



# Study on green transformation of engineering construction enterprises from the perspective of sustainable development

Xiaoyan Dai<sup>1,2,\*</sup>, Kai Hu<sup>1,2</sup>, Yingang Wang<sup>1,2</sup>

<sup>1</sup> School of Architecture and Material Engineering, Hubei University of Education. Wuhan 430205, China

<sup>2</sup> BIM Technology Application Engineering Center, Hubei University of Education, Wuhan 430205, China.

\*Correspondence should be addressed to Xiaoyan Dai:  
383561219@qq.com

**Abstract.** Sustainable development is one of the core connotations of Chinese-style modernization, green low-carbon transformation has become the only way to high-quality sustainable development of enterprises. Based on the new requirements of the green development of engineering construction enterprises, this paper analyzes the problems existing in the green transformation of enterprises, and puts forward that enterprises should adhere to the people-oriented principle, and promote engineering construction to the whole process of green construction transformation, and accelerate the coordinated development of intelligent construction and the industrialization of new buildings to promote the transformation of engineering construction into green construction throughout the process, and strengthen cooperation between upstream and downstream enterprises in the entire industrial chain to maximize overall low-carbon benefits.

**Keywords:** Sustainable development; green transformation; engineering construction enterprises

## 1 INTRODUCTION

“The United Nations 2030 Agenda for Sustainable Development” establishes 17 Sustainable Development Goals, which aims to completely solve the development problems of the three dimensions of society, Economy and environment in an integrated way from 2015 to 2030. The 16th National Congress of the Communist Party of China (CPC) has made “Continuous enhancement of the capacity for sustainable development” one of the goals of the all-round construction of the CPC Xiaokang, shifting the focus from the development of immediate and local interests to the development of long-term and overall interests, to realize the harmonious coexistence of man and environment and promote the sustainable development of society. Construction in-

© The Author(s) 2023

S. Yacob et al. (eds.), *Proceedings of the 2023 7th International Seminar on Education, Management and Social Sciences (ISEMSS 2023)*, Advances in Social Science, Education and Humanities Research 779,  
[https://doi.org/10.2991/978-2-38476-126-5\\_96](https://doi.org/10.2991/978-2-38476-126-5_96)

dustry is the pillar industry of national economy, but it is also the key field and important handhold of sustainable development because of the backward economic growth mode, high consumption of energy and resources, low level of informatization and intelligentization. Engineering construction enterprises are an important part of the market economy, can provide more jobs for society, promote urban and rural development, stable economic growth, promote national economic and social development, therefore, we should speed up the green transition in the cause of sustainable development represented by the “Double carbon” goal, so as to meet more development opportunities.

## **2 NEW REQUIREMENTS FOR GREEN DEVELOPMENT OF ENGINEERING CONSTRUCTION ENTERPRISES FROM THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT**

### **2.1 Green and low-carbon environmental protection**

According to the “China Building Energy Consumption Research Report (2021)”, in 2019, China's construction industry emitted 4.997 billion tons of carbon, accounting for 50.6 percent of China's total carbon emissions. Project construction enterprises should take “Double carbon” target as the lead, vigorously promote energy conservation and emission reduction, green and low-carbon development. On 22 September of the 2021, the state council issued the “Opinions on complete, accurate and comprehensive implementation of the new development concept and work to achieve peak carbon and carbon neutrality”, which propose that we should establish a green and low-carbon circular economic development system, and promote a comprehensive green transformation of economic and social development, develop green and low-carbon industries vigorously, and improve the quality of green and low-carbon development in urban and rural areas. The engineering construction enterprises should comply with the development demand of low-carbon economy era, take the supply-side structural reform as the guidance, and take the green construction measures to help our country achieve the “Double carbon” target on schedule.

### **2.2 Empowering enterprises digitally**

Characterized by digitalization, networking and intelligentization, The intelligent construction is a positive response to the “14th five-year plan for National Economic and social development and the outline of the vision goals for 2035”, which emphasis that we should accelerate digital development and drive the transformation of the mode of production, way of life and way of governance as a whole through digital transformation.” . Engineering construction enterprises should focus on improving the level of digital management, and carry out the standardized modeling, networking interaction, visual cognition, high-performance computing on the basis of digital construction elements of, and promote the construction of prefabricated building, and to

promote the use of building intelligent robots such as wall-laying robots, steel beam welding robots, multi-point drilling and rock-breaking robots, build Smart site and apply BIM technology for collision detection and optimization to solve practical problems with digital thinking, as shown in Figure 1.

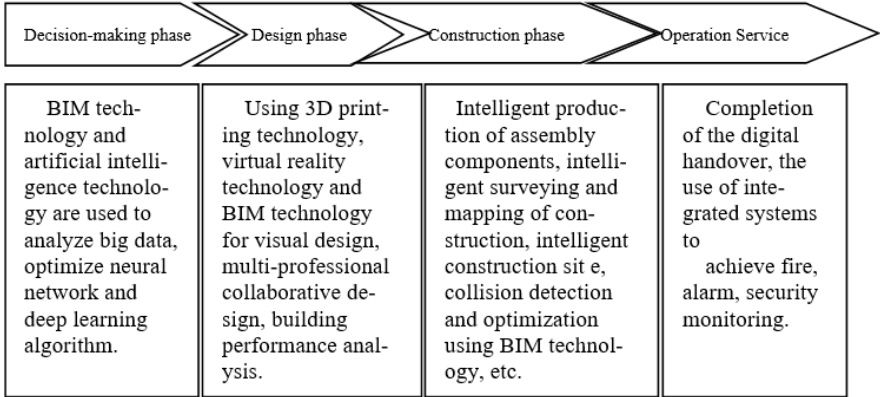


Fig. 1. Intelligent construction activities throughout the life cycle of the project

### 2.3 Promoting the high-quality development of economy and society.

Our country's economy has changed from high-speed growth stage to high-quality development stage, high-quality development is the fundamental way of sustainable development. The green construction industry covers many enterprises, involves a wide range of categories, and has a strong driving force on related industries, a significant economic effect, and a high contribution rate to GDP. The green development of construction enterprises will not only reshape the construction industry in terms of product forms, business models, mode of production and management models, but also create new industries, new forms of business and new models, to provide application scenarios for cross-sector, all-round and multi-level industrial integration, to create more green jobs, to promote the development of green economy, and to foster and strengthen new driving forces <sup>[1]</sup>.

## 3 PROBLEMS IN GREEN TRANSFORMATION OF ENGINEERING CONSTRUCTION ENTERPRISES FROM THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT

### 3.1 Awareness of green development of enterprises should be strengthened urgently

Most of the engineering construction enterprises in our country have not set up technology R & D centers, lack the ability of technology innovation and the endogenous motive force for green development and have the extensive mode of production, the

low utilization efficiency of resources and labor force, the lack of green construction measures, and the serious environmental pollution of dust and noise. The construction intelligent robot which is helpful to improve the construction quality and efficiency and reduce the safety risk has not been popularized, and the green purchasing consciousness is weak.

### **3.2 The digitization level of enterprises needs to be improved.**

The digitization transformation means that enterprises apply new digital technology in the process of production and management to realize data-driven production and management decision <sup>[2]</sup>, it is the only way for engineering construction enterprise to develop into intelligent construction. At present, most of the engineering construction enterprise in our country have low level of informationization, relatively few core technologies, limited financial strength, difficult and high cost of financing.

### **3.3 The synergy between upstream and downstream enterprises is not strong**

Green construction is the embodiment of the concept of sustainable development in the field of engineering construction, including green building materials, green policy, green Planning/planning, green design, green construction, green operation and maintenance, green demolition and integrated use of the entire industrial chain <sup>[3]</sup>. At present, the domestic green construction industry is still relatively “Split”, and there is no data connection, resource sharing and business collaboration between upstream and downstream enterprises in the industrial chain.

## **4 SUSTAINABLE DEVELOPMENT-ORIENTED IMPLEMENTATION PATH OF GREEN TRANSFORMATION OF ENGINEERING CONSTRUCTION ENTERPRISES**

The State Council's “guidance on accelerating the establishment and improvement of a green, low-carbon and circular economic development system” mentioned that the new development concept will be firmly implemented, and we should promote green Planning, green design, green investment, green construction, green production. In order to gain more advantages in the construction market, the engineering construction enterprises must take the sustainable development as the direction, follow the trend and speed up the green transformation in the new round of scientific and technological revolution and industrial transformation, and enable high-quality development, firmly take the right and market-oriented path of innovation.

#### **4.1 Put people first, and promote engineering construction to the whole process of green construction**

Green planning is the use of digital, networked, intelligent technology, co-ordinate design, production, construction and operation to help the industrial chain upstream and downstream enterprises to share resources, joint development, and develop a reasonable carbon reduction plan, which embodies the green characteristics of industrialization, informationization, intensification and industrialization. Green design is to achieve the pre-participation of producers, builders and operators, to promote integrated design, collaborative design and prefabricated building standardized design, and give priority to building materials and products, recyclable materials and reusable materials that have been certified as green building materials, energy-saving technologies such as building-integrated photovoltaics, optical storage, new building power distribution systems and high-performance solar collectors should be vigorously promoted.

The construction enterprises should construct the supervision system of the carbon emission of the construction enterprises in the green construction link, analyze the key carbon-reducing fields, tap the potential of carbon-reducing, promote the green construction new technology actively, use the information technology such as BIM, big data, cloud computing and the Internet of things to promote prefabricated building construction, promote innovation in construction methods, to realize resource conservation and environmental protection by industrialization and intelligent construction, and improve the level of fine management on construction site. Green delivery is to evaluate the effect of saving resources and protecting environment by green construction.

#### **4.2 Speed up the digitization transformation of enterprises, promote the coordinated development of intelligent construction and new-type construction industrialization.**

Engineering construction enterprises should use digital technology to carry out all-round, multi-angle, all-chain transformation, to promote intelligent construction by digital construction. The construction enterprises should attach great importance to the information construction from the strategic level, and establish the digital transformation cognition system from the enterprise level to the project level by strengthening the digital transformation training. In particular, the leaders of enterprises should ensure that corporate culture, management ideas, organizational behavior to meet the needs of digital development. Engineering construction enterprises should attach importance to cooperation with trade associations, training institutions, consulting companies and universities, and strengthen the training and reserve of digital application talents, so as to improve the endogenous power and ability of enterprises' digital transformation as shown in Figure 2.

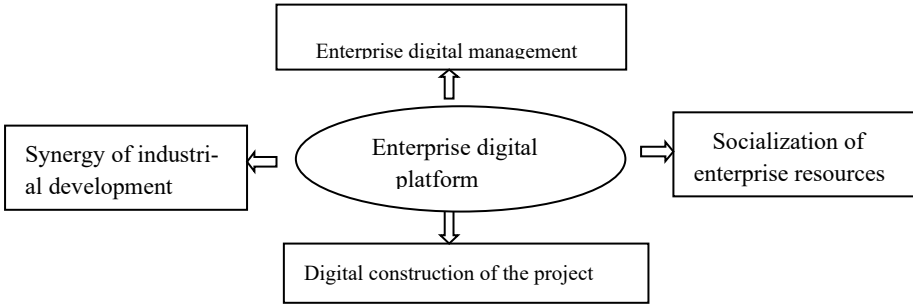


Fig. 2. Digital platform function of construction enterprise

The socialization of enterprise resource is to strengthen the data connection, resource sharing and business coordination between enterprise and the upstream and downstream enterprises of industrial chain, to construct the engineering digital ecosystem, and to establish the long-term strategic partnership, promote the engineering design, procurement, construction, commissioning, operation and other links of efficient coordination, create a win-win situation, optimize economic benefits [4].

#### 4.3 Strengthen the cooperation between upstream and downstream enterprises in the whole industrial chain to realize the maximum low-carbon benefit

We should promote coordinated development throughout the life cycle jointly, fully reflect professional division of labor and social cooperation. Engineering construction enterprises should advance with the times, promote the integration and development of green construction and new technology, and change the procurement mode from offline procurement to industry e-commerce platform, by means of digital means to promote the interconnection between enterprises in the upper and lower reaches of the industrial chain, so as to improve the development quality of green construction and improve the economic, social and ecological benefits of construction activities to maximize the overall low-carbon benefits.

## 5 CONCLUSION

Our country's economy has changed from high-speed growth to high-quality development stage [5], Engineering construction enterprises should strengthen the implementation of national policies, take the initiative to adapt to the new situation, adhere to green and low-carbon development, seize the opportunity to speed up the digital transformation and upgrading, promoting enterprises to enhance their ability to cope with risks and sustainable development.

## REFERENCES

1. Fan, Z. (2022) .“The implementation path of green development of construction industry under the dual-carbon target ”. China Economic Weekly, (4): 107-109(in Chinese).
2. Tian,H. (2021) . “Experience, practice and development prospect of digital transformation in construction enterprises ” . Construction economy, (10) : 5-10 (in Chinese).
3. He, F. (2022). “ Demand analysis of green construction industrialization development . ” Construction Science and Technology, (8) : 17-20 (in Chinese).
4. Yang, J (2021) .“Cost control strategy of medium-sized industrial enterprises based on value chain ” . China foreign trade, (1): 40-41 (in Chinese).
5. Xiao, X (2021) .“Lead and promote the high quality development of construction industry with green construction ”. Architecture, (4): 22-23 (in Chinese).

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

