

Research on Driving Factors and Strategies of Digital Development of Forest Health Industry in Liaoning Province

Yi Sun*, Lei Zhang, Yangmei Xu

Liaoning University of International Business and Economics, Dalian, Liaoning, 116052, China

sunyi@luibe.edu.cn

**Corresponding author*

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Abstract: In recent years, with the rapid development of digital technology, digitalization has become an important force to promote the development of all industries in China. However, Liaoning forest recreation industry still exists problems such as imperfect digital infrastructure and limited innovation ability of digital technology in digital transformation. Therefore, how to integrate digitalization with Liaoning forest recreation industry has become a problem to be solved. This paper describes the concept and history of digital transformation of Liaoning forest recreation industry, and analyzes the current digitalization status in detail by combining the geographical distribution of Liaoning forest recreation bases, the demand side and the supply side, and analyzes the driving factors of digital transformation and upgrading of Liaoning forest recreation industry in terms of both internal and external driving factors, and finds that the driving factors are in the form of causal feedback relationship that influences each other, and constructs a causal feedback diagram. The causal feedback relationship is found and a causal feedback diagram is constructed. Finally, relevant suggestions are put forward to improve the digitization level of Liaoning forest recreation, strengthen the construction of digital infrastructure, promote the upgrading and development of the industrial chain, and facilitate the digital transformation of Liaoning forest recreation industry.

1. Introduction

In March 2019, the Opinions on Promoting the Development of the Forest Recreation Industry emphasized that the forest recreation industry should promote the development mode of "Internet + Forest Recreation", promote the use of artificial intelligence, the Internet of Things, and big data and other technologies and equipment to realize intelligent forest recreation, and develop a new type of business that combines cutting-edge science and technology. This new industry can greatly promote the diversification and in-depth development of the forest recreation industry. Relying on unique forest resources and humanistic and historical conditions, Liaoning provides an opportunity for the development of local forest recreation industry. However, at present, Liaoning's forest recreation industry still suffers from the lack of digital technology innovation ability, imperfect

digital infrastructure and inconspicuous brand benefits. In order to comply with the trend of consumption upgrading, promote the transformation and upgrading of the forest recreation industry oriented to the digitalization of products and services, and reduce low-end supply. This paper starts from the theory and connotation of digitalization of forest recreation industry, outlines the current situation of digitalization of Liaoning forest recreation industry, and analyzes and refines the driving factors of digitalization transformation and upgrading of Liaoning forest recreation industry from internal and external dimensions, so as to provide theoretical support for the development of effective strategies for the development of Liaoning forest recreation industry, and also provide reference for the integrated development of forestry industry under the practice of the theory of the "two mountains". It also provides reference and thinking for the integrated development of forestry industry under the practice of "two mountains" theory.

2. Conceptual Definition and History Analysis of Digitalization of Forest Recreation Industry

2.1. Definition of the Concept of Digitalization of Forest Recreation Industry

Forest recreation refers to health activities that use the forest environment as the main means of treatment, aiming at maintaining, sustaining and restoring human health, including the provision of high-quality natural forest environment, integrated health care and physical and mental health comprehensive services, etc. [1]. The digitalization of the forest recreation industry is a new type of industry in which the traditional forest recreation industry is affected by the current wave of digitization, and digital transformation is carried out by using advanced digital technological equipment in order to optimize the industrial services, meet the needs of customers, and provide people with comprehensive health tourism services [2].

The products and services of forest recreation and other eco-industries are becoming increasingly diversified and specialized, driven by digital technology, intelligent equipment and specialized services [3]. Through the introduction of advanced technologies and equipment such as artificial intelligence, Internet of Things, big data, etc., the forest recreation industry can realize intelligent management and refined operation, improve service quality and efficiency, provide consumers with more accurate and personalized health services, and utilize the monitoring of intelligent equipment and sensors to collect the relevant data of the forest environment, and provide consumers with tailor-made recreation programs and suggestions. Digital transformation has become a favorable booster for the traditional forest recreation industry to diversify and develop at a deeper level.

2.2. Development History of Digitalization in the Forest Recreation Industry

2.2.1. Phase I: the budding period of digital development of the forest recreation industry (1980 to 2002)

The first stage of digital development history of the forest recreation industry is shown in Figure 1. In 1980, the Department of Agriculture, Forestry and Forestry of Taiwan, China and researcher Liu (1984) published "Forest Bathing - The Latest Fitness" and "Forest Bathing - Green Fitness"[4], respectively. Research on forest recreation in the mainland is more from the perspective of forest utilization to explain the health benefits of forests, and less on the medical relationship between forests and human beings to carry out scientific assessment and monitoring research. Adneretal (2001) explored the interaction between innovative choices and consumer demand in the process of development of digital technology in the Internet era[5]. Forest recreation research at this stage has a certain scientific awareness, but has not yet formed a comprehensive scientific system of forest recreation research[6], and digital research is mostly focused on scenarios such as digital

technology or information technology innovations in organizations, and at this time, digitalization in the field of forest recreation is still in the exploratory and preliminary application stage[7].

2.2.2. Phase 2: Integration period of digital development of the forest recreation industry (2003-2015)

The second stage of digital development history of the forest recreation industry is shown in Figure 1. The Foreign Project Cooperation Center (FPCC) of the State Forestry and Grassland Administration (SFGA) and the Beijing Municipal Bureau of Landscape Forestry (BMBLF) introduced the Japanese concept and model of forest therapy in 2012, and the government initiated the first batch of pilot construction of forest recreation bases in 2015, which marked the beginning of the practice of the forest recreation industry in China [8]. Digital research in this period focused on scenarios such as industrial change and business value creation based on digital technology [9]. Karimi et al (2015) identified the role of dynamic capabilities as disruptive innovations in responding to the digital transformation process through empirical research on the forest industry, providing a theoretical basis for digital marketing and promotion strategies [10]. By analyzing the application of big data and artificial intelligence technology, enterprises can deeply excavate user needs and preferences, effectively promote the customization and personalization of forest recreation products, so that enterprises can accurately formulate marketing strategies based on the analysis of user data and accurately recommend relevant recreation products to different target customer groups [11].

2.2.3. Phase 3: Growth rate period of digital development of forest recreation industry (2016 to present)

The third stage of digital development history of the forest recreation industry is shown in Figure 1. In 2016, Anji County, Hongya County and other counties became the first batch of forest recreation demonstration zones in China, and Sichuan promulgated the first domestic forest recreation rating guide. The launch of the construction of the demonstration area and the rating guide further strengthened the practice and development of China's forest recreation industry, laying the foundation for subsequent base construction. Meanwhile in the field of digital research, academics and industries have begun to pay attention to how enterprises can realize digital transformation by building platforms and ecosystems and other scenarios[12]. Intiaz & Kim (2019), through an in-depth understanding of the basic situation of the digital transformation of the forest recreation industry and the business model, put forward the proposal to reshape the customer value proposition and the strategic operation model in order to promote the forest recreation industry's of digital transformation [13].

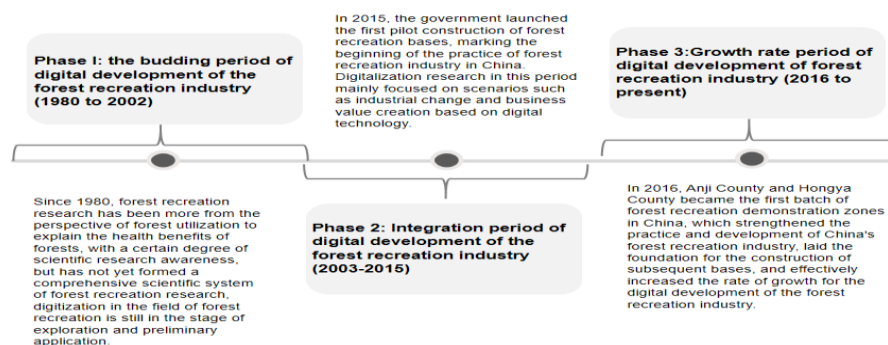


Figure 1: Map of the digital development history of the forest recreation industry

3. Liaoning Forest Recreation Industry Digital Development Status Quo

3.1. The Distribution of Forest Recreation Bases in Liaoning Shows the Phenomenon of “Radiation Aggregation”

Since 2015, 27 provinces, autonomous regions and municipalities have carried out the construction of forest recreation bases. The State Forestry and Grassland Bureau jointly launched a multi-departmental selection of national forest recreation base pilot construction units, and has selected nine batches, selected the national forest recreation base pilot construction units 1682, covering 30 provinces, autonomous regions and municipalities directly under the Central Government, 216 forest recreation homes, county (city, district) level forest recreation pilot 146, township level 169, construction units 1151. There are 672 forest recreation units in northern China, accounting for about 40%, and 550 pilot construction units of forest recreation bases with enterprises as the main operating body, accounting for about 33%, and the distribution of each province is shown in Table 1. Among them, there are 27 pilot construction units of forest recreation bases with enterprises as the main operating body in Liaoning, and the distribution of selection batches is shown in Figure 2.

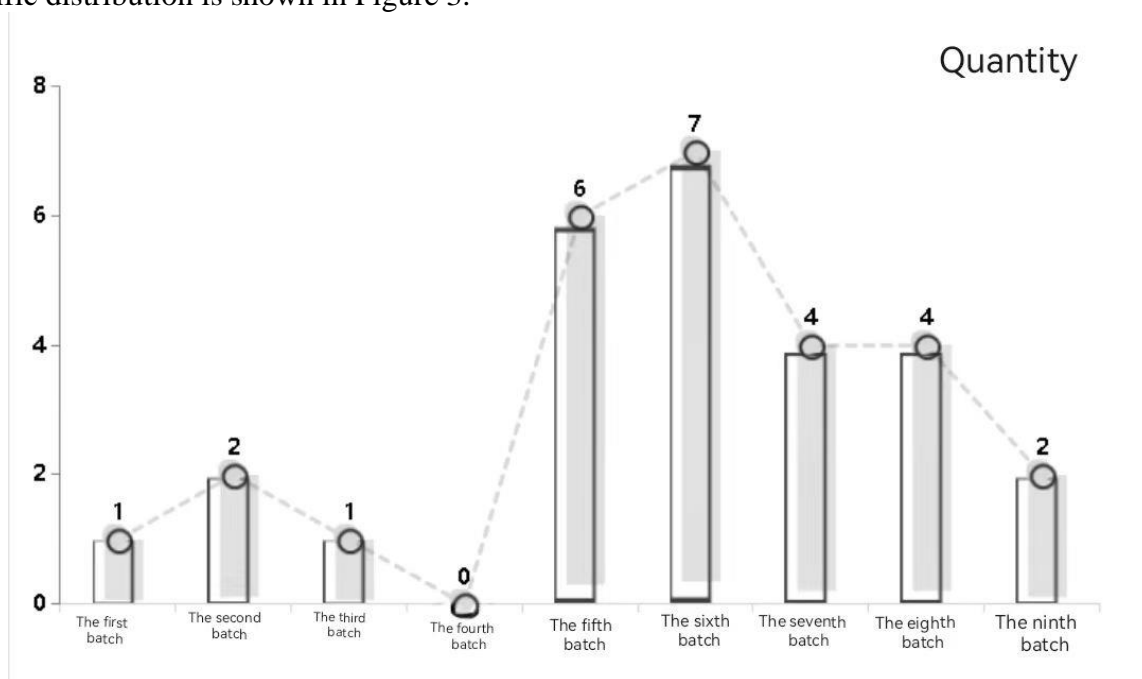
Table 1: Distribution of Pilot Construction Units of Forest Recreation Bases in Northern China with Enterprises as the Main Operating Body by Province

number	province	first batch	second batch	third batch	fourth batch	fifth batch	Sixth batch	Seventh batch	Eighth batch	Ninth batch
1	Heilongjiang province	2	-	5	6	4	23	6	6	9
2	Jilin province	4	9	3	8	11	3	2	-	1
3	Liaoning Province	1	2	1	-	6	7	4	4	2
4	Beijing Province	-	1	1	1	1	2	1	-	-
5	Tianjin Province	-	-	-	-	1	1	-	-	-
6	Hebei Province	-	-	1	4	3	1	-	1	-
7	Uygur Autonomous Region	1	2	4	-	1	-	-	-	-
8	Inner Mongolia Autonomous Region	-	4	4	6	7	4	6	4	5
9	Ningxia Hui Autonomous Region	1	-	-	-	-	1	-	1	1
10	Shanxi Province	1	-	2	9	25	37	15	4	6
11	Shandong Province	-	2	3	8	0	25	17	6	9
12	Henan Province	1	8	7	15	24	17	12	11	11
13	Shaanxi Province	-	2	1	1	14	7	1	4	8
14	Gansu Province	-	-	-	-	5	6	5	5	5
15	Qinghai Province	1	-	2	3	5	2	-	-	-
Total		12	30	36	62	104	138	65	46	57
		550								

Data source: Compiled and summarized based on relevant information from the Forest Recreation and Nutrition Branch of the China Forestry Industry Federation.

Most forest recreation bases tend to be established in areas with better natural resources, tourism

resources, population and economy, GDP, and infrastructure conditions [14], and the distribution of forest recreation bases in China follows this pattern. Compared with the central and western economic belts, the eastern economic belt has fewer bases, and the forest recreation bases in different economic belts have obvious characteristics in spatial distribution [15]. Liaoning is located in the eastern economic belt of China, and from the perspective of outside the province, the spatial distribution of forest recreation bases in Liaoning shows a sparse state, but there exists a certain trend of agglomeration. From the provincial point of view, the number of forest recreation bases among different municipalities varies greatly, showing the characteristics of “big radiation and small agglomeration”, and the bases are mostly concentrated in the areas of Liaodong, Liaonan, and Liaosi. These areas have unique advantages in terms of natural scenery, ecological environment and cultural resources, which can provide favorable conditions for the development of the forest recreation industry[16], and thus the distribution of bases in this region is relatively dense, and the specific distribution is shown in Figure 3.



Source of data: Summarized from the relevant information of the Forest Recreation and Nutrition Branch of the China Federation of Forestry Industries.

Figure 2: Distribution of selection batches of the 27 pilot construction units of forest recreation bases in Liaoning with enterprises as the main operating body



Data source: Organized and summarized according to the relevant information of the Forest Recreation and Nutrition Branch of the China Forestry Industry Federation.

Figure 3: Distribution of Forest Recreation Bases in Liaoning Province

3.2. Digitalization of Liaoning's Forest Recreation Industry Stalled

3.2.1. Difficulties in financing for most forest recreation enterprises in Liaoning have led to a slowdown in digitalization.

The aggregation of many developmental digitalization elements requires sufficient financial support, which is an important foundation to ensure that recreation enterprises can steadily advance in both project operation and resource development.

In 2022, China's recreation tourism industry continued to be fully affected by the epidemic, and the market scale declined more. According to the data on the website of Enterprise Search Cat, there are 1,360 surviving forest recreation tourism-related enterprises in the country, of which Liaoning only accounts for 22, and their financing structure is relatively single, generally from bank loans, while other direct financing means, such as stocks, funds and bonds, are used less frequently [17]. In as well as the specific construction, investment and financing of most forest recreation enterprises, limited or even blank external disclosure information, lack of timeliness [18]. Although the development of Liaoning forest recreation in recent years has a gradually positive trend, it still has the characteristics of high construction costs, long recovery cycle, low revenue stability, and there is an asymmetry of information, financing supply and demand, high credit risk, narrow financing channels and other problems. This has led to investors mostly holding a wait-and-see attitude and not daring to enter the market. At present, it is difficult to raise the funds required for enterprises to carry out digital upgrading and transformation, and the digital construction of most cultural and entertainment enterprises has been caught in a bottleneck.

3.2.2. The development mode and product type of digitalization of Liaoning's forest recreation industry are relatively single

Liaoning's forest recreation industry has not yet been significantly integrated in the comprehensive application of disciplines, and is too dependent on the original ecological resources. 60% of the operators' understanding of forest recreation is still only at the level of forest tourism, holiday and leisure, and do not pay attention to the importance of digitalisation in the forest recreation industry, and there is a certain degree of blindness in practice and a lack of practical innovation and the concept of integrated development of the industry [19]. From the perspective of industrial services and product development, digitalization can effectively enrich and expand the mode of industrial services and product development, and Xie Yifan et al. (2021) argued that enterprises with more in-depth experiential products and a focus on product diversification have a higher willingness of consumers to consume, and the base revenue situation is also relatively good. However, there is significant regional heterogeneity in the product supply of forest recreation bases in Liaoning Province in the pre-development period, and the product design, forest recreation resource conditions, scale, and digital ornamental recreational facilities and services within and around the bases are relatively imperfect, and are lacking compared to other cities [20]. There are large differences in the digital forest recreation services and products that can be provided by different cities, and in general the electronic technology coverage of base features is low, and single products and services are difficult to stimulate consumers' deep sensory experience.

3.2.3. The degree of full-process digital tracking service of Liaoning forest recreation industry is not deep enough

Although the service consciousness of Liaoning's recreation and tourism industry has generally increased, the whole-process digital tracking service has yet to be further improved. The untimely release of institutional information and the lack of channel accessibility will reduce the consumer

experience. Especially in terms of service demand response, the information related to forest recreation searched by consumers on search engines is generally a large number of repetitive news reports, and it is impossible to obtain enough effective information, for example, the most search results are the list of forest recreation construction pilots [21].

How to better dynamically match consumer demand, so that the platform is more customized and targeted, how to achieve social interaction space spanning and deliverability based on consumption data and other issues are Liaoning forest recreation industry digital development urgently need to be resolved.

4. Driving Factors for the Digital Development of Liaoning's Forest Recreation Industry

4.1. External Driving Factors

4.1.1. Macro-control of government policies and strengthening of economic support for promotion and publicity

The support of Liaoning provincial government for forest recreation industry is one of the important external factors for digital development. With the further enhancement of national ecological awareness and improved understanding of health needs, the relevant government departments have begun to pay attention to the health benefits provided by forest recreation and the efficiency enhancement that digitalization has brought to the industry, and have actively cooperated with forestry and other departments to jointly promote the implementation of legislation and policy recommendations for the digital development of Liaoning's forest recreation industry. In its recent policies, the government will encourage the digital transformation of the forest recreation industry through financial subsidies and tax incentives, as well as increase economic investment in digital technology, support forest recreation enterprises to carry out research and development of digital technology, and encourage enterprises to adopt digital technology to improve productivity and product quality, so as to promote the digital transformation of the forest recreation industry. At the same time, the promotion and publicity of the “green brand” of Liaoning's forest recreation and tourism industry will be stepped up to attract domestic and foreign tourists and increase the flow of visitors. The external causal feedback relationship of national policy macro-control is shown in Figure 4.

4.1.2. Optimization and upgrading of consumption structure, consumer demand changes to high quality

The change of consumer demand to high quality is also an important external factor for the digitization of Liaoning forest recreation industry [22]. In recent years, due to China's economic development, the consumption structure of urban and rural residents is being upgraded from subsistence consumption to developmental consumption, from material consumption to service consumption, and from traditional consumption to new types of consumption. At present, the leading force of national economic growth is consumption, in the 1st quarter of 2023, the Engel coefficient of the national residents is 31.6%, and the residents' consumption in health, health care has increased significantly, and the consumption stage is shifting from mass consumption to high-quality life consumption. High-quality consumption upgrading will be accompanied by new consumer demand, so that the Liaoning forest recreation industry needs to be more accurate in the positioning of the consumer market, which will lead to changes in product services and industry, and promote the Liaoning forest recreation industry service system and technology upgrading. Therefore, the change of consumer demand is also one of the important driving forces to promote

the digital transformation of Liaoning forest recreation industry. The external causal feedback relationship of changes in consumer demand is shown in Figure 4.

4.1.3. Forest recreation in the ascendant, the competition of brands around the world is gradually increasing

The development situation of forest recreation industry in different parts of China is different due to its resources and environment, and the brand building ideas and strategies are not the same. In recent years, other provinces on the creation of forest recreation digital transformation of the innovative ideas are emerging, the effect of the excellent response, for Liaoning forest recreation industry, due to the external brand competition is increasingly fierce pressure generated by the development of the digital transformation of the driving force. Provincial forest recreation industry planning in full swing, and according to local conditions, some provinces choose to innovate on the basis of the original local resources[23], such as Heilongjiang Province, the forest recreation base thanks to the unique type of climate and topography and geology, to create a brand focusing on the local unique “ice and snow culture”, “Medical and health care”. In Huinan County, Tonghua City, Jilin Province, following the development idea of "agriculture + health care", it focuses on the construction of intelligent agricultural estates and wetland parks, combines traditional Chinese medicine planting with landscape, and develops the forest recreation industry with local characteristics [24]. Recreation enterprises should be clear about their strengths and weaknesses compared with other brands, apply cutting-edge technology to their services, enrich the supply of products, make the vertical extension of the industrial chain, publicize the service concepts of taking health as the core, being close to the green, and experiencing nature, and form a healthy industrial chain, so as to exert their advantages in brand competition, attract consumers, and form a benign competition with other external brands. The external causal feedback relationship of brand competition is shown in Figure 4.

4.2. Internal Motivational Factors

4.2.1. Consumer willingness increases and demand can match supply.

Currently, people are increasingly concerned about their psychological and physiological well-being. Recreation in the forest environment exerts a positive influence on human health. Conducting forest recreation activities enjoys the advantages of reducing blood pressure, pulse rate, and sympathetic nerve activity[25]. The consumers' willingness to consume forest recreation is on the rise, and consumers place greater emphasis on the construction of forest recreation bases' facilities and the functional attributes of the products. With the continuous improvement of people's demands, some traditional activities have failed to meet their requirements. Liaoning forest recreation enterprises need to add some innovative services and facilities suitable for tourists from their perspective.[26].

Industry digital transformation and upgrading, supply can match demand. In recent years, Liaoning forest recreation industry in order to better meet the needs of consumers, but also in the construction of perfect industrial facilities, improve the quality of service, industry digital transformation can better meet the current consumers for forest recreation personalized needs. Through digital technology to achieve customized services, improve consumer experience, satisfaction, and consumer satisfaction has a strong impact on the degree of re-visit, the degree of recommendation. The application of digital facilities in the scenic area will improve consumer satisfaction with the scenic area, and then increase consumer loyalty to the scenic area [27]. In addition, digital technology can help forest recreation enterprises in Liaoning Province to improve

the transparency and traceability of their products and enhance consumers' trust in their products. The digital transformation and upgrading of the industry can actively match the demand and strive to reach a high level of dynamic balance, forming a virtuous cycle. The internal causal feedback relationship of market demand, matching supply and demand is shown in Figure 4.

4.2.2. Digital technology and equipment are constantly upgraded, and the service function of the forest recreation industry is perfected.

The trend of integration of digitalization and industry has increased, and the continuous innovation of digital technology and industrial construction strategies is the internal power to promote the digital transformation of Liaoning's forest recreation industry. These technologies and strategies can help enterprises improve service efficiency, reduce costs and enhance their competitiveness. In terms of enterprise management, through big data analysis technology, enterprises can better understand consumer demand and develop products that are more in line with market demand [28]. The application of artificial intelligence technology can also help enterprises realize intelligent management and improve production efficiency and product quality. In terms of product and service upgrading, IoT-aware healthcare intelligence systems based on machine learning can enhance patient and doctor interaction, cloud services are helping healthcare users communicate with each other, sensors help patients send data to the healthcare system, which can include different types of information such as temperature, blood glucose levels, heart rate, etc., and the big data system provides a powerful way to efficiently monitor the consumer's health status technical support [29]. The internal causal feedback relationship of technological innovation is shown in Figure 4.

4.2.3. The risk of enterprise manpower cost control is reduced, and industrial resources are effectively and rationally allocated.

Reasonable control of labor cost is an issue that every enterprise needs to pay attention to, and proper labor cost control can enhance the core competitiveness of the enterprise. Manpower cost control can add internal power for Liaoning forest recreation industry to realize sustainable development. At present, most of the forest recreation enterprises in Liaoning are facing resource constraints such as manpower, land, technology, etc. Digital transformation can combine the advantages of industrial resources with networking, improve the flexibility and finesse of each production and development link of the industry, and help Liaoning forest recreation enterprises to better control labor costs. The integration of digitalization into the cost management of corporate governance can enable enterprises to dynamically understand the market price of services or products, carry out human cost control work based on the value chain perspective, establish an informatized data platform, and form a synergy at multiple levels to reduce the pressure of human cost control in the enterprise, so as to effectively promote the digitalization of forest recreation enterprises to smooth the operation and strengthen the allocation of resources. The internal causal feedback relationship of labor cost is shown in Figure 4.

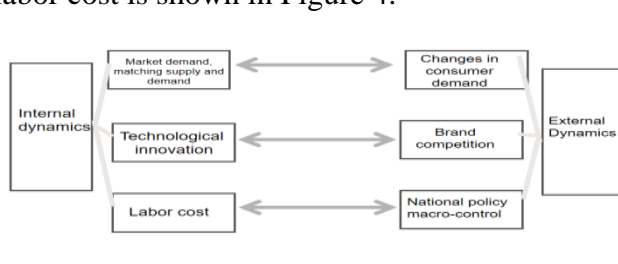


Figure 4: Causal feedback relationship among the driving factors

5. Effective Strategies for Digital Development of Liaoning Forest Recreation Industry

5.1. Provide Comprehensive Financial Guarantee to Accelerate the Digital Development of Liaoning Forest Recreation Industry

For the current lack of funds and financing difficulties in Liaoning's forest recreation industry, in addition to the government's strengthened financial support, it should further improve the financial and monetary policies, optimize the management mode of financial subsidies, and crack down on the misuse of financial funds and misuse of behavior. At the same time, it is also necessary to further reduce the tax burden of the forest recreation industry, increase credit support and lift the investment restrictions on social capital. In addition, private capital can be introduced by encouraging forest recreation enterprises to mitigate the risks of industrial operations and lower the financing threshold of innovative recreation projects, effectively reducing the pressure of government debt. The government should also promote financial institutions to innovate financial service models for forest recreation enterprises, and urge financial institutions to customize loan programs and financial products according to the needs of forest recreation business, such as "leisure farm loan", "recreation project service loan", "recreation industry chain integration loan", "recreation project service loan", "recreation industry chain integration loan", and so on. "Recreation Industry Chain Integration Loan", "Forest Recreation and Agriculture Integration Loan", etc.[30].

5.2. Cultivate Oriented Professionals to Help Liaoning Forest Recreation Industry Digital Product Innovation

As a multidisciplinary discipline, forest recreation involves forestry, medicine, psychology, management, education, tourism and other fields, and it includes a wide range of complex research areas and types of services. Summarizing the practical experience of the development of forest recreation industry in various countries and combining with the actual development of forest recreation industry in China at present, the development of forest recreation product system integrating education and training industry, health and leisure industry, and old age care industry is the source driving force to promote the sustainable development of forest recreation industry [31].

Liaoning forest recreation industry can take the form of "introduction", "going out" and "cooperation". The first is to tap the professional talents, vigorously introduce the industry with rich experience, and enhance the team strength. The second is to enhance the business quality and service level of the practitioners by sending staff to the coastal developed or advanced regions for exchange and further study. The third is to establish a cooperative relationship with the third-party colleges to train the much-needed talents for the project, forming a "ladder-type" human resources supply reserve, and making efforts from all sides to solve the dilemma of the lack of industrial talents [32], and boosting the digital development of Liaoning's forest recuperation industry.

5.3. Optimizing the Whole Process of Digital Tracking Service, Improving the Service Satisfaction of Liaoning's Forest Recreation Tourism Industry

Digital tools play an important role of "process reengineering" in the forest recreation tourism industry, which can redesign the process of the demand side of the service and optimize the operation process of recreation tourism organizations.

In terms of digital process response on the demand side, Liaoning forest recreation enterprises can make use of online education lectures, education consulting, etc., and realize remote teaching and training activities through the publicity department's regular promotion of popular science

tweets on online platforms. Meanwhile, enterprises should focus on improving user stickiness by dynamically matching consumer demand, tracking consumer data, and handling complaints and public opinion in order to improve immediacy and communication.

On the supply side, enterprises can make use of digital tools to mine tourists' preferences through data algorithms, draw customer portraits, acquire potential demand, and predict user behavior. On the other hand, they can analyze the trajectory of tourists' behavior so as to provide personalized services tailored to users' needs. Through the whole process of digital tracking, they can continuously promote the interactive restructuring of business nodes in the recreation and tourism industry, dynamically match consumers' needs, and optimize the industrial structure in order to realize the advantageous fusion effect.

6. Conclusions

This paper takes Liaoning forest recreation industry as the research object and centers on its digitization motivating factors and strategies, which is a powerful supplement to the existing research system on digitization of Liaoning forest recreation industry, and makes up for the shortcomings of the existing research to a certain extent, and at the same time can provide the necessary reference basis. The results of the study mainly reveal the following points: first, most of the forest recreation enterprises in Liaoning have difficulties in financing, which leads to the slow development of digitization; second, the development mode and product type of digitization in Liaoning forest recreation industry are relatively single; and third, the degree of digital tracking service of the whole process of Liaoning forest recreation industry is not deep. At the same time, the following initiatives can also be taken to effectively promote the digital development of forest recreation in Liaoning Province: first, provide comprehensive financial protection to accelerate the digital development speed of Liaoning forest recreation industry; second, cultivate targeted professionals to help Liaoning forest recreation industry digital product innovation; third, optimize the whole process of digital tracking services to improve the satisfaction of Liaoning forest recreation tourism industry services.

Compared with the existing research results, this paper is based on the Liaoning Province forest recreation base power factor dimensions to analyze and investigate, combing the internal and external power factors and their mutual influence of the causal feedback relationship chain, and targeted to put forward to promote the sustainable development of Liaoning Province forest recreation industry related recommendations.

Of course, there are some shortcomings in this study, which are mainly manifested in the following: firstly, due to the fact that it is extremely difficult to obtain the digitalized data of the forest recreation industry at the municipal level, most of the analyzed data come from literature search and survey, which leads to the analysis of the data is not comprehensive enough, which makes the results of the analysis have a relative bias. Secondly, some of the data in this paper are weak in timeliness, which makes it difficult to conduct in-depth investigation on the future development of forest recreation industry digitization in Liaoning Province. Due to the fact that fewer data related to the digitization of the forest recreation industry with strong timeliness have been collected comprehensively at present, we can only analyze the existing data to ensure the smooth implementation of the study. In the future, there is an urgent need to expand the data source channels to ensure that the analysis results are more objective and reasonable.

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