The Application Status and Future Development Direction of Intelligent Construction Technology in Landscape Engineering

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Abstract: This article makes a comprehensive and in-depth study on the application of intelligent construction technology in landscape engineering. In the introduction, firstly, the core position of landscape engineering in urban construction and the wide application trend of intelligent construction technology in all walks of life with the progress of science and technology are expounded. Based on this background, this article clarifies the importance and practical significance of studying the application status and future development direction of intelligent construction technology in landscape engineering, aiming at improving efficiency, reducing costs and promoting the sustainable development of landscape engineering through intelligent means. In this article, the commonly used intelligent construction technologies in landscape engineering are introduced in detail, and the remarkable effects of these technologies in improving construction accuracy, optimizing resource allocation and reducing labor costs are analyzed. Futhermore, from the perspective of industry development, the profound influence of intelligent construction technology on the production mode, management mode and market competition pattern of landscape engineering industry and its positive role are deeply discussed. Finally, this article emphasizes the close relationship between intelligent construction technology and the sustainable development of landscape engineering, and looks forward to the broad development prospects of landscape engineering driven by intelligent technology in the future.

1. Introduction

Landscape engineering is an important part of urban construction. It is related to the greening and beautification of the city, and it is also the key factor to improve the quality of life of residents and create a livable environment [1]. It covers many aspects, such as plant planting, landscape design, water body layout, garden road laying, etc. Through scientific and reasonable planning and construction, natural elements and artificial structures are perfectly integrated to create a beautiful and practical urban green space [2]. In the process of rapid urbanization, the importance of landscape engineering has become increasingly prominent. It has become an important symbol to measure the level of modernization and ecological civilization of a city [3].

In recent years, with the rapid development of science and technology, intelligent construction technology has gradually emerged and shown a wide application prospect in all walks of life [4]. From the automatic production line of manufacturing industry to the intelligent building system of construction industry, intelligent technology is profoundly changing the production mode and operation mode of traditional industries with its characteristics of high efficiency, accuracy and controllability [5]. In the field of landscape engineering, the application of intelligent construction technology is also unstoppable [6]. Whether it is accurate measurement and positioning by intelligent equipment or optimizing plant configuration and maintenance management by big data analysis, intelligent technology has brought unprecedented opportunities for landscape engineering.

In view of this, it is particularly important to study the application status and future development direction of intelligent construction technology in landscape engineering. This research will help us to deeply understand the practical application effect of intelligent technology in landscape engineering, and also provide strong technical support and decision-making basis for future landscape engineering construction. Through the application of intelligent construction technology,

we can effectively improve efficiency, reduce the waste of manpower and material resources and reduce the project cost. Futhermore, intelligent technology can help us better achieve the sustainable development goal of landscape engineering, so as to create a more beautiful and livable urban green space on the premise of protecting the ecological environment. Therefore, it is of great necessity and practical significance to carry out this research.

2. Application status of intelligent construction technology in landscape engineering

In the field of landscape engineering, intelligent construction technology is gradually becoming an important force to promote the progress of the industry. At present, a series of advanced intelligent technologies are widely used in all aspects of landscape engineering [7]. Among them, the intelligent planning and design system, with its powerful data processing and analysis capabilities, can provide scientific and reasonable planning and design schemes for landscape engineering according to various factors such as topography, climate and soil. Automated construction equipment, such as intelligent excavators and automatic sprinkler systems, has achieved high efficiency and accuracy in the construction process through accurate control and execution [8]. In addition, the application of remote monitoring and management platform makes the construction management of landscape engineering more convenient and efficient. Managers can grasp the progress of the project anytime and anywhere and adjust the construction plan in time.

The specific application cases of these intelligent construction technologies in landscape engineering are not uncommon [9]. For example, Table 1 shows the specific application of intelligent construction technology in landscape engineering, and at the same time makes clear the main benefits brought by these technologies. This fully reflects the importance and value of intelligent construction technology in landscape engineering.

Table 1 Specific Application Cases and Benefits of Intelligent Construction Technologies in Landscape Engineering

Intelligent Technology	Specific Application	Main Benefits
Intelligent Planning & Design System	Provide scientific and reasonable landscape planning and design schemes based on factors such as terrain, climate, soil, etc.	Improve the scientificity and accuracy of planning and design, reduce human errors
Intelligent Excavator	Achieve efficient and precise excavation through precise control	Improve construction efficiency, reduce material waste and labor costs
Automatic Sprinkler System	Automatically adjust the sprinkling amount and time according to plant needs, improve irrigation efficiency	Save water resources, ensure plants receive timely and appropriate irrigation
Remote Monitoring & Management Platform	Real-time grasp of project progress, adjust construction plans anytime and anywhere, improve management efficiency	Enhance the convenience and timeliness of construction management, improve management efficiency

However, the application of intelligent construction technology in landscape engineering also faces some challenges. There are still shortcomings in technology maturity that cannot be ignored. Although intelligent technology has made great progress, it is still limited in some application fields and needs to be continuously improved and optimized [10]. Furthermore, cost input is also a big problem. The purchase and maintenance cost of intelligent equipment is high, which may be difficult to bear for some garden projects with limited funds. In addition, the smooth application of intelligent construction technology is inseparable from the operation and management of professional and technical personnel. Therefore, strengthening personnel training and improving the comprehensive quality of technical personnel has become an indispensable part of popularizing intelligent construction technology.

3. Influence analysis of intelligent construction technology in landscape engineering

The introduction of intelligent construction technology has a far-reaching impact on the production mode, management mode and market competition pattern of landscape engineering industry. From the production mode, traditional landscape engineering relies on a lot of manpower and manual operation, and the application of intelligent technology makes the construction process more automatic and accurate. This can effectively improve the construction efficiency, reduce the errors caused by human factors, and make the production mode of landscape engineering gradually change to modernization and industrialization. In terms of management mode, intelligent technology provides a brand-new management means for landscape engineering. Through remote monitoring, data analysis and other technologies, managers can grasp the progress of the project in real time and find and solve problems in time. In this way, more efficient and scientific management is realized. The application of intelligent technology has also intensified the changes in the market competition pattern. Those enterprises that can master and use intelligent technology skillfully will occupy greater advantages in the market.

Intelligent technology has changed the production mode and management mode of landscape engineering industry, and also greatly promoted the innovation and development of the industry. The application of intelligent technology enables landscape engineers to realize new design concepts more freely. For example, through the intelligent planning and design system, different landscape effects can be simulated, providing designers with more creative space. The application of intelligent technology has also greatly improved the construction quality and efficiency of landscape engineering. The extensive use of automatic construction equipment (intelligent excavators, automatic paving machines, etc.) makes the construction process more accurate and fast. These equipment can operate in strict accordance with the design requirements, which greatly reduces the interference of human factors on the construction quality and ensures that every detail of the garden project can achieve the expected effect of the designer. Intelligent technology has also brought revolutionary changes to the daily management of landscape engineering. Through intelligent irrigation system, precise irrigation can be carried out according to the actual water demand of plants. This not only saves water resources, but also ensures the healthy growth of plants. The intelligent lighting system can automatically adjust the light intensity according to environmental changes, providing tourists with a more comfortable and pleasant sightseeing environment.

For example, Table 2 summarizes the main impact of intelligent technology on the employment structure of landscape engineering industry. It points out the change of job requirements, the improvement of skills requirements, the adjustment of employment structure and the increase of training and learning needs, and emphasizes the importance of employees' continuous learning to adapt to this change. Therefore, employees in the landscape engineering industry need to constantly learn new knowledge and skills to adapt to the changes in employment structure brought about by intelligent technology.

Table 2 Impact of Intelligent Technology on the Employment Structure of the Landscape Engineering Industry

Aspect of Impact	Specific Content
Change in Job Demand	Increased demand for intelligent technology jobs, decreased demand for traditional manual operation jobs
Skill Requirements Upgrade	Practitioners need to master new skills such as intelligent equipment operation and data analysis
Employment Structure Adjustment	Increased demand for technical and management talents, gradual reduction of labor-intensive positions
Increased Training and Learning Needs	Practitioners need to continuously learn new knowledge and skills to adapt to the development of intelligent technology

4. Future development direction of intelligent construction technology in landscape engineering

The application of intelligent construction technology in landscape engineering in the future will present a broader development prospect. With the continuous progress of technology, we can foresee that the automation level in landscape engineering will reach a new height. A higher level of automation technology will be introduced, so that many tedious and repetitive tasks in the construction process can be completed by intelligent equipment, greatly improving the construction efficiency and quality. Furthermore, the decision support system will become more intelligent, which can provide more accurate and scientific decision-making basis for the planning, design, construction and management of landscape engineering based on big data and artificial intelligence technology. The wide application of Internet of Things technology will make all kinds of equipment and facilities in landscape engineering interconnected, form an intelligent management system, and further improve the intelligent level of landscape engineering.

In order to promote the in-depth application of intelligent construction technology in landscape engineering, we need to adopt a series of strategies and suggestions, as shown in Figure 1.

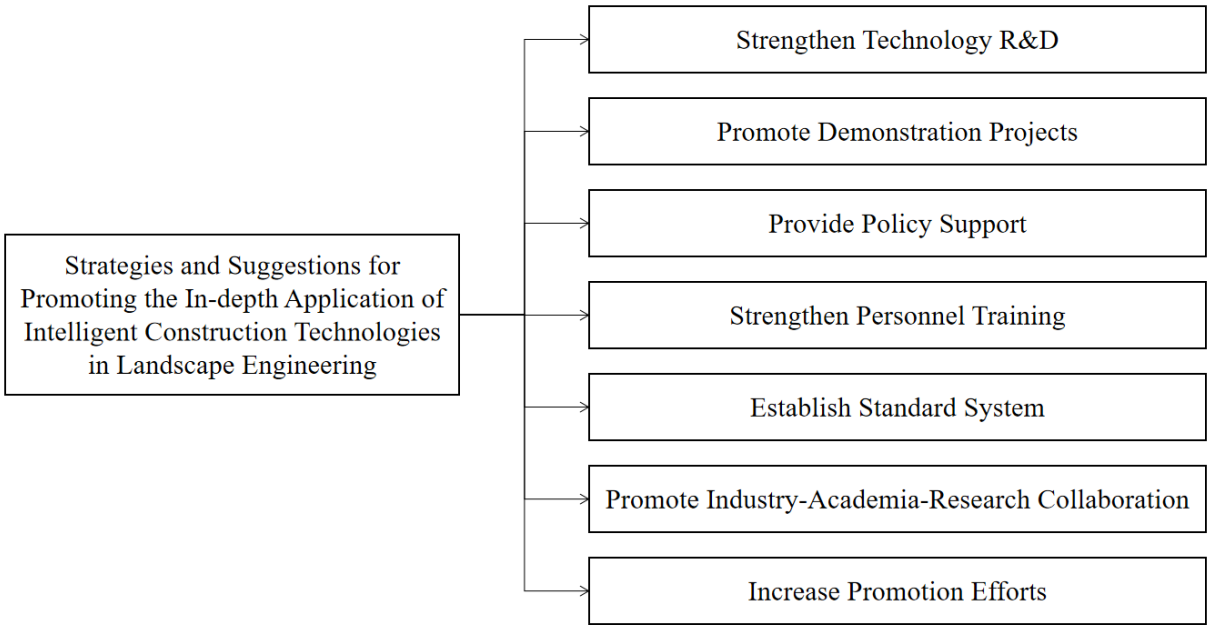

Figure 1 Strategies and suggestions

Intelligent construction technology is closely related to the sustainable development of landscape engineering. In the future development, we should pay attention to the coordination and unification of technology, economy and environment. The application of intelligent technology should improve the efficiency and quality of landscape engineering, and at the same time pay attention to saving energy, reducing pollution and promoting the green development of landscape engineering. We should also consider the economy of intelligent technology to ensure that its application in landscape engineering can bring practical economic benefits. Only in this way can we promote the intellectualization of landscape engineering and realize the sustainable development of economy, society and environment.

5. Conclusions

Through in-depth discussion and analysis of intelligent construction technology in landscape engineering, we can find that intelligent technology is gradually infiltrating into every link of landscape engineering. It has injected new vitality into the transformation and upgrading of the industry. The application of intelligent construction technology greatly improves the construction efficiency and quality of landscape engineering, reduces the labor cost and optimizes the resource allocation. This laid a solid foundation for the sustainable development of landscape engineering.

Furthermore, this article also recognizes that the application of intelligent construction technology in landscape engineering still faces many challenges and problems, such as insufficient technical maturity, high cost and difficult personnel training. These problems need to be solved step by step by continuously strengthening technology research and development, improving policies and regulations, and strengthening personnel training.

This article emphasizes the close relationship between intelligent construction technology and the sustainable development of landscape engineering, and looks forward to the broad development prospect of landscape engineering driven by intelligent technology in the future. Based on the above, the development goal of realizing the coordination and unity of technology, economy and environment is put forward. In the future, with the continuous progress of intelligent technology and the continuous expansion of application scope, landscape engineering will usher in a broader development prospect. We will continue to explore the deep integration of intelligent technology and landscape engineering, promote the innovation and development of landscape engineering industry, and contribute more to the realization of urban green ecological construction and sustainable development goals.

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