Research on Innovation Management of Highway Construction Project Based on Big Data

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Abstract. Despite the continuous emergence of innovative technology in highway construction management, some scholars also put forward a lot of new project innovation methods. However, in the process of carrying out the project, there are still a series of problems in the management of our highway project. Highway engineering is a complex project. The construction scope of these projects is large and the cost of investment is relatively high[1]. In order to ensure the quality of highway engineering construction, we must strengthen the degree of construction management. At present, the emergence of computer big data also pushes the highway engineering construction innovation management to the technical peak.

Keywords: Big Data, Highway Engineering, Construction Project, Innovation

1. Introduction

We should be clear that the purpose of highway construction technology is to ensure that highway construction can meet the technical quality indicators of construction units. In order to meet people's requirements for highway traffic, we need not only technological innovation of highway engineering. We also need to innovate the project management of highway engineering. Moreover, in recent years, with the continuous popularization of modernization and economic globalization, the number of vehicles in China is increasing[2]. Highway engineering plays an increasingly important role in the process of modernization. This situation has also been a high degree of attention by the relevant people and the relevant departments of the government.

The emergence of computer big data has brought our life into the information age. We mentioned above that we should carry out technological innovation and project management innovation of highway engineering. We can use the information technology of big data to carry out the innovative management task of highway engineering projects. Compared with the traditional highway engineering project management, the computing power of computer big data is stronger. Its computing
speed is faster. It has more content storage. Therefore, this system is more suitable for the actual situation of highway traffic.

2. Some problems existing in highway engineering management nowadays

2.1. Inadequate preparation in the early stage of construction

In the process of highway engineering project construction, we often see the problem is the lack of construction materials. Due to the lack of materials, the progress of the construction project may be delayed. The essence of this kind of problem is the inadequate preparation in the early stage of construction. On this basis, we may also encounter the problem of unreasonable construction machinery organization. Because most of the road construction on the mechanical requirements are very high. If the mechanical work efficiency is very low and the mechanical preparation is insufficient, the project progress will be affected[3]. In addition, we need to prepare emergency plans to deal with emergencies. Without an emergency plan, it is difficult for us to solve unexpected problems.

2.2. Lack of project monitoring and management

The supervision of construction quality should not only carry out simple pre test, but also carry out appropriate test after the whole process. However, in the process of highway engineering construction, due to the large scale, the process of the project is very complex. Long construction time may make people more lazy. It is very difficult for quality supervisors to check the details of all projects. This situation may lead to the quality and safety of the project can not be guaranteed (see Figure 1).

![Figure 1. Three dimensional modeling of Highway Engineering](image)

2.3. Unreasonable cost management

The cost of highway engineering is related to the capital mobilization of enterprises. In fact, cost management is also an important part of the construction project management process. However, it is also incorrect to pursue low-cost project implementation. Low cost materials are also difficult to build into a good project. Therefore, enterprises should carry out reasonable cost management. Cost management can reduce the waste of funds and the formation of bean curd residue project. In my opinion, scientific and standardized cost management is an important factor to ensure the smooth
progress of the project.

3. Management innovation of construction elements of highway engineering based on big data

3.1. Innovative management of construction personnel

In theory, construction personnel are the main part of the project construction. It is the first major factor affecting construction management. According to the theory of engineering psychology, the working attitude and enthusiasm of construction personnel will affect the quality of engineering construction. We can use the technology of big data to innovate the management of construction personnel. We can use the database to establish a complete information system for construction personnel[4]. Managers can see all the information of all personnel in these systems. This way can facilitate people to carry out innovation management.

3.2. Innovative management of construction materials

There are many kinds of engineering materials involved in the construction of highway engineering. There are also a lot of them. Therefore, the management of these materials is very difficult. According to the traditional material management method, we may use warehouse storage supply for material management. However, most of this management work is done manually. This approach is inefficient. The completion rate is not high. We can use big data to build the information database of warehouse materials. Warehouse management personnel can use the computer to intuitively see the amount of surplus and use of materials.

3.3. Innovative management of construction equipment

In fact, the innovative management of construction equipment is also an important part of project management. Mechanical equipment is the auxiliary public education of highway construction. The level of mechanical equipment management will directly affect the efficiency and quality of engineering construction. We can use the convenience of big data to establish a leasing system for construction equipment. This kind of leasing system can assign specialists to carry out maintenance and supervision of the use of mechanical equipment. This form can better carry out innovative management of construction equipment.

4. Innovation strategy of highway construction project innovation management based on big data

4.1. Innovative management of construction technology

Technology and construction technology are the soul of highway engineering project construction. In order to strengthen the innovative management of construction technology, we should focus on grasping the key process. Only in this way can we improve the technical level of construction. Big data technology contains the construction technology of highway engineering. Such as drawing technology and simulation technology. We can use computer big data to create engineering drawings instead of drawing manually[4]. Similar technologies can be used for technological innovation management (see Table 1).
Table 1. Investigation on innovation strategy of highway construction project innovation management based on big data

| Innovative methods          | Main requirements                           |
|-----------------------------|---------------------------------------------|
| Management of Technology    | The importance of completing the process    |
| Control of construction     | Reasonable control of process cycle         |
| period                      |                                             |
| Construction safety         | Improvement of safety literacy of workers   |
| Complete quality system     | Ensure the smooth operation of the process  |

4.2. Construction of control system for construction period

In theory, the construction period will directly affect the economic benefits of the project. We can set up the construction period control system of database to manage the construction period. Take the standard completion time of the construction unit as the main objective, scientifically analyze and prepare the construction period network diagram. This is also the innovative application of big data in project management.

4.3. Innovative management of construction safety

The importance of construction safety awareness is very important. Safety management refers to the improvement of people's safety awareness. The use of network courses based on big data can help us manage the safety awareness of employees. This kind of management can improve the personal quality of the staff. On this basis, we can use big data to establish a system for predicting safety accidents in engineering projects. According to different parameters, this system can help enterprises to predict safety accidents. According to different safety accidents, enterprises should make different emergency plans. We can also set up some full-time safety officers at the construction site. The GPS system of big data is used for dynamic tracking inspection.

4.4. Establish perfect quality system of construction management

Establish a perfect quality index control system, we can better guide the smooth progress of construction. In the process of modern highway engineering construction, the importance of index control system in the development process is more and more obvious. The construction process of index control system based on big data can be divided into four important parts. First, data collection is indispensable. It is also the advantage of big data to collect data with the convenience of computers. Second, the arrangement and analysis of data based on computer. Third, the review of information. Fourth, the formation of control index based on database.

5. Innovation of innovative management concept of highway engineering construction project based on big data

If we only innovate the management and technology of engineering projects. Our purpose is also not correct. In order to popularize the innovation management consciousness of the project more quickly,
we should cultivate the innovation of the thought idea of the professionals. A theory without practice is incomplete[5]. However, practice without theory is also blind. We must fully realize the importance and enthusiasm of highway engineering construction project management. This innovative way of management is a miracle across the ages.

The traditional highway management mode not only wastes manpower, but also wastes resources and money. Moreover, the efficiency of this method is also very low. At present, the emergence of computer big data technology solves this problem very well. The application of big data in engineering management is more and more recognized by people. It is gratifying that it has been used more and more widely. Moreover, according to a lot of practice, the effect of project management based on big data is obvious[6].

6. Conclusion

In fact, the mode of project management in China is backward compared with other developed countries. Our highway engineering research started late. Although we have made a lot of achievements, we still have many problems. In this situation, the innovation management of highway construction project based on big data is beyond doubt.

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