

Green Innovation: A Way to Technology Innovation for Building Material Enterprise

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Abstract Sustainable development is a tendency of economic development in 21 century, therefore, construction material enterprises must carry out the policy of technology innovation. Technology innovation is the important foundation to the existence and development of construction material enterprises. This paper addresses the adverse factors counteracting technology innovation of construction material enterprises nowadays, and proposes the way of green innovation for construction material enterprises, which has certain realistic meanings.

Key words Technology innovation; Building material enterprise; Creativity; Green innovation

1 Introduction

Innovation refers to bringing new things in social or economic activities to achieve a perfect combination of social resources and production factors, and to make greatest profit. Enterprise innovation can be classified into two major types, system innovation and technology innovation. System innovation provides effective system and vigor for development of enterprises, while technology innovation refers to the application of new production factors and combinations in production and operation, such as advancing new technology and articles, applying new materials, researching and developing products, and adding new characteristics and functions to the products. Technology innovation includes engineering and commercial application and economic superiority transformation, aiming to provide enterprises with methods and competitive strength. It gives full play to make enterprises competitive and full of vitality in such a fierce and ruthless market. In such a modern economic structure with ever-deepening globalization, the existence and development of enterprises are mainly decided by their competitive edge, of which technology innovation plays the basic supporting role. Therefore, how to equip the enterprises with good creativity becomes important to their existence and development.

Since China joined WTO, our construction material enterprises have faced both new chances and challenges. Only by implementing strategies of prospering an enterprise by science and technology, good quality and output, can construction material enterprises gain the superiority in a more and more intense market. To attain the strategic goal of construction material enterprise, we need to stick to its core of establishing enterprise technology creativity and constantly improving product quality and technology, to make enterprise vitalized, its fame honored, its competitiveness raised, and moreover, its competitive edge permanently embraced in the market.

2 Functions and Meanings of Building Material Enterprises

To most of our construction material enterprises, functions and meanings of technology innovation lie in the following aspects:

First, technology innovation is the need to be adapted to the new situation of China's joining WTO. Since then, construction material enterprises have faced increasingly intense market competition. Construction material industry is underdeveloped, and we want it changed. To improve enterprise competitiveness, the basic solution is to increase science and technology investment. We should persist in advancing science and technology, actively spreading and applying new technology and new achievements, comprehensively boosting enterprises' technological quality, and strengthening its market competitiveness and technology innovative ability. Only in this way can enterprises keep an outstanding status in increasingly intense markets.

Second, to strengthen technology innovation is the urgent need for construction material enterprise inner development as well as the need for enterprise to bring about a change from extensive to intensive management of economy. To meet the latter need, the key solution is to advance industry upgrading in all-around and the basic means is technology innovation. Our construction material enterprises have produced many problems in long-term development, such as high resource expenditure, low production efficiency, products with unadvanced technology and low added values, and ecological deterioration and

depleted resources caused by enterprises' indifference to the importance of sustainable development. Only by relying on advancing technology and tech innovation can these problems be fundamentally resolved to bring about a change from extensive to intensive management of economy.

Third, to foster the construction material enterprises' technology innovation is the requirement of introducing, growing, using and developing talents. The development of these enterprises is bound to inter-disciplinary talents. Technology innovation is a driving force to stimulate enterprise talents' initiative, critical path to foster construction material enterprise learning talents, an effective means of improving talents' quality, fountainhead of enriching enterprises' knowledge.

Fourth, technology innovation is an important assurance for construction material enterprises to implement the strategy of prospering an enterprise by quality. This strategy is the only road to develop enterprises. Quality is the heart of the enterprises, as well an important mark to justify the comprehensive capabilities of a construction material enterprise. To improve engineering quality, we need to constantly develop new products, technology, materials, articles and equipment, and moreover innovate technology.

3 The Main Factors Counteracting the Technology Innovation of Construction Material Enterprises

During the recent ten years, construction material enterprises have established and consolidated their dominant position in the market for the development of relational technology, the strong demand of construction materials, the gradual consummation of market economy and the forceful support from our government. At present, however, there still exist lots of factors counteracting technology innovation of construction material enterprises. The main factors are as follows:

First, as the intensity of market competition increased, a lot of malpractices emerged, such as multi-level contracting, jerry-building, crudely-making and passing off inferior goods as superior ones, which resulted in inferior goods taking up the market of superior goods. Even in some cases, bad money drove out good money and shoddy goods dominated the whole market elbowing the superior goods aside. Thus, the market mechanism was reversed, that is, the inferior selected and the superior eliminated. Therefore, the internal impetus from construction market was weakened, which unfavoured the technology innovation of construction material enterprises.

Second, at present, construction material industry is just at the primary stage where they can only develop mainly depending on vast investment of funds, resources and labors because of their backward management and their lack of scientific organization. They generally lack spirit of technology innovation and capability for independent research and development. In addition, during the process of technology innovation, there also exist a lot of problems such as imperfections in innovation system, rigidity in innovation mechanism, shortage in scientific and technological investment, managing and deciding echelon's lack of creative spirit, and sluggish application and commercialization of scientific and technological achievements, which seriously restrict and hamper the technology innovation of construction material enterprises.

Thus, to foster the technology innovation of construction material enterprises, firstly, we need to standardize the operation of the construction market and make the principle of selecting the superior and eliminating the inferior run well to create a beneficial policy and market environment. Second, construction material enterprises need to improve technological management, institute a set of incentive mechanism favourable to technology innovation, earnestly formulate the new development strategy after entering WTO and map out the specific approaches of technology innovation.

4 The Strategies to Advance Green Technology Innovation of Construction Material Enterprises

Since Construction Industry came into WTO, and with many foreign construction material enterprises swarming in, the mainstay of the construction market has dramatically strengthened, and the market share of China's construction material enterprises gradually decreased, and the industry competition has upgraded. So China's construction material enterprises must strengthen the research and analysis of inside and outside enterprise environment, formulate strategy, key point and policy for their development in a certain way and procedure, advocate overall strategy and planning to guide enterprises to have a long-term development. This leads enterprises to the right direction, target and key point of innovation, in order to make them have a definite goal of how to go about their work of technology innovation and advance industry upgrading, and strengthen their market competitiveness.

The ultimate aim of technology innovation is to push the whole society forward. Both theories and practices of technology innovation can always be related to development outlook of a certain historical background, which conversely, unconsciously have directing impact on technology innovation and make it become the most active factor to promote social development. Traditional theory of technology innovation was created in the age of industry-based economy and made a huge and well-known impact on social development of that time. But with alteration of economic forms and constant growth of outlook itself, newly-created theory should be adjusted to better fit new development outlook. Green technology innovation is ecological one, an active answer to the present scientific development and an inevitable choice by history. Green technology innovation, conforming to requirement of sustainable development, is based on green technology and invention. It helps improve the ecological environment and quality of human life, and to some extent, enable to attain economic profit. Closely related to human production and life, green innovation is an inevitable choice to be implemented.

To promote green technology innovation of construction material enterprise, we must take hands in both macro and micro aspects. There follows details:

4.1 Support of the green innovation and advanced technology

We should make rules as soon as possible and practice the Green Innovation under the criterion. Our government should set a target and bring it into the rational economy and social development. By doing that, the new construction material and the reproductive resources will be applied reasonably, catching the pace of economic development and environmental protection. Our government has issued The Criteria of Residential Construction, The Standards of Assessing the Quality of Residential Construction, The Criteria of Green Construction, The Regulations of Energy-saving Civilian Construction, The Standards of Energy-saving Designs in Areas with Torrid Summer and Frigid Winter, The Domestic Water-saving Devices, etc. All these criteria provide legal foundation to the Green Innovation. Meanwhile, with the backing of universities, research units and departments, construction material enterprises should strengthen the research and development of high, new and applied technology and focus on developing staple materials of high-intensity to save resources, enhance duration of construction, quicken the speed of application of research results and finally form the strong support system for the Green Innovation.

4.2 Innovative ways of construction material enterprises' green technology

To implement our nation's policy Four Savings and One Environmental Protection, green technology innovation can be classified into green product innovation and green craft innovation. The former one refers to the one that makes products harmless to the ecological environment and body health while being used or afterward, and moreover, be recyclable and regenerative. The latter one aims to reduce the production and emission of waste gas and pollution, cut down environmental pollutant brought by industrial activities and bring down cost and expenditure. Green technology innovation sets environment protection and sustainable development as the basic target and seeks economic, social and environmental benefit. Before having green technology innovation, construction material enterprise should firstly depend on its own funds, technology and personnel to set a reasonable plan, and then pay emphasis on the general evaluation of the plan. Enterprises' green technology innovation covers new source greening, research and spreading greening and marketing greening:

4.2.1 New innovation source greening

With the development of construction material enterprises, supplier, manufacturer, consumer all together compose the mainstay of several key sections, which include products' design, production and marketing. They form a value chain of innovation product, which, therefore shapes 4-leveled green technology innovation source of construction material enterprise: cooperation by government, college and enterprise; cooperation by college and enterprise; independent research and development by enterprise or university; enterprise improving traditional products.

4.2.2 Research and spreading greening

There is a close relationship between technology and environment. When we solve the environmental problems by technology, we should attach importance to the research and developing of technology source with an emphasis on innovation specialties, quality of enterprise, social pressure, organization environment and other factors relating to construction material enterprises.

4.2.3 Green marketing

Construction material enterprises should grow the concept of green marketing, build up the system of green marketing, increase green investment, and lay stress on the development of green technology. At the same time, government should use well its macroeconomic control to improve green marketing environment. The developmental strategy should be led by the government, with education propagating

and laws to govern enterprises.

5 Conclusion

Construction material industry is bound up with social development and people's life. In order to deal with the increasingly intense competition, our construction material enterprises should overcome all the adverse factors and take the road to Green Technology Innovation with our government's macroeconomic regulation and powerful support.

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