PERSPECTIVE

Examining the elements that influence biotechnology innovation policy

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ABSTRACT

New knowledge and technologies such as genetics and biotechnology have been around for over three decades. Biotechnology is one of the advanced technologies that countries are investing in in order to achieve sustainable development in the twenty-first century, after passing through various periods in which labor force, resources, and capital, each at a different time, have been comparative and competitive advantages for a more powerful economy. The invention of fundamental and incremental advances, as well as a variety of applications that produce income for countries, are among the possibilities of this knowledge. Biotechnology innovation policies have been discussed for this goal. This paper evaluates research development policies, internati--onal-corporate partnership policies, and government-supported innovation policies using resource-based theory. This study's statistical population consisted of 165 responses from directors and experts working in Iran's biotechnology industry (pharmaceutical, food and agriculture). SMART PLS software was used to test research hypotheses. The study's findings demonstrated that research development policies, international business partnership policies, and government-supported innovation policies all have a major influence on the growth of biotechnology innovation activities. In addition, we reviewed the study's ramifications and suggested potential next possibilities.

Key Words: *Biotechnology, Innovation, Innovation policy*

INTRODUCTION

Biotechnology has had an increasing influence on the environmental, agricultural, medicinal, energy, and industrial se--ctors, with breakthroughs in genetic engineering, diagnostic and tissue engineering, and culture engineering. By 2010, the sector had grown to over 6200 private biotech businesses, with 64 percent of Small and Medium-Sized Enterprises (SMEs) operating in the field of biotechnology focusing on four primary markets: The United States, Canada, Europe, and Asia/Pacific. More than 60% of worldwide biotechnology income is directed by the United States. With more than 400 enterprises, Canada is in second place. With more product and investment approvals than ever before, the European biotechnology market has expanded even more. The Asia/Pacific market is booming and developing across the continent, with Australia, China, India, and Singapore among the leading players. Companies have pursued a lot of collaborations since the biotechnology business has become more regionally diverse; worldwide competitiveness has also increased in this arena. Regardless of location, it is regarded as the finest investment for potential deals and innovations. Clinical trials cannot be conducted only by SMEs due to the rigorous regulatory environment and increasing expenses.

While 24 biotechnology medications, vaccines, symptoms, and novel applications were licensed in the United States in 2001, more than 450 instances are still in clinical studies.

Even if a product does make it to the market, its success is not assured. Monsanto, for example, a previous agricultural pioneer and biotechnologist, substantially invested in insect-resistant genetically modified crops, even though these products were a great scientific achievement, its efforts to bring them to the market were unsuccessful owing to public opposition. Companies in every area must deal with marketing difficulties and deal with them appropriately to prosper in the market. Biotech firms are unique in that strategic decisions and marketing difficulties are not always straightforward. Given the nature of science, most technology-based businesses, which are frequently involved in the production of new, highly inventive goods, are still evolving. Gaining a dominant market share is tough for these businesses. As a result, businesses must improve their technical skills by using R&D initiatives that result in competitive advantages. There are two primary aspects to options. The first is to select the pioneering order, which is a business that serves as a knowledge creator and seeks to deliver new items and technology to the market. Biotechnology remains mostly confined to fundamental research.

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Existing colleges may easily deliver more innovation than other conventional technological industries, as long as the corporation can afford the high expenses and risks of extensive product development and promotion research. Multinational firms can only give this choice. The second approach is to construct a mix of applied and fundamental research initiatives employing the company's local and international research and development resources, as well as existing expertise. Organizations commonly refer to R&D efforts as the first choice, but the second option may entail acquiring or licensing technologies from other companies, or entering a strategic partnership to obtain technology. Patents, publications, technical meetings, conversations between employees of similar or competing companies, participation in a consortium that performs a major project, the recruitment of employees from competing companies, and reverse engineering of products are all examples of ways to publish international and technical/scientific knowledge and skills.

This study examines biotechnology-based organizations' perspectives from the perspective of an innovation strategy that aids in the comprehension of new literature and adds to the overall credibility of each of its constructive partnerships. The study's key contribution is to give a thorough knowledge of biotechnology product innovation strategy. The current study aims to answer the issue of whether the biotechnology industry's performance may be influenced by suitable innovation policies. The literature on biotechnology innovation policy is examined in the next section. Finally, the research model, technique, findings, and research recommendations are provided. The structural equations of Smart PLS are employed to test the hypotheses in this study. The world now is more competitive than it has ever been. At all levels of individual and societal life, competition occurs.

Organizations, as critical components of society's economic and social processes, are critical venues for the emergence of creativity and innovation, and their existence is reliant on change and innovation. From the first concept through the launch of a new product, successful innovation necessitates an integrated design process. These initiatives need effective collaboration and design management, as well as knowledge management strategies and technologies. The innovation management process is a step-by-step procedure that begins with a thorough evaluation of all elements influencing the idea's formation and continues until new items are brought to the market. Each innovation management framework should have a structure and flexibility that will allow all of the variables that impact innovation to be successfully implemented. Because commercialization is such an important part of the innovation process, and the success of the entire innovation process is dependent on the success of market research, new literature called "knowledge-based economy" has emerged, in which technical knowledge, innovation, skills, and continuous learning play a key role. As a result, a variety of institutions in society should encourage and facilitate innovation, learning, and dynamism in such economies. The findings of the study revealed that, when R&D resources (R&D spending, R&D human capital) are taken into account, cooperative tactics can have an impact on biotechnology businesses' innovation performance. The findings of this study supported Kang and Park's findings, demonstrating that the mix of biotechnology skills necessary and the level of human skill development in teams influenced biotechnology sector innovation.

CONCLUSION

The current study examines biotechnology innovation policies and the elements that influence them. The findings reveal that intercorporate collaboration, state funding, and R&D source all have a significant impact on the innovation process in biotechnology, which is highly important for bringing in innovation in the field of biotechnology. We hope that the findings of this study will inspire and drive future scholars to test our model in a variety of settings.