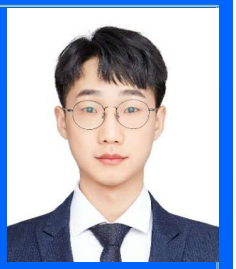
Trading platform for C&D waste: an integrated and effective strategy for resource recovery



W.W. Wu[1], L.H. Xie[1], J. Hao[2]

[1] Department of Construction and Real Estate, Southeast University, Nanjing, Jiangsu, China

[2] Department of Civil Engineering, Xi'an Jiaotong Liverpool University, Suzhou, Jiangsu, China

Presenting author email: Jianli.hao@xjtlu.edu.cn

Introduction

Construction and demolition (C&D) waste is defined as the waste that arises from construction, renovation, and demolition activities. Inert C&D waste materials, such as sub-soil, sand and stone, could be directly re-used on another construction site, while materials such as concrete, bricks and wood could be recycled

This study tinvestigated the feasibility of providing a trading platform for C&D waste as an integrated and effective strategy for current practices of C&D waste management and resource recovery in China, and proposes theoretical models based on platform economy theory and third-party governance. A Petri net tool was employed to investigate the analysis process in the platform governance mode. It was used to study the organizational structure and dynamic behavior of the system process, focusing on possible state changes and the relationship between states in the system.

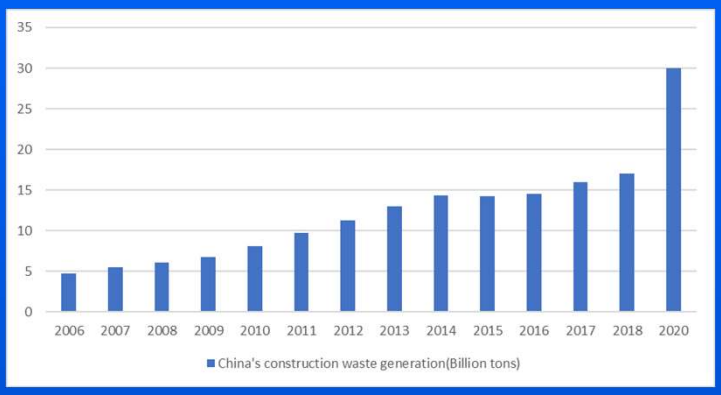


Figure 1: Statistics of China's construction waste production from 2006 to 2020

Results & Discussion

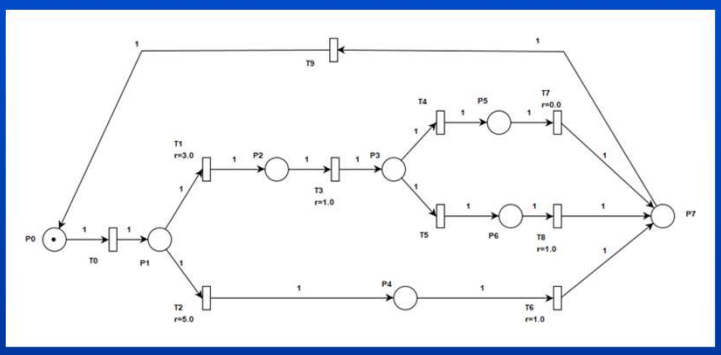


Figure 2: Timed Petri net model of traditional trading process

According to the timed Petri net, the two transaction mode processes are simulated with the simulation results shown in Table 3. According to the results, it takes 4.83 days to complete a traditional transaction process. By comparison, the time is shortened to 2.31 days by using the platform. Moreover, taking into account the matching speed of the platform after breaking through the critical mass, the efficiency of transaction using the platform will far exceed that of the traditional transaction process.

Due to the narrow trading period of construction waste, the higher the transaction efficiency the more significant the effect of C&D waste management and the more construction companies can profit from it. Through comparison of the two trading modes, it can be seen that using the platform for trading is not only more efficient, but also provides richer and more reliable services.

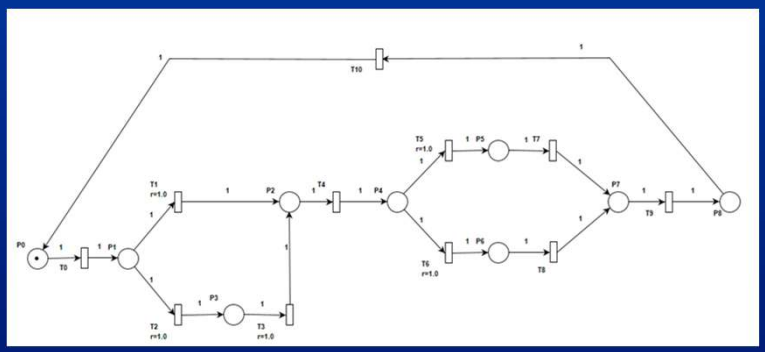


Figure 3: Timed Petri net model of platform trading process

Conclusions

The trading platform for C&D waste provides users with the ability to search for other users and products, and the opportunity to complete matching quickly, which reduces transaction costs while improving the efficiency of the transaction process. This business model improves the economic organization structure by improving the coordination of supply and demand under incomplete information and increasing the level of efficiency, thereby generating higher social surplus. By providing a common virtual place to promote the interaction between supply and demand in the C&D waste trading market, the externalities that cannot be internalized by the groups themself can be absorbed.