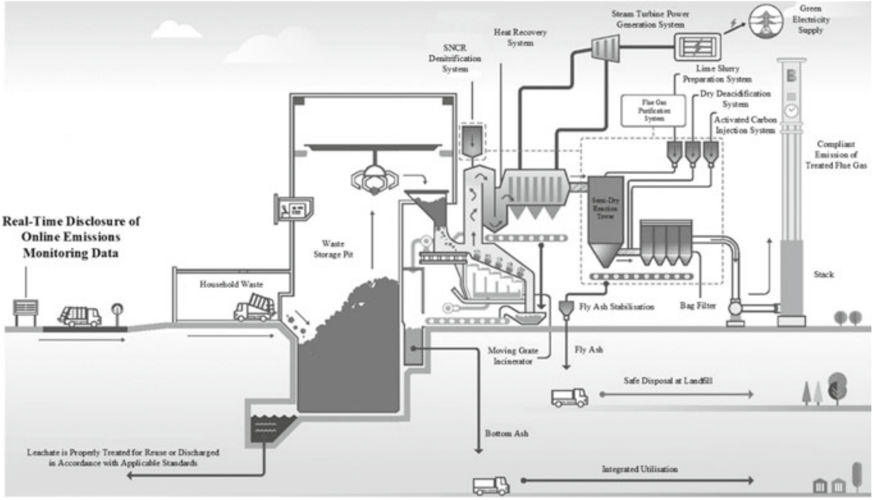

Fig. 3.4 Life cycle environmental monitoring of Everbright Environment

of enterprises' production and operations. For example, the IoT can facilitate access to data such as that on raw material entering and leaving the warehouse, raw and auxiliary material inputs in production, product output, fuel, and water consumption, and waste discharge. It can also build a flow system by using material balance, master the real-time situation with data on the discharge of wastewater and waste gases, and provide them to the pollutant treatment facility system for decision-making, analysis, and early warning. Additionally, emerging technologies can reduce the energy consumption of IoT devices. Eventually, IoT technology can help enterprises build sustainable smart systems [7].

Many enterprises have begun to rely on IoT technology for the entire life cycle of environmental management. For example, Everbright Environment, a leading enterprise in China's environmental protection industry, is the largest waste-to-energy operator in Asia, ranking 283 among China's top 500 enterprises. The Everbright Environment's Suzhou waste-to-energy project is China's first environmental monitoring demonstration project to have realized whole-process monitoring and real-time release, as shown in Fig. 3.4.[8] Real-time monitoring covers the entire process beginning with waste entering the furnace to waste incineration and emission treatment and provides early warning functions through data and working condition analysis to eliminate the pollution at the outset. It also releases real-time monitoring data to provide source data for environmental supervision. In summary, enterprises are able to use IoT technology to collect and analyze data and implement processes to be compatible with visual environmental management, thereby reducing energy consumption and improving resource utilization to generate economic and environmental benefits.

[8] https://www.cebenvironment.com/en/csr/sustainability/sr2020.pdf.

3.2 New Forms of Industry Providing Opportunities for Enterprises' Implementation of the Green Growth Model

3.2.1 Collaborative Logistics

Logistics is defined as the process of planning, implementing, and controlling the flow and storage of goods, services, and related information from the origin to the consumption to meet customers' demands. Collaborative logistics refers to multiple logistics carriers forming coalitions to jointly perform parts of their logistics operations [8]. Carriers integrate logistics tasks and resources according to a certain organizational mode, reasonably schedule logistics resources, and jointly optimize the distribution of such tasks to reduce total costs and increase profits and individual competitiveness. The emergence of collaborative logistics stems from the fact that logistics activities are pure consumption processes. High logistics costs and low logistics efficiency significantly affect growth. For example, in 2020, China's gross domestic product (GDP) was 101.6 trillion CNY, exceeding 70% of the United States (US) GDP for the first time.[9] However, the total cost of social logistics in China was 14.9 trillion CNY, and the ratio of the total cost of social logistics to GDP was 14.7%, much higher than that in developed European countries and the US.[10] Problems such as high carbon emissions and low resource utilization in the logistics process also affect the implementation of the green growth model. In the face of increasingly fierce competition and shrinking profits, logistics carriers seek to strengthen mutual cooperation and explore new ways to reduce costs and improve efficiency.

Collaborative logistics can effectively solve these problems. A fourth-party logistics service provider, Cainiao Logistics, is a typical example. Cainiao Logistics provides high-quality centralized management services such as socialized warehousing, logistics network planning, data-sharing and application platforms, retail order management, and market forecasts for manufacturers, retailers, customers, and third-party independent logistics carriers without undertaking specific logistics operation activities, as shown in Fig. 3.5.[11] By integrating nearly 30 third-party logistics partners and industry resources on a platform, Cainiao Logistics greatly improves efficiency and reduces costs, carbon emissions, and resource wastage through efficient collaboration and technical innovation. According to Cainiao Logistics' Social Responsibility Report 2020, they have reduced more than 600,000 tons of carbon emissions, used hundreds of millions of recyclable cartons, and saved more than 86 million meters of packaging tape in 2020.[12] Collaborative logistics realizes the advantages of high efficiency, low cost, and high resource utilization, providing new opportunities for enterprises to implement the green growth model.

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[9] https://www.q578.com/s-9-1286817-0/.

[10] https://free.chinabaogao.com/jiaotong/202103/031A355302021.html.

[11] https://www.sohu.com/a/243355366_310399.

[12] https://zhuanlan.zhihu.com/p/376123041.

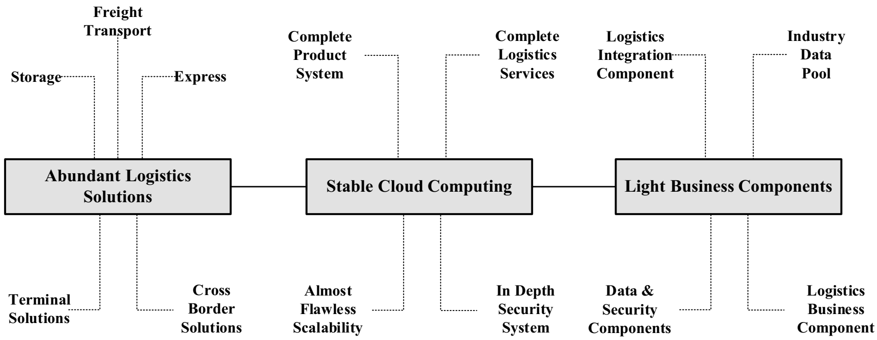

Fig. 3.5 Schematic diagram of Cainiao Logistics

3.2.2 Crowdsourcing Design and Manufacturing

Crowdsourcing design and manufacturing refers to enterprises seeking external inputs from the "crowd" in the form of functional design solutions for new product development [9]. Through Internet crowdsourcing platforms and external resources, crowdsourced design and manufacturing can quickly respond to customers' customization demands, modify the innovation activities previously conducted by the enterprise's internal departments and publish them online, seek resources from outside the enterprise, and transcend the innovation boundaries of traditional business. It also offers a co-creation experience for customers that helps firms better reap competitive advantages [10]. In addition, crowdsourcing design and manufacturing reduces the repeated investment of resources and wastage of production capacity through the integration of internal and external resources and increases resource utilization efficiency. Finally, it also helps realize value co-creation among enterprises and positively affects their green growth.

Internet technology has accelerated the development of social networking. An increasing number of users in different fields are conducting collaborative design and research and development (R&D) with enterprises through the Internet. For example, Haier has built an open innovation platform, the Haier Open Partnership Ecosystem (HOPE), which brings together universities, scientific research institutions, large companies, start-ups, and other groups, covering more than 100 core technology fields and 120,000 community experts.[13] Relying on the interactive scenarios and tools provided by HOPE, participants can submit personalized demands or innovative solutions for household appliances for users to choose from. HOPE uses big data, cloud computing, and other technologies to accurately match the supply and demand to find the best solution for users, as shown in Fig. 3.6.[14] At present, HOPE has designed and produced a variety of environmental protection household appliances

13 http://hope.haier.com/hope_web/?page_id=1277.

14 https://m.sohu.com/a/203703247_697770.

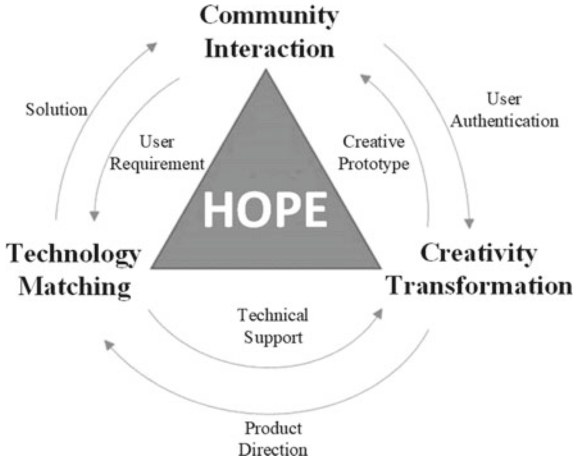

Fig. 3.6 Haier's innovation platform HOPE

based on users' demands, such as energy-saving refrigerators and water-saving dishwashers. By meeting the demands of personalized customization, increasing resource utilization efficiency, and helping to realize value co-creation, crowdsourcing design and manufacturing provides important opportunities for enterprises to adopt the green growth model.

3.2.3 Networked Collaborative Manufacturing

Networked collaborative manufacturing refers to a business that uses the Internet and information technology to realize the cooperation of enterprises in product design, manufacturing processes, and management within and across supply chains. This can achieve agility, flexibility, low cost, and customer centricity by transforming operations [11]. With the rise of the network economy and increasing development of information technology, the market has undergone significant changes. As the degree of innovation, personalization, specialization, and demand dynamics increase, the technical content required to meet market demand is correspondingly higher. An enterprise cannot adapt to this change by relying solely on upgrading internal technology and resource optimization. Modern manufacturing pertains not only to a specific enterprise but also to a group of enterprises, thereby requiring the establishment of closer and more reliable collaborative relationships among enterprises. The integration and optimal allocation of resources, such as equipment, software, technology, and human resources, form the basis of the resource organization model in collaborative manufacturing environments. Networked collaborative manufacturing uses the Internet and various integration technologies to break the constraints of time and space and closely connect enterprises' product design, manufacturing, operation, maintenance, and management within and across supply chains to utilize resources throughout the product life cycle and improve efficiency and product quality.

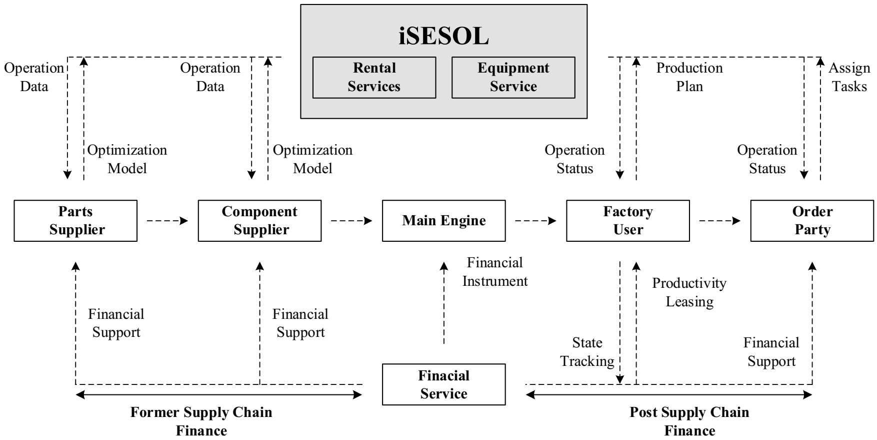

Fig. 3.7 Shenyang Machine Tool Group's networked collaborative manufacturing platform based on iSESOL

Many manufacturing enterprises have begun to implement networked collaborative manufacturing. For example, China's Shenyang Machine Tool Group has built a networked collaborative manufacturing platform based on iSESOL, according to the demands of machine tool users, as shown in Fig. 3.7.[15] This platform relies on many upstream and downstream enterprises that are connected to the industrial chain. According to the different product characteristics and needs of the production process, it can exchange information freely, share knowledge and innovation achievements, and make collaborative decisions. The resources connected to the platform can provide raw material, procurement, and other support for the production processes of related products, enabling manufacturing enterprises to quickly enter the production process, which improves the overall competitiveness of the industrial chain. With the development of industrial Internet platforms, 5G, and other technologies, networked collaborative manufacturing will realize the transformation of enterprises from high-consumption, high-pollution extensive manufacturing to green manufacturing through value co-creation and sharing.

3.2.4 Social Community Manufacturing

Social community manufacturing refers to the product development and production processes in which decentralized manufacturing and service resources establish information, physical and social interconnections through social networks and other media, various communities through self-organization, and interactions between community members and communities and cooperate throughout the product's life

[15] https://www.isesol.com/solution?top=3254.

cycle, as shown in Fig. 3.8. Rapid changes in the global market and the personalized and dynamic diversity of customers' demands have led to large-scale personalization and extensive customer participation as new features of the manufacturing industry. This also encourages enterprises to seek production organization reform and transformation to adapt to the abovementioned changes and maintain competitiveness. Simultaneously, the increasingly subdivided market promotes the continuous emergence of distributed socialized manufacturing service resources. To improve competitiveness and bargaining power, these resources often constitute communities through self-organization, undertake tasks with the overall resource capacity, and improve resource utility through sharing and cooperation. Each community can replace traditional large-scale enterprises in terms of function and business and leads to more flexible and adaptable production organizations. Social community manufacturing has evolved in this context. By breaking down, reorganizing, integrating enterprises, and using and gathering social resources into a community, community members can share information and resources and realize value co-creation with the help of the community and its leading members. In contrast, customers can participate in the entire life cycle of manufacturing by proposing personalized demands, scheme designs, production, manufacturing, and assembly testing, operation, and maintenance, thereby becoming "Prosumers" [12].

With the increasing application of social network technologies and social media to business and enterprise cooperation, the discovery and sharing of social resources, business networking between enterprises, Internet collaboration, and enterprise relationship management have become simpler and more efficient. Enterprises communicate with customers and suppliers through social platforms such as LinkedIn and CloudERP. Simultaneously, cloud computing, social computing, big data analysis, and other information-computing technologies enable the intelligent processing of enterprise production data, real-time active production decision-making, and so on. For example, China's Smart Manufacturing Integrated System (SMIS) framework enables the interconnection and integration of information in enterprises, and the production process becomes intelligent and controllable in real time [13]. These emerging information technologies solve the problems of social community manufacturing in discovering and sharing massive, socialized manufacturing resources, multi-agent interconnections, and interactive cooperation and improve resource

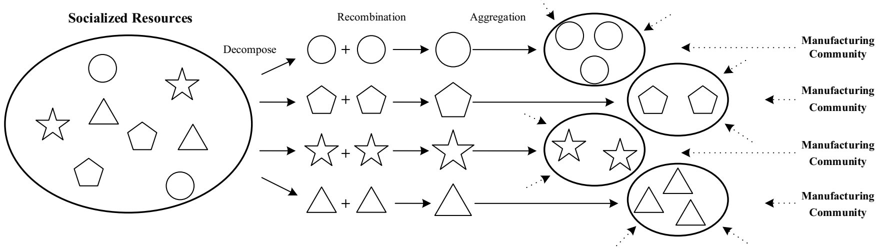

Fig. 3.8 Formation of social community manufacturing

utility and cooperation efficiency. For example, Haier made an active attempt in social community manufacturing with the Haidayuan platform. This platform not only gathers user demands that lead to enterprises' innovation but is also oriented to the large-scale personalized demands of users to connect suppliers' resources, provide solutions, and form a social ecosystem for product design and development, production, manufacturing, marketing, and services.[16] All in all, social community manufacturing is a new concept for realizing large-scale personalized manufacturing of products. It supports community producers and customers to jointly create personalized products and services, which provides a foundation for the efficient organization and utilization of socialized manufacturing resources, service-oriented transformation of manufacturing enterprises, and improvement of the overall interest level of the industry. Therefore, social community manufacturing provides new ideas for enterprises to implement the green growth model.

3.3 New Business Models Providing Avenues for Enterprises' Implementation of the Green Growth Model

3.3.1 Online and Offline Dual Channels

Offline channels refer to trade channels that sell goods through physical stores. Online channels refer to e-commerce trade activities through the Internet. A supply chain system comprising online and offline channels is called a dual channel supply chain. With the rapid development of the Internet and e-commerce, customers have gained access to increasingly convenient channels for product purchases. Previous single and offline channels find it difficult to meet customers' demands. Despite selling through offline channels, more enterprises have established online channels as well to meet customers' demands and improve market competitiveness through dual channels. For example, Heilan used direct-sale stores for early-stage offline sales and then established online consignment channels for online sales, developing rapidly to become the number one brand in China's clothing and home textile industry.[17] As of 2020, Apple had 511 offline stores worldwide and sold products online on its official website as well.[18]

The advantage of a traditional offline channel is that customers can feel and experience the goods. Although online channels are inferior to offline channels in this aspect, they are important for enterprises to reduce advertising costs, meet customers' demands, reduce inventory, and broaden market scope. Simultaneously, they also provide customers with more convenient information and save time. The advantage

[16] http://l.ihaier.com/aboutus.

[17] http://www.heilan.com.cn/abmilestone.

[18] https://www.sohu.com/a/396279345_120335275.

of adopting online and offline dual channels provides an avenue for the accurate matching of supply and demand, which can reduce ineffective production capacity, save costs, add demand-side value, and help enterprises adopt the green growth model.

3.3.2 Closed-Loop Supply Chain

A closed-loop supply chain refers to the complete supply chain cycle from procurement to final sale, including regenerative and reverse processes [14]. Its purpose is to close the flow of materials, reduce pollution discharge and residual waste, and provide services to customers at a lower cost. Social development increases the annual output of new products in the market. The surge in goods such as clothing, toys, daily chemicals, food, digital products, and household appliances not only consumes considerable natural resources but also leads to serious environmental pollution. According to the Global E-Waste Monitor 2020: Quantities, Flows, and the Circular Economy Potential released by the United Nations Institute for Training and Research, in 2019, 53.6 million tons of electronic and electrical waste were produced worldwide, with approximately 7.3 kg per capita. By 2030, the total annual volume of electronic and electrical waste products worldwide is likely to reach 74.7 million tons.[19] Recycling of waste products is one of the basic tasks to realize resource recycling and enterprises' green growth. Enterprises can create excess profits by recycling valuable components of waste products, which is conducive to improving their economic and social environmental benefits. Governments worldwide have also enacted policies to encourage enterprises to recycle waste products and promote the development of a circular economy. Based on the above mentioned economic interests and favorable policies, an increasing number of manufacturers and third-party collectors have initiated recycling businesses, promoting the development of closed-loop supply chains [15].

A closed-loop supply chain is not a simple combination of traditional forward and reverse supply chains but includes the entire process from product design, production, and sale to recycling and reuse of waste products (Fig. 3.9). For example, Apple recycles waste products through an Apple trade plan and then disassembles and reuses waste products using robots such as Daisy and Dave.[20] As China's largest electronic vehicle enterprise, BYD has set up 11 power battery recycling points in China to innocuously recycle and reuse waste batteries, forming a closed loop.[21] According to Huawei's Sustainability Report 2020, it collected 4500 tons of terminal electronic waste through its own recycling channels in 2020, disassembled the electronic equipment that had to be scrapped, and extracted substances such as copper

[19] https://collections.unu.edu/view/UNU:7737.

[20] https://baijiahao.baidu.com/s?id=1730704852691373911&wfr=spider&for=pc.

[21] https://www.byd.com/cn/SocialResponsibility/SocietyDevelopment.html.

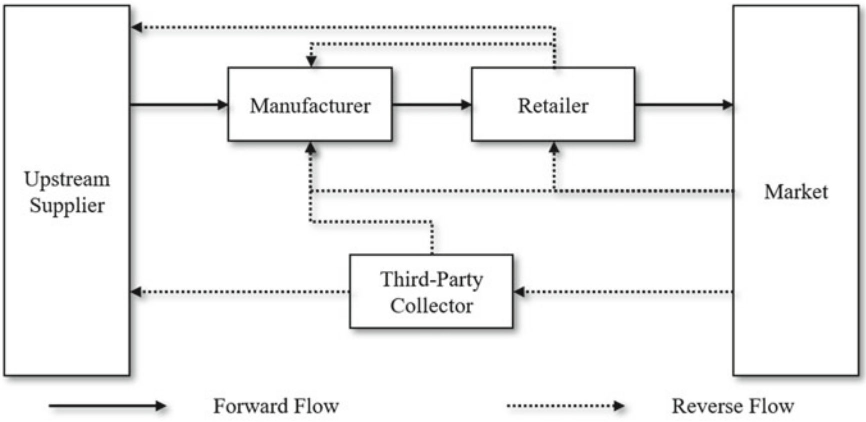

Fig. 3.9 Schematic diagram of closed-loop supply chain [16]

and gold, achieving a final landfill rate of only 0.79%.[22] A closed-loop supply chain effectively reduces the environmental pollution caused by waste products through the reuse and harmless treatment of recycled waste products. Simultaneously, it realizes the recycling of resources and improves resource utilization efficiency. This is an important avenue for enterprises to implement the green growth model.

3.3.3 Platform Economy

Platform economy refers to a new type of economic integration system driven by computing technologies such as the Internet and cloud computing, big data, and the IoT, with many platform enterprises taking the lead and customers and service providers as participants [17]. It connects suppliers and customers on both sides through an Internet platform and provides important connections for the completion of transactions. Generally, the platform does not provide products but mainly intermediary services for users and obtains income by charging certain service fees for users on both sides, as shown in Fig. 3.10. Since the beginning of the twenty-first century, e-commerce platforms have benefited from economic prosperity and the maturity of information technology to become an important consumption channel [18]. By relying on the Internet and digital technology, the platform economy can simplify the transaction process, improve transaction efficiency, and reduce transaction costs.

With vigorous development of the platform economy, an increasing number of enterprises conduct second-hand product trading activities on Internet trading platforms such as Aihuishou and Guazi. In the second-hand market, recyclers can use the convenience and timeliness of Internet transactions to cover more customers,

[22] https://www-file.huawei.com/-/media/corp2020/pdf/sustainability/sustainability-report-2020-en.pdf.

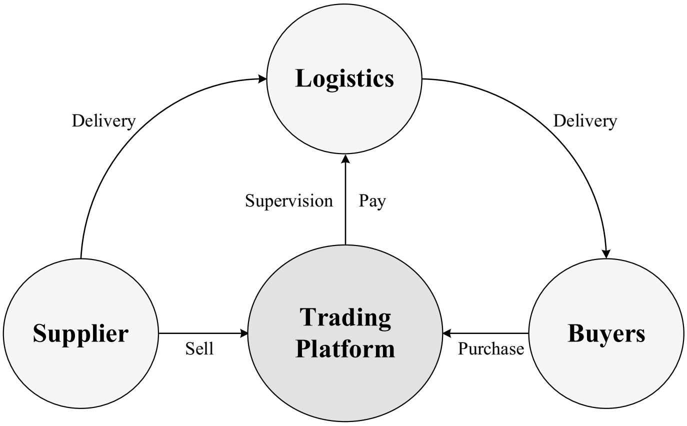

Fig. 3.10 Schematic diagram of the platform economy

expand recycling scope, and improve recycling efficiency to synergize environmental protection and enterprise performance improvement. For example, as the largest electronic product recycling and environmental protection disposal platform in China, Aihuishou achieved an annual trading volume of more than 22 million units in 2021, and its total annual revenue reached 7.78 billion CNY.[23] In addition, by relying on the platform economy model, enterprises can implement the green growth model by comprehensively integrating resources and promoting the joint participation of all upstream and downstream value chain entities. For example, Alibaba proposed the "Scope 3+" carbon emission reduction plan involving the participation of the entire value chain in 2021, as shown in Fig. 3.11. It plans to achieve the carbon emission reduction target of 1.5 billion tons within 15 years.[24] These advantages of the platform economy provide new avenues for enterprises to implement the green growth model.

3.3.4 Energy Performance Contracting

Energy performance contracting is an innovative commercial energy-saving mechanism based on market operations. It refers to the agreement and operation model of energy-saving objectives attained by customers and energy service companies. It requires energy service companies to provide technical services to customers and realize the relevant energy-saving requirements, whereas customers need to pay a certain fee for the energy-saving benefits to ensure the profit of the energy service company, as shown in Fig. 3.12. Energy performance contraction has a highly reliable energy-saving effect. The saved energy cost can be used to pay for investment

[23] https://3g.163.com/dy/article/H26SNAV90539JGBD.html.
[24] https://sustainability.alibabagroup.com/en.

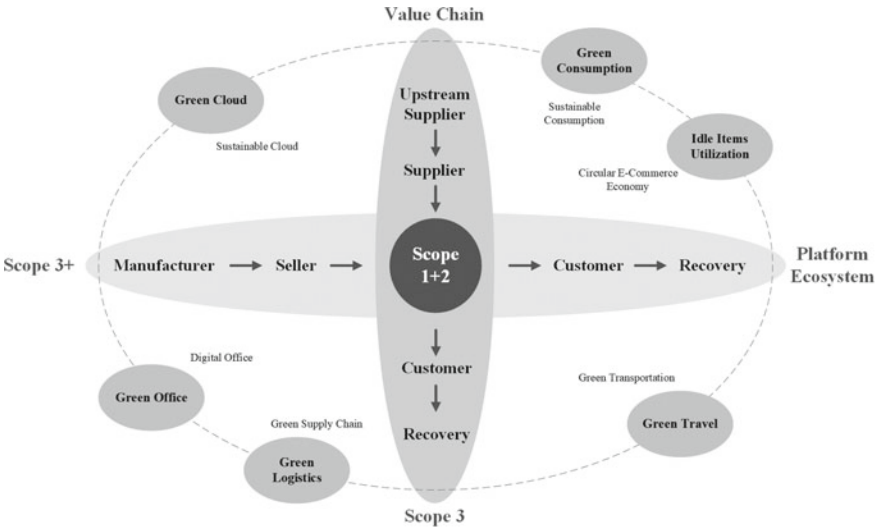

Fig. 3.11 Alibaba's "Scope 3+" carbon emission reduction plan

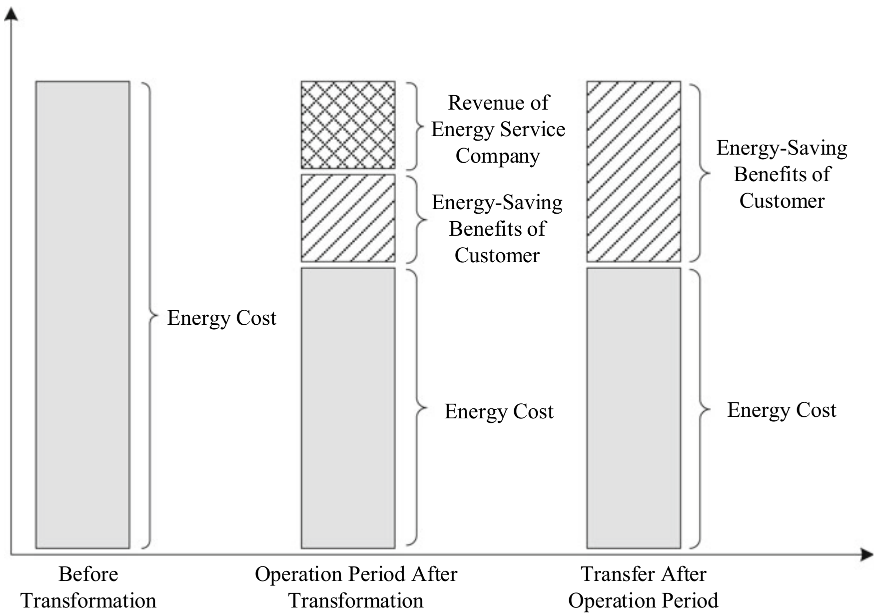

Fig. 3.12 Benefit distribution structure of energy performance contracting

projects, including the costs of transforming and upgrading energy-saving equipment and introducing various technologies. It has gradually become one of the most common approaches for energy savings and emission reduction [19].

Energy performance contracting is a model that provides energy-saving services for customers in need, based on future energy-saving benefits. It has successfully spawned a new energy-saving industry. For example, Econoler International provides customers with energy resource assessments, energy cost analyses, real-time management of energy consumption, and dynamic monitoring of energy-saving equipment and other services. It has conducted business in many countries around the world and has completed more than 2500 energy performance contracting projects.[25] Jiutian Energy implemented an energy performance contracting project for power generation engineering for Chengde Steel. After a one-year construction period, the introduction of advanced steam turbine generator units, transformation of water supply and drainage systems, and thermal control systems have all been completed, and an annual energy-saving income of approximately 180 million CNY has been earned.[26] Energy performance contracting meets not only the demands of modern enterprise operation specialization and service socialization but also the trend of an energy-saving society. It helps enterprises promote green transformation and ensures the effectiveness of their green growth.

3.4 Summary

This chapter discusses the development trends of enterprises' green growth model from the perspectives of new technologies, new forms of industry, and new business models. New technologies, such as next generation Internet and IoT, help to reduce transaction costs, accurately match supply and demand, achieve value co-creation and sharing, and realize the entire life cycle of environmental management. New forms of industry, such as collaborative logistics, crowdsourcing design and manufacturing, networked collaborative manufacturing, and social community manufacturing, help to reduce ineffective production capacity, meet customers' demands, and realize value co-creation. New business models, such as online and offline dual channels, closed-loop supply chain, platform economy, and energy performance contracting, help to improve operational efficiency, realize resource recycling, and increase energy efficiency. Thereby, the new technologies, new forms of industry, and new business models provide methods, opportunities, and avenues for enterprises' implementation of the green growth model.

[25] https://baijiahao.baidu.com/s?id=1673707676973554969&wfr=spider&for=pc.

[26] https://www.docin.com/p-2362925703.html.

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