Journal of Innovation and Development
ISSN: 2958-4752 | Vol. 7, No. 2, 2024

Influence Factors and Implementation Pathways for the Green Transformation of Private Enterprises in Guangdong Based on Grounded Theory and AHP Analysis Method

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Abstract: The high-quality development of Guangdong's economy is inseparable from the innovation of elements and green transformation of private enterprises. This paper applies Grounded Theory, taking Shenzhen BYD Company as the subject of analysis, to clarify the driving factors affecting BYD's green transformation. Subsequently, the Analytic Hierarchy Process (AHP) is selected to construct a model of factors influencing the green transformation of private enterprises, to analyze the effects of these factors, and to identify the most influential factors for the green transformation of private enterprises. Finally, targeted implementation pathways for the green transformation of private enterprises in Guangdong are proposed: first, identifying market opportunities; second, government policy support; third, advocacy of business ethics by entrepreneurs; fourth, reduction of financing risks; and fifth, green technology innovation.

Keywords: High-quality Development; Private Enterprises; Green Transformation; Implementation Pathways; Grounded Theory.

1. Introduction

Private enterprises are the main force in promoting employment of the labor force, important participants in exploring the development of new quality productive forces at this stage, and key industries for promoting industrial transformation and upgrading for high-quality economic development in Guangdong in the new era [1]. Under the constraints of the "dual carbon" goals, the high-quality development of the private economy cannot be separated from industrial element innovation and green transformation [3], and green transformation has become one of the important ways to promote the high-quality development of private enterprises. In 2024, Guangdong Province newly introduced the "Guangdong Private Economy 30 Articles", behind the strong policy is a more superior business environment and more vibrant innovation, the economic status and innovative role of private enterprises will be fully displayed. Guangdong private enterprises are good at "seizing the opportunity", and have a naturally endowed keen insight into the market, so promoting green transformation is imperative and urgent.

In recent years, the industry at home and abroad has actively participated in the green transformation of enterprises, and the academic community has also carried out in-depth theoretical research on this. Vesela. V (2018) pointed out that in order to cope with the global climate change and environmental issues of carbon neutrality, it has become an irreversible trend for traditional industries to promote resource-saving and environmentally friendly green development [3]. Wan Panbing, Yang Mian and others (2021) believe that green transformation refers to a sustainable growth model of green high-quality "value orientation" realized by green technology innovation under the guidance of green concepts [4]. LI H L (2019) and others used the data envelopment analysis method to analyze the template data of enterprises, demonstrating the correlation between market incentive environment and enterprise green transformation efficiency [5]. Wu and others (2022) further believe that external factors such as government policies and social supervision have a positive effect on the efficiency of enterprise green transformation [6]. Lin Xiaoyan and Yan Pengyu and others (2022) through the analysis of Anta Group's green transformation practice, proposed that the ethics of entrepreneurs is one of the important ways to solve the dilemma of green transformation of private enterprises in Fujian [7]. In addition, the innovative application of new quality productive force technology will also directly affect the green transformation activities of enterprises [8].

In summary, although scholars have carried out a series of studies on the green transformation of enterprises, and believe that there are different connotations and driving factors under different economic environments and corporate governance systems, there are fewer studies based on the characteristics of provincial private economies, combined with vertical typical cases. For this reason, this study takes Shenzhen BYD Company as a typical representative of Guangdong private enterprises, through the grounded theory qualitative analysis method, combs the high-quality development process, business conditions, resource allocation and other aspects of BYD Company, deeply understand and accurately grasp the internal data of enterprises, industry data, policy documents and other situations, and extract the correlation factors and core elements of private enterprise green transformation. At the same time, combining with the AHP hierarchical analysis method, analyzes the degree of influence of different factors on the green transformation of private enterprises from three aspects of the target layer, criterion layer, and scheme layer. Finally, based on the degree of influence of promoting green transformation factors, it puts forward effective paths for the green transformation of private enterprises.

2. Analysis of Influencing Factors for the Green Transformation of Private Enterprises Based on Grounded Theory

2.1. Case Selection and Data Collection

2.1.1. Case Selection

This study selects BYD (Shenzhen) Company as the subject of analysis for the following two main reasons. On one hand, BYD Company is a well-known private enterprise in Shenzhen, Guangdong, which has achieved a leading advantage in the fields of automobiles, batteries, and OEM processing for more than 20 years. Therefore, BYD's development experience may have a significant impact on promoting high-quality development of private enterprises in Guangdong. On the other hand, the outstanding performance of BYD's new energy vehicles in the past three years is related to green transformation and also reflects the effectiveness of high-quality development, setting a benchmark for the green transformation and high-quality evolution of private enterprises in Guangdong [9]. How to explore the key driving factors of BYD's green transformation is self-evident in its significance for the high-quality development and practice of private enterprises in Guangdong.

2.1.2. Data Collection

Using grounded theory as a research tool, we deeply organize and analyze the collected information and examples through open coding, axial coding, and selective coding. The information used comes from BYD (Shenzhen) Company's annual reports, media videos, academic journal papers, and interviews with the company's founder Wang Chuanfu recorded in the book "Chen Cheng's Biography of Wang Chuanfu: The BYD Myth" [10], as well as offline interviews with BYD end consumers. Finally, the survey results are statistically investigated to explore the key driving factors in BYD Company's green transformation process.

2.2. Grounded Theory Analysis

2.2.1. Open Coding

Open coding refers to processing the original data without any prejudice and without preconceived notions, starting from the fragmentation of the original data, through preliminary conceptualization, conceptualization, and typification, and then through layer-by-layer decomposition, comparison, refinement, induction, etc., to form initial categories. This study identified 231 tags, from which 41 conceptual codes were inducted, and at the same time, 22 initial categories were inducted and organized according to the logical relationships between the conceptual codes. Due to space limitations, Table 1 only lists some of the data records, conceptualization, and category deduction process to demonstrate the open coding process.

Table 1. Partial Record of Data and the Process of Labeling and Categorization

National policies, important speeches, expert interviews, corporate interviews, videos, etc.	Conceptualization	Categorization
1. BYD, established for thirty years, has taken root in Guangdong and Shenzhen (a1), growing and strengthening alongside the economic and social development of Guangdong and Shenzhen (a2).....,it has consecutively ranked first in global new energy vehicle sales (a3), creating a miracle in the development of the world's automotive industry (a4). Wang Chuanfu believes that these achievements are a microcosm of Guangdong Province's adherence to manufacturing as the mainstay (a5), accelerating the development of new quality productive forces (a6), and achieving high-quality development. This could not be possible without the "heart-to-heart" guidance and services from the party committees and governments at all levels (a7), the good development environment created for enterprises (a8); it is inseparable from the "heart-to-heart" industry and innovation elements of Guangdong (a9), efficient collaborative strategy (a10); and it is inseparable from the government and enterprises "heart-to-heart" working together, jointly shaping a vibrant industrial ecosystem (a11)... (Documentary materials) 2. BYD has a technological dream (a38), to provide users (a39) with extremely safe (a40) cars, and has never given up (a41) this bold concept for 20 years (a42), technology is valuable (a43), life is priceless (a44), independent development (a45), own brand (a46), looking up to the brand (a47), and first applying many top technologies of BYD Group.....BYD is a company that advocates technology (a47), hoping that through technological innovation, it can solve some social issues (a48), such as environmental pollution (a49), energy security (a50)... (Video materials) 3.The bottleneck of electric vehicles (a51) is the battery... China imports 70% of its oil, 70% of the oil is transported by sea (a52); 70% is consumed by transportation (a53). The future trend of new energy (a54) is determined by our country's energy strategic security (a55)..... (Video materials) 4. Intelligent travel + electrification (a56) leads global green travel. BYD Group Chairman and President Wang Chuanfu pointed out that electric vehicles are a major transformation, many core elements (a57) have completely changed..... (Documentary materials)	A1 Government (a1, a2, a8, a16, ...) A2 Industrial Policy (a5, a7, a62, a63, a66, a67, ...) A3 Technology (a30, a31, a32, a38, a42, a47, ...) A4 Industry (a9, a11, a12, a29, a37, a65, ...) A5 Greening (a61, a69, a70, ...) A6 Transformation (a12, a14, a70, ...) A7 Supply Chain System (a10, a28, a29, a35, a36, ...) A8 Brand (a17, a19, a20, a22, a45, a46, ...)	AA1 Government Subsidies (A1, A17, A32) AA2 Tax Policies (A2, A40) AA3 Market Service System (A7, A27) AA4 Financing Environment (A4, A15) AA5 Social Responsibility Fulfillment (A12, A14, A25) AA6 Green Technology Innovation (A3, A5) AA7 First-Class Technology R&D (A6, A10, A45) AA8 Customer Value (A11, A35) .....

2.2.2. Axial Coding

This study initially conducts open coding on BYD's research data and refines, revises, and supplements the open coding based on new data. Subsequently, it identifies the axial coding and establishes connections between various levels of coding. The results of axial coding are presented in Table 2 below.

Table 2. Axial Coding Process

Number	Main Category	Initial Category
1	Government Policy Support	AA1 Government Subsidies; AA2 Tax Policies
2	Business Environment	AA3 Market Economic System; AA4 Financing Environment; AA11 Intellectual Property Protection; AA12 Legal Fairness
3	Entrepreneurial Ethics	AA5 Social Responsibility Fulfillment; AA13 Lawful Operation; AA14 Industry Patriotism Awareness
4	Technological Innovation	AA6 Green Technology Innovation AA7 First-Class Technology Development Capability
5	Organizational Management	AA9 Green Standard Formulation AA16 Green Standard Guidance
6	Green Product Process Efficiency	AA15 Control of Energy Consumption per Unit of Product AA16 Quality Improvement and Productivity Efficiency
7	Financial Strength	AA10 Investment Scale in Green Procurement and Green Knowledge Training
8	Talent Team	AA17 Number of Talents with Green Knowledge; AA18 Level of Green Knowledge Mastery
9	Market Response	AA19 Product Profit Model AA21 Green Brand Appeal
10	Consumer Value	AA8 Customer Value AA20 Product Value AA22 User Safety

2.2.3. Selective Coding and Explanation of Key Driving Factors

The results of the axial coding are revised, and then the core categories are identified, establishing relationships between the various levels of coding. This paper clarifies the core category as the key driving factors for the green transformation of private enterprises, including government policies, enterprise level, and customer level.

- Governmental Policy Level. The guidance from the government and policies has provided strong financial subsidies to support the green transformation of private enterprises, arousing consumers' awareness of green consumption, and effectively promoting the development of private enterprises' green transformation. At the national level, top-level design is used as a starting point, with governments and departments at all levels implementing policies step by step, enhancing the authority of policies, which serves as a policy guarantee for the green transformation of private enterprises.
- Enterprise Level. Private enterprises are essentially market-oriented and profit-driven; hence, the mission and responsibility of entrepreneurs are key supporting forces for promoting the green transformation of private enterprises. Green transformation has driven technological innovation, and strong technology makes a strong enterprise, so green transformation is the logical support for enterprises to enhance their competitiveness. First-class employees, first-class organizations, first-class technology, first-class culture, and first-class production processes are the basic guarantees for private enterprises to strengthen their construction and investment, and to gain competitiveness in domestic and international market competition.
- Customer Level. "Enterprises come from customers and go to customers," the high-quality demand for products or services from customers forces enterprises to transform and upgrade. Based on a thorough understanding of consumer needs, more targeted and attractive green products are produced. Thereby, establishing the green ecological image of private enterprises, strengthening the influence of the green brand, realizing a virtuous cycle of green value creation, green value motivation, and green user utility, until the realization of the profit model of the green transformation of private enterprises is achieved.

In summary, the analysis of BYD's green transformation case shows that the driving factors for the green transformation of private enterprises include policy guidance and support at the government policy level, the practical needs of enterprise operations, and consumer demand for products and services. These factors form a dynamic system that promotes the logical evolution of the green transformation of private enterprises.

3. Analysis of the Influencing Degree of Factors Affecting the Greening of Private Enterprises Based on AHP

3.1. Construction of the Model for Influencing Factors of Private Enterprises' Greening Based on AHP

The Analytic Hierarchy Process (AHP), known for its simplicity, hierarchical nature, and ease of operation, is frequently applied in various economic decision-making fields. Referring to the "Green Enterprise Evaluation Standards" established by the China Biodiversity Conservation and Green Development Foundation in 2022, and combining relevant literature from both domestic and international sources along with the core category coding results of BYD's green transformation identified in this paper, the AHP method is selected to construct a model for analyzing the influencing factors of greening in private enterprises.

3.2. Weight Calculation and Ranking

To gain a comprehensive and objective understanding of the influencing factors of green transformation enterprises and their degrees of impact, this paper will conduct a comparative cross-analysis of green transformation enterprises and traditional enterprises. Through a survey method, 5 successfully transformed private enterprises and 5 traditional private enterprises were collected. Utilizing the

group decision-making function in the YAAHP software, the consistency check results of each judgment matrix were analyzed. The consistency ratio of the judgment matrices for each indicator signifies that the weighting of the indicator system has passed the consistency test. Finally, the final weights of each indicator were calculated, and the ranking results are shown in Table 3.

Table 3. Ranking of Elements for Transforming and Traditional Private Enterprises

Number	Transforming Private Enterprises		Transforming Private Enterprises	
First Intermediate Layer Elements Sorted by Weight in Descending Order for Decision Objectives				
	Intermediate Layer Factors	Weight	Intermediate Layer Factors	Weight
1	Customer Level	0.4072	Government Policy Level	0.3835
2	Enterprise Level	0.3197	Enterprise Level	0.3501
3	Government Policy Level	0.2731	Customer Level	0.2664
Solution Layer Elements Sorted by Weight in Descending Order for Decision Objectives				
1	Customer Satisfaction	0.1930	Government Subsidies	0.1938
2	Brand Trust	0.1813	Financing Environment	0.1720
3	Entrepreneurial Ethics	0.1430	Entrepreneurial Ethics	0.1548
4	Technological Innovation	0.1268	Technological Innovation	0.1228
5	Capital Investment	0.0955	Customer Satisfaction	0.1105
6	Product Process	0.0658	Brand Trust	0.1087
7	Government Subsidies	0.0578	Capital Investment	0.0679
8	Talent Team	0.0468	Product Process	0.0674
9	Talent Team	0.0466	Organizational Management	0.0663
10	Organizational Management	0.0429	Talent Team	0.0647

3.3. Results and Analysis

The evaluation results (Table 3) indicate that among successfully transformed private enterprises, the market and customer level (40.72%) have the greatest impact on the green transformation of private enterprises, followed by the enterprise level (31.97%), and the government level (27.31%). In contrast, in traditional private enterprises that have not undergone transformation, the government level has the greatest impact on the green transformation of private enterprises, with a weight of 38.35%, followed by the enterprise level (35.01%), and the market and customer level (26.64%). Combining research data and the results shown in the table above, the conclusions of the AHP-based study on the influencing factors of green transformation are summarized as follows:

Successfully transformed private enterprises place greater emphasis on the market and customers, while traditional enterprises that have not transformed are more influenced by government and policies. In the criteria layer of the influencing factors of successfully transformed private enterprises, the market and customer level accounts for 40.72%, which is very important for private enterprises that are successful in green transformation. Transforming enterprises have a strong market awareness and keen market insight. In the process of choosing green transformation, they first focus on the needs of target customers, the leading nature of products, and value-added aspects. For traditional enterprises that have not transformed, the government policy factor is more important, accounting for 38.35%. Relatively speaking, they appear more conservative in thought and more dependent on external environmental support such as government subsidies, financing policies, and fiscal and tax policies. Considering the complexity and long-term nature of transformation, traditional enterprises believe that there are unpredictable risks in the green transformation process, and government subsidies can alleviate the risks undertaken by enterprises in green transformation. In addition, a significant amount of capital needs to be continuously invested during the transformation process, so traditional enterprises pay more attention to the important factor of the financing environment.

The enterprise level accounts for 31.97% and 35.01% for transformed and traditional enterprises, respectively. It can be seen that enterprise-level factors also have a significant impact on green transformation. Among its secondary indicators, entrepreneurial ethics and technological innovation have the greatest impact on the transformation of both types of private enterprises. The long-term and uncertain nature of green transformation conflicts with the short-term profit goals of enterprises, causing significant distress for the green transformation of private enterprises. Green technology implies technological innovation and leadership, and the balance between the huge risks of continuous investment of human, financial, and material resources and the maximization of benefits in private enterprise operations requires the support and promotion of the ethical standards of entrepreneurs.

Looking at the ranking of secondary indicator weights, in successfully transformed private enterprises, the weights of customer demand satisfaction and market response are much higher than other influencing factors. This indicates that the main motivation for transforming enterprises comes from the innovation of their profit model; only when the benefits increase will their enthusiasm for green transformation be enhanced. The effectiveness of entrepreneurial ethics and technological innovation improves the revenue level of enterprise green transformation from different aspects. In

addition, the transformation of private enterprises to green requires continuous investment in demand for funds, and capital investment is an important material foundation to ensure the construction of the green system. The other six indicators are not much different, indicating that the other six indicators do not have a significant impact on green construction, but such factors are indispensable and remain a necessary factor for green transformation.

In enterprises that have not undergone green transformation, they are in turn government subsidies, financing environment, entrepreneurial ethics, technological innovation, customer satisfaction, and brand trust, which are ranked in the top six. These considerations are based on whether the risk undertaken is within the range they can accept, such as investment risk, decision-making risk, and market risk. After all, the return on benefits is the primary consideration for private enterprises.

4. Implementation Pathways for High-Quality Green Transformation of Private Enterprises

In summary, this paper summarizes the pathways for the green transformation of private enterprises as follows: First, identify market opportunities and seek customer needs. Then, under the ethical value proposition of entrepreneurs, carry out green transformation. With the guarantee of corporate capital, continuously innovate in green technology to enhance the green total factor efficiency of the enterprise. Finally, combine a favorable green business environment, along with government and policy support as a driving opportunity, to promote the high-quality development and green transformation of private enterprises. The specific implementation approaches are as follows:

4.1. Adhere to Market Orientation

According to Maslow's hierarchy of needs theory, focus on customers' higher-level consumption needs such as environmental protection, health, safety, and self-actualization, and pay attention to the development of product attributes such as low carbon, environmental protection, and safety. Strive to control the cost increase brought by green technology R&D, environmentally friendly raw materials, and manufacturing processes, and enhance the cost-effectiveness of green products. Increasing customer consumption and market recognition is key to the green transformation of private enterprises. In combination with the current development of green transformation of private enterprises, green technology development and product green upgrading should be further strengthened to enhance the influence and appeal of green brands. Persist in customer-centricity, actively face the large green consumer group, understand and meet consumers' green product and service needs through technologies such as big data. At the same time, create a digital online feedback platform to facilitate customers to make consumption evaluations of services and products, and promote private enterprises to improve green service levels.

4.2. Play the Guiding Role of Government Policies

The strong support of national policies has pointed out the direction for private enterprises to carry out green transformation and is a prerequisite for successful transformation [11]. In 2023, a series of national and local government policies to revitalize the private economy were introduced one after another, such as the "Measures to Promote the Development and Growth of the Private Economy in Jiangmen City," aimed at stimulating the innovative vitality and internal driving force for high-quality development of private enterprises. In addition to existing policies, the issue of high-quality professional scarce talents in private enterprises can seek government policy support. To help private enterprises introduce high-quality talents, actively promote school-enterprise joint training, industry-education integration, and other talent training models to provide intellectual support for green transformation. Local governments should increase support for green technology innovation, provide policy support and economic incentives, and encourage enterprises to carry out green technology innovation. In addition, the government can also establish green technology innovation demonstration zones to provide enterprises with innovation platforms and resource support, and promote the application of green technology in enterprises.

4.3. Play the Leading Role of Entrepreneurs

Private enterprises aim to maximize profits, and how to balance corporate benefits with social responsibility and implement green transformation depends on the value proposition of top decision-makers. The goal of green transformation of private enterprises reflects the highest ideals and pursuits of all employees and is a prerequisite for the green transformation of private enterprises. Entrepreneurs in private enterprises often play an irreplaceable leading and exemplary role in promoting the construction of green corporate culture. Leadership by example is a silent call, instilling the concept of corporate green transformation to all employees through their own actions. To cultivate green corporate culture, enterprises can strengthen environmental education and training for employees to fully realize the importance of environmental protection for enterprise development. Enterprises can also establish environmental protection reward systems to motivate employees to actively participate in environmental protection actions and form a good environmental protection atmosphere. Enterprises should also strengthen internal and external communication and cooperation, establish good cooperative relations with governments, social organizations, customers, and other parties to jointly promote green transformation.

4.4. Effectively Reduce the Financing Risks of Private Enterprises

Compared with traditional financial institutions, green financial institutions pay more attention to environmental protection and sustainable development [12], and therefore tend to provide more support to enterprises in financing terms. For example, monetary policy tools can be used to include private enterprises in the scope of financial institutions supporting green and low-carbon tools, reduce interest rates, and provide loan guarantees to alleviate corporate financing pressure, thereby reducing the cost of environmental protection investment. Traditional financial institutions have relatively limited financing support for environmental protection projects, often facing difficulties and high costs of financing. Green financial institutions are committed to supporting the development of green industries and environmental protection projects, providing more financing

channels and opportunities. Enterprises can raise funds through issuing green bonds, applying for green loans, and other methods, thereby reducing the cost of environmental protection investment. At the same time, introducing green finance can also provide professional consulting and services to help enterprises make environmental protection investment decisions and project management, and improve investment benefits.

4.5. Establish a Green Technology Innovation System

Enterprises can enhance their innovation capabilities by increasing R&D investment, cultivating high-quality scientific research talents, introducing advanced green technologies, and strengthening their own innovation capabilities. Enterprises should also actively cooperate with scientific research institutions and universities to jointly carry out green technology innovation research, achieve resource sharing and complementary advantages. Establishing a green technology innovation system also requires strengthening cooperation and communication among enterprises. Enterprises can promote cooperation and communication among enterprises by establishing alliances or associations to jointly promote innovation and application of green technology. Enterprises can also carry out international cooperation, attract advanced green technologies and experience from abroad, and promote technical exchange and cooperation between domestic and foreign enterprises. In the process of establishing a green technology innovation system, it is also necessary to strengthen the construction of technical standards and regulatory systems. Formulating unified green technology standards and establishing a sound technical supervision mechanism can standardize the green technology innovation behavior of enterprises, promote the application and promotion of green technology. At the same time, strengthen technical assessment and supervision of enterprises to ensure the effective implementation and operation of green technology.

5. Conclusion

From the perspective of constraints, private enterprises have more constraints compared to state-owned enterprises due to historical reasons, current constraints, and corporate attributes, showing stronger path dependence in green transformation. Combining the current situation of private enterprises in Guangdong, whether it is the early planning, mid-term implementation, or later operation and maintenance, the green transformation of private enterprises in Guangdong is at the forefront of the times, but there are still many difficulties and challenges. The transformation and upgrading of private enterprises still have a long way to go and still need the joint efforts of the government, enterprises, and the market to be realized. Private enterprises should seize the opportunities of high-quality development, actively meet the challenges of green transformation, take the market as the center, lead the transformation with internal causes of enterprises, support the national macroeconomic policy, continuously enhance their core competitiveness, and achieve a virtuous cycle process of “customer demand→green value creation →green value motivation→green value realization” to promote the realization of the green transformation of private enterprises.

Acknowledgments

This work is supported by the 2022 co-construction project of the “14th Five-Year Plan” for the development of philosophy and social sciences in Guangzhou (2022GZGJ85), the Youth Innovative Talent Project of Regular Colleges and Universities in Guangdong Province(2022WQNCX178).

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