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Research on the path of high-quality development of the construction industry driven by new quality productivity

Tiantian Zhao

Linyi Vocational College, Linyi, Shandong, 276017, China
20170027@lyvc.edu.cn

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Abstract: As a pillar industry of the national economy, the construction industry is an important part of the industrial modernization. Driven by the background of new quality productivity, how to realize the high-quality development of the construction industry, intelligent construction, green construction, digital construction is the only way. Leading the construction of modern industrial system with scientific and technological innovation, taking intelligent construction as the starting point, vigorously promote the digital transformation and high-quality development of the construction industry, and accelerate the formation of "new quality productivity" with the characteristics of the construction industry.This paper mainly analyzes the problems existing in the current development of the construction industry under the background of the new quality productivity, puts forward the measures to improve the new quality productivity of the construction industry, and analyzes the actual construction case as the innovation practice of the new quality productivity, and shows the application potential of the new quality productivity in the construction industry. This paper aims to provide theoretical support and practical guidance for the transformation and upgrading of the construction industry, in order to promote the high-quality development of the construction industry.

1. Research background

1.1. Connotation of new quality productivity

New quality productivity refers to the ability to realize the overall improvement of production mode, production efficiency and product quality through technological innovation, allocation optimization of production factors and industrial structure upgrading. It emphasizes the leading role of innovation, gets rid of the traditional mode and path of economic growth, has the characteristics of high-tech, high efficiency and high quality, and is the quality of advanced productive forces in line with the new development concept[1]. New quality productivity plays a key role in promoting the transformation and upgrading of the construction industry, realizing high-quality development and promoting the sustainable development of the construction industry.

1.2. The status and challenges of the construction industry in the national economy

As a pillar industry of the national economy, the construction industry not only directly contributes a large amount of GDP, but also is deeply related to many upstream and downstream industries, forming a huge economic network. Its healthy development has a strong driving force for economic growth, which can absorb a large number of labor force and relieve the employment pressure. At the same time, the construction industry is an important driving force of urbanization. Through the construction of infrastructure and living space, it can accelerate the renewal of urban appearance and improve the quality of life of residents. In addition, the continuous technological innovation and industrial upgrading of the industry promote the efficient utilization of resources and the application of environmental protection technology, and contribute to the sustainable economic development[2]. In short, the construction industry occupies a core position in the national economy, and is an important support for economic growth, employment security, urban prosperity and industrial upgrading

The construction industry faces multiple challenges in the current development. On the one hand, with the acceleration of the urbanization process, the scale of construction projects is constantly expanding, the complexity is increasing, and the technical requirements for design, construction and management are also becoming higher and higher. On the other hand, resource and environmental constraints are increasingly severe, energy conservation and emission reduction, green building has become an important direction of the development of the industry, but technology popularization and cost control are still difficult problems. At the same time, the industry competition is intensifying, the profit space is compressed, and the enterprises need to constantly innovate and improve the management efficiency to cope with the market changes. In addition, the shortage of talents, especially the lack of high-end technology and management talents, also restricts the sustainable and healthy development of the construction industry. Therefore, the construction industry needs to strengthen technological innovation, optimize resource allocation, promote green development, and pay attention to talent training and introduction, in order to cope with many challenges in the current development.

1.3. The promoting role of new quality productivity on the high-quality development of the construction industry.

As the source of innovation driven, new quality productivity has a strong role in promoting the high-quality development of the construction industry. By introducing advanced elements such as high-tech, intelligent and green, it optimizes the construction production process, improves the building quality and efficiency, and promotes the deep integration of the construction industry with information technology, new material technology and other fields. This process not only promotes the transformation and upgrading of the construction industry, but also enhances the position of the construction industry in the global value chain, laying a solid foundation for the realization of high-quality and sustainable development of the construction industry.

2. Research significance

2.1. Overview of BIM Technology

It is of great academic value and practical significance to study the high-quality development path of the construction industry driven by new quality productivity. Academically, it has deepened the understanding of the internal laws of the transformation and upgrading of the construction industry, provided a new perspective for the multi-disciplinary research such as architecture and

economics, and enriched the theoretical system of high-quality development[3]. In reality, this research provides strategic guidance for the construction industry to cope with market changes, technological innovation and environmental challenges, and helps to promote the technological innovation, management optimization and industrial upgrading of the construction industry, promote the sustainable development of the construction industry, and enhance the national economic competitiveness and international status.

3. Methods to improve new quality productivity in the construction industry

3.1. Technological innovation path

Driven by the new quality productivity, the technological innovation path of the construction industry shows a trend of diversification and intelligence. First of all, the application of new technologies and new processes becomes the key, such as the deep integration of big data, industrial Internet, artificial intelligence, 5G and other cutting-edge technologies with the construction industry, promoting the development of intelligent construction. Through prefabricated steel structure, BIM technology and other means, the standardization and modular production of building components are realized, and the efficiency and quality of construction are greatly improved.BIM technology integrates the whole life cycle information of architectural design, construction, operation and maintenance, realizes three-dimensional modeling, data sharing and collaborative work, and significantly improves the high-quality development of the construction industry. It improves the design accuracy and construction efficiency, reduces the cost, enhances the transparency and controllability of project management, and promotes the intelligent, green and sustainable development of the construction industry[4]. The wide application of BIM technology provides strong technical support for the high-quality development of the construction industry.

Secondly, the application of new materials is also an important direction of technological innovation. The research and development and application of new materials such as green building materials and high-performance materials not only improve the building quality, but also promote the green and low-carbon development of the construction industry.

Moreover, management innovation is equally important. Promoting new management modes such as the digital delivery of engineering projects and the establishment of intelligent construction evaluation system can optimize the allocation of resources and improve the efficiency of project management.

To sum up, the technological innovation path in the construction industry driven by new quality productivity includes the application of new technologies and new processes, the research and development and application of new materials, and the innovation of management mode. These innovative paths have jointly promoted the transformation and upgrading and sustainable development of the construction industry[5].

3.2. Industrial Upgrading Path

Driven by the strong productivity of new quality, the construction industry is experiencing a profound path of industrial upgrading. This process is mainly reflected in the three core directions of intelligence, green and service. Intelligent upgrade, through the integration and application of BIM, Internet of Things, big data and other advanced technologies, to realize the digital and intelligent management of the whole life cycle of the building, improve the efficiency and quality of design, construction, operation and maintenance and other links. Green transformation focuses on the research and development and application of low-carbon environmental protection materials, as well as the promotion of energy-saving and emission reduction technologies, and promotes the

transformation of the construction industry to a green, low-carbon and circular development mode. At the same time, the service-oriented extension has become a new trend of industrial upgrading. The construction industry is no longer limited to the traditional construction services, but to the comprehensive services of the whole life cycle of construction, including consulting, design, financing, operation and maintenance, to meet the diversified and personalized needs of customers.

The implementation of this series of industrial upgrading paths will not only enhance the overall competitiveness of the construction industry, but also contribute important forces to the sustainable development of the economy and society. The optimization of management mode is also an important aspect of industrial upgrading. Through the introduction of lean management, project general contracting, whole-process engineering consulting and other advanced management modes, the construction industry has realized the whole-life-cycle management of engineering projects[6]. The application of these management modes not only improves the overall benefit and quality of the project, but also promotes the transformation and upgrading and the high-quality development of the enterprise.

3.3. Digital Transformation Path

First of all, technology integration and innovation are the core path of the digital transformation of the construction industry. With the rapid development of advanced technologies such as big data, artificial intelligence and the Internet of Things, the construction industry has begun to deeply integrate these technologies into various links such as design, construction, operation and maintenance. For example, through BIM (Building Information Model) technology, the digital management of the whole life cycle of building project can be realized, improving the design accuracy and construction efficiency; With the Internet of Things technology, it can monitor the operation status of building equipment in real time, predict maintenance requirements and reduce operation and maintenance cost. In addition, the application of technologies such as cloud computing and edge computing also provides the construction industry with strong data processing and analysis capabilities, supporting enterprises to make more accurate and efficient decisions. The integration and innovation of these technologies not only promote the reform of the production mode of the construction industry, but also improve the intelligent level and user experience of the construction products.

Secondly, the innovation of business model and management model is an important support for the digital transformation of the construction industry. In the process of digital transformation, construction enterprises need to actively explore new business models, such as engineering general contracting, PPP (government and social capital cooperation), etc., to adapt to the changes in market demand. At the same time, enterprises also need to optimize the management process, improve the management efficiency, and achieve fine management and intelligent decision-making. This includes building a digital management platform to realize the real-time sharing and collaboration of project information, using data analysis technology to deeply mine and analyze the data in the project management process to provide scientific basis for decision-making, and promoting the flattening and flexibility of the organizational structure to improve the response speed and innovation ability of the organization. Through the implementation of these innovative measures, construction enterprises can more efficiently integrate resources, reduce costs and improve service quality, so as to achieve high-quality development.

3.4. Talent training Path

In order to meet the needs of digital transformation and intelligent upgrading of the industry, talent training should pay attention to cross-border integration and innovation ability training. On

the one hand, we should strengthen the integration teaching of architectural professional knowledge, information technology, data science and other interdisciplinary disciplines, and cultivate compound talents who understand both architecture and technology.At the same time, it promotes the concept of lifelong learning, and encourages employees to continuously update their knowledge structure and master emerging technologies and management concepts. Through these measures, the construction industry will build a talent training system to meet the requirements of new quality productivity, and provide a solid talent support for the continuous innovation and development of the industry.

4. Typical case analysis

4.1. Project Overview

Figure 1: Donggang Wanda Plaza Shopping Center

The Donggang Wanda Plaza Shopping Center is located west of Qingdao Road and north of Shandong Road, which is a landmark construction project in Rizhao City. Specific pictures are shown above, Figure 1.With a total construction area of 151,032.82 square meters, the project is a large commercial complex integrating various functions, such as commercial center, indoor pedestrian street, shopping, characteristic catering, culture, entertainment and so on. The project has two floors underground, four floors above ground, design grade B and seismic grade 2. The foundation bearing layer is slightly weathered granite, the structure form of independent foundation under the column and waterproof floor is adopted, and the main body is the frame structure, which fully demonstrates the design concept and construction technology of modern architecture.

4.2. Specific practice path and results

4.2.1 Technology innovation and quality control

In the construction of the project, Rizhao Tiantai Construction and Installation Engineering Co., Ltd., as the construction unit, cooperated closely with Rizhao Xingye Real Estate Development Co., Ltd., Rizhao Geotechnical Engineering Survey Institute and other units to jointly overcome a number of technical problems. Through the use of advanced construction technology and strict quality control measures, we need to ensure the smooth progress and high quality completion of the

project. The project won the first prize of Shandong Province Engineering Construction Taishan Cup in 2021, which fully proves its outstanding performance in technological innovation and quality control.

4.2.2 Technical innovation and quality control

In the process of design and construction, the project always adheres to the concept of green environmental protection, and actively adopts environmental protection materials and energy-saving technology to reduce the impact on the environment. At the same time, the project also focuses on sustainable development. Through scientific planning and reasonable layout, it provides convenient business services and a comfortable shopping environment for the surrounding residents, and further promotes the prosperity and development of the regional economy.

4.2.3 Green, environmental protection and sustainable development

The completion of Rizhao Donggang Wanda Plaza Shopping Center not only adds a beautiful scenery to Rizhao, but also greatly improves the commercial atmosphere and brand image of the city. The project has attracted many well-known brands at home and abroad to settle in, providing diversified consumption choices for citizens. At the same time, the successful operation of the project has also brought significant economic and social benefits, and made a positive contribution to the economic development and social progress of Rizhao city.

4.2.4 Demonstration and leading role of the industry

As a typical representative of the high-quality development of the construction industry in Rizhao, the Rizhao Donggang Wanda Plaza Shopping Center project has set an industry benchmark in technological innovation, quality control, green environmental protection and other aspects. Its successful experience and management mode provide valuable reference and reference for other construction projects, and play an important demonstration and leading role in promoting the high-quality development of the whole industry.

5. Conclusion and Outlook

Driven by the strong new quality productivity, the construction industry is entering a new stage of high-quality development. In this process, digital transformation has become the core engine. Through the deep integration of big data, cloud computing, artificial intelligence, Internet of Things and other advanced technologies, it not only reshaped the whole life cycle management process of architectural design, construction and operation, but also greatly improves the refinement level and production efficiency of project management. The wide application of green buildings and low-carbon technologies promotes the efficient utilization and recycling of resources, reduces environmental pollution, and promotes the transformation of the construction industry to a sustainable development direction[7]. At the same time, the popularization of BIM (Building information model) technology has realized the leap from two-dimensional drawings to three-dimensional digital models, enhanced the coordination of design and construction, reduced the error rate, and accelerated the standardization and intelligent process of the construction industry. In addition, the rise of prefabricated buildings and intelligent manufacturing has further promoted the factory production of construction products, improved the construction speed and quality, and reduced the intensity and safety risks of site operations. To sum up, the injection of new quality productivity is leading the construction industry towards a new and more efficient, intelligent, green and sustainable era of high-quality development.

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