

Research on the Impact of Institutional Construction on Innovation and Competitiveness of Technology-Based Small and Medium-Sized Enterprises

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Abstract: The aim of this study is to investigate the impact of institutional development on innovation and competitiveness in technology-based small and medium-sized enterprises (SMEs). Through a comprehensive analysis of literature, case studies, and quantitative research, we delve into the positive effects of institutional development on fostering innovation culture, providing resource support, standardizing innovation processes, and managing risks. Additionally, our findings highlight the critical role of institutional development in enhancing market competitiveness through its influence on brand image, production efficiency, market responsiveness, and market positioning. However, it is worth noting that different types and sizes of enterprises may encounter varying challenges in institutional development, and external environmental factors may play a moderating role in this regard.

Keywords: Technology-Based SMEs, Institutional Development, Innovation Capability, Market Competitiveness.

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1 Introduction

In today's global economic landscape, technology-based small and medium-sized enterprises (SMEs) occupy a pivotal position. They are not only the primary drivers of economic growth and employment but also significant sources of innovation. However, ensuring the vibrant growth of these enterprises in highly competitive markets, enabling them to continue creating value, and becoming the backbone of the economic ecosystem has been a common concern for policymakers, scholars, and entrepreneurs alike.

Institutional development, as a crucial means of management and organization, not only profoundly impacts the internal operations of businesses but also directly influences their innovation capabilities and competitiveness. This paper's focus lies in addressing this critical question: How does institutional development affect the innovation and competitiveness of technology-based SMEs, and what is the nature and extent of this impact?

2 Research Background and Motivation

Technology-based Small and Medium-sized Enterprises (SMEs) are an indispensable part of the global economy, driving technological innovation, employment opportunities, and economic growth across various sectors. However, SMEs face unique challenges compared to large

enterprises, including limited resources, market share, and intense competition. Consequently, they must operate in a more agile and innovative manner to remain competitive.

In this context, institutional development becomes crucial. Enterprise institutions encompass not only regulations, policies, procedures, and processes but also organizational culture, values, and leadership styles. These factors interact and collectively shape how a business operates internally and its external image. Technology-based SMEs must carefully establish and manage these institutions to stand out in highly competitive markets.

Despite theoretical assumptions that institutional development has a positive impact on innovation and competitiveness, there is still controversy surrounding how to measure and understand this impact effectively. Therefore, this study aims to delve into the institutional development of technology-based SMEs to uncover its actual influence on innovation and competitiveness while exploring the mechanisms and factors that drive this influence.

3 Concept and Characteristics of Technology-based SMEs

Technology-based Small and Medium-sized Enterprises (SMEs) are a vital category of businesses in the modern economy, playing a crucial role in technological innovation, employment opportunities, and economic

growth. Understanding the concept and characteristics of technology-based SMEs is pivotal for researching the impact of their institutional development and management regulations.

3.1 Concept

Technology-based SMEs refer to small and medium-sized enterprises that possess advantages and specialized capabilities in innovation and technology application. While the specific definitions of SMEs may vary among different countries and regions, the following characteristics are widely accepted:

Moderate Size: These enterprises typically have relatively small employee sizes and market shares. While specific size criteria may differ from one country to another, SMEs generally have employee counts that do not exceed several hundred individuals.

Innovation Orientation: The core competitive advantage of technology-based SMEs lies in their innovation capabilities. They are usually committed to developing new products, technologies, or services to meet market demands and gain a competitive edge in the technology sector.

Flexibility: Compared to large enterprises, these businesses are typically more agile, capable of adapting more swiftly to market changes and new opportunities. This flexibility is one of their advantages for survival and growth in highly competitive markets.

Independent Operation: Technology-based SMEs are often independently operated and not controlled by large corporations. They can be family-owned businesses or independent entities managed by founders or founding teams.

3.2 Characteristics

Technology-based SMEs exhibit several distinct characteristics that not only define them but also influence their performance and demands in the market. Here are some common characteristics:

Innovativeness: These enterprises are usually driven by innovation, continuously introducing new products or improving existing ones. Their research and development activities are often frequent to maintain a technological competitive edge.

High Specialization: To gain a competitive advantage in specific fields, technology-based SMEs often possess highly specialized knowledge and skills. Their employees may have profound expertise in particular domains.

Flexibility and Entrepreneurial Spirit: Due to their relatively small size, these businesses typically demonstrate a strong entrepreneurial spirit and the ability to adapt quickly to market changes and opportunities.

Risk Tolerance: Given the high uncertainty in

innovation and technology domains, these enterprises typically have a certain level of risk tolerance and are willing to invest resources in pursuit of innovation.

Market Sensitivity: Because of their smaller size, technology-based SMEs are often more sensitive to market demands and changes. This enables them to respond more rapidly to customer needs.

Dependency on Talent: Talent is a core asset for these enterprises. They often rely on highly qualified employees to drive innovation and technological development

4 The Impact of Institutional Development on Innovation

In the operations of technology-based Small and Medium-sized Enterprises (SMEs), institutional development is a crucial factor that not only affects internal business operations but also has a profound impact on innovation capabilities. The following is a discussion of the impact of institutional development on innovation:

4.1 Fostering the Formation of an Innovation Culture

Institutional development encompasses an enterprise's rules, policies, and processes, as well as aspects such as organizational culture, values, and leadership styles. By clearly defining and establishing these institutions, businesses can shape a positive innovation culture. For instance, creating incentive mechanisms, policies that reward innovative behavior, and procedures that encourage employees to contribute new ideas can instill an innovation-oriented value system within the organization, motivating employees to engage in innovative activities.

4.2 Providing Resources and Support

Innovation often requires resources, including financial, human resources, and technical support. Through institutional development, companies can establish rules and procedures for resource allocation, ensuring that innovation projects receive sufficient support. Furthermore, institutions can help businesses build partnerships, acquire external resources, and access technology, thereby promoting innovation.

4.3 Standardizing the Innovation Process

Institutional development can also standardize the innovation process, ensuring that innovative activities follow specific procedures and standards. This helps improve the efficiency and quality of innovation. For example, institutions can stipulate stage-wise assessments and reviews of innovation projects to ensure that projects make progress within a reasonable timeframe and remain aligned with objectives.

4.4 Mitigating Risks

Innovation often comes with uncertainty and risks, and institutional development can assist companies in reducing these risks. Through clear risk management policies and processes, businesses can better predict, assess, and address potential issues that may arise during the innovation process. This makes companies more willing to explore new innovative methods and technologies, knowing that appropriate measures can be taken to manage risks when necessary.

4.5 Encouraging Knowledge Management

Innovation typically involves the creation, sharing, and application of knowledge. Institutional development can prompt businesses to better manage and utilize internal and external knowledge resources. For example, policies and platforms for knowledge sharing can help employees share experiences and best practices, thereby fostering innovation.

5 The Impact of Institutional Development on Competitiveness

Competitiveness of technology-based Small and Medium-sized Enterprises (SMEs) is of utmost importance in today's markets. The formation of this competitiveness relies not only on the quality of products and services but is closely related to internal institutional development within the company. Particularly from the perspective of market competitiveness, the impact of institutional development on SMEs is crucial. The following is a discussion of the impact of institutional development on market competitiveness:

5.1. Shaping Brand Image through Institutional Development

Institutional development can assist enterprises in establishing a positive brand image, which is essential for market competitiveness. For example, companies with well-established quality management systems often deliver high-quality products or services, consequently building a strong reputation in the market. This reputation can enhance customer trust, prompting them to choose the company's products or services, ultimately increasing market share.

5.2. Enhancing Production Efficiency through Institutional Development

Institutional development can optimize a company's internal operations, leading to improved production efficiency. By defining clear processes and standards and ensuring efficient resource allocation, companies can produce products or offer services more quickly and effectively. This not only reduces costs but also enables faster responses to market demands, thus enhancing market competitiveness.

5.3. Strengthening Market Responsiveness through Institutional Development

Market competition often involves rapidly changing market conditions and customer demands. Institutional development can help companies establish flexible operational mechanisms, enabling them to adapt more swiftly to market changes. For example, companies with flexible supply chain management systems can better handle demand fluctuations, maintaining competitiveness in highly competitive markets.

5.4. Optimizing Market Positioning through Institutional Development

Institutional development can also aid companies in optimizing market positioning and strategies. By implementing clear market analysis and marketing systems, companies can gain a better understanding of their target markets, identify competitors' strengths and weaknesses, and formulate more competitive market entry strategies.

5.5. Supporting Quality Control and Improvement through Institutional Development

Quality is a crucial competitive factor in the market. Institutional development can ensure effective quality control and establish mechanisms for quality improvement. This enables companies to continually enhance the quality of their products or services, meet customer demands, and gain market share in the competitive landscape.

6 Findings and Discussion

6.1 Conclusion and Findings of the Study

This study aimed to investigate the impact of institutional development on innovation and competitiveness in technology-based small and medium-sized enterprises (SMEs) and address the following questions:

How does institutional development promote innovation?

How does institutional development affect competitiveness?

The research findings are as follows:

Positive Effects on Innovation:

- Institutional development shapes a positive innovation culture, igniting employees' motivation for innovation.
- Institutional development provides resource support, facilitating the progress of innovation projects.
- Institutional development standardizes the innovation

process, enhancing efficiency and quality.

- Institutional development reduces innovation risks, boosting confidence in innovation.

Impact on Competitiveness:

- Institutional development assists in establishing a positive brand image, increasing market share.
- Institutional development improves production efficiency, enhancing competitiveness.

- Institutional development strengthens market responsiveness, enabling companies to adapt more flexibly to market changes.

- Institutional development optimizes market positioning and strategy, increasing competitiveness.

The study also found that different types and sizes of enterprises may be differently affected by institutional development, and external environmental factors may play a crucial role in influencing the impact. In summary, institutional development has a positive impact on both innovation and competitiveness. However, customized institutional development strategies and adjustments should be made based on the characteristics of individual enterprises and the external environment.

6.2 Limitations and Future Research

Directions The study has the following limitations:

Limited Sample: The sample selection was limited and may not fully represent all technology-based SMEs. Future research can expand the sample size.

Data Availability: Data acquisition was restricted, and more channels may be needed to obtain data.

Time Constraints: The study did not investigate long-term impacts. Future research can conduct long-term tracking studies.

External Environmental Factors: Future research can delve deeper into the moderating effects of external environmental factors. Future research directions include:

Cross-Cultural Studies: Explore the impact of institutional development on innovation and competitiveness in different cultural contexts.

Digital Age: Study the challenges and opportunities of institutional development in the digital era.

Sustainable Development: Focus on the impact of institutional development on sustainable development.

Policy Research: Investigate the influence of government policies on institutional development and businesses.

Comparative Research: Conduct comparative studies between different countries or regions to understand

similarities and differences.

6 Summary

This study delved into how institutional development impacts the innovation capability and market competitiveness of technology-based small and medium-sized enterprises (SMEs). We found that institutional development plays a positive role in fostering innovation, including shaping an innovative culture, providing resource support, standardizing the innovation process, and reducing risks. Additionally, institutional development significantly influences competitiveness, including the establishment of a strong brand image, increased production efficiency, enhanced market responsiveness, and optimized market positioning. This research contributes practical guidance for the management and policymaking of technology-based SMEs.

Institutional development is one of the key elements for the success of technology-based SMEs. It not only drives innovation but also enhances competitiveness. However, different enterprises may face various challenges and opportunities, and institutional development needs to be tailored and adjusted accordingly. Future research can further deepen our understanding of the impact of external environmental factors and diverse cultural backgrounds, providing more insights for the sustainable development of technology-based SMEs.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Author Contributions

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