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Research Article

Construction of Enterprise Management Business Model Based on Internet of Things RFID Technology

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This paper proposes a new tag anticollision algorithm. On the basis of the common query tree algorithm, this algorithm increases the number of query bits, so that the algorithm has a faster tag identification amount in the state of full time slots. Collision bit and total response bit are used to estimate the number of tags, and combined with the highest collision bit to determine whether it is continuous, the number of query crosses is adaptively adjusted, and a variable bit dynamic query tree tag anticollision algorithm is designed. In conjunction with the settlement environment, improvements have also been made in the status of the identified tags. The new algorithm has improved progress in reducing idle time slots and reducing search depth. Under the premise of ensuring stability, the recognition efficiency of the algorithm is improved. From the perspective of different dimensions of corporate network and marketing dynamic capabilities, based on the strength of network relationships and product development processes, it can promote value creation model innovation in business model innovation. That is, when the network partners communicate very frequently, they can provide new ideas and resources for enterprise product development and creation and then can better integrate innovation through product innovation, quality improvement, product development cycle shortening, and development advance management. Typed products and resources are put into the operation process of the industrial chain of product output to better create new products for customers and lay the foundation for realizing the innovation of corporate value creation models. Based on the network density and customer relationship process, it can promote the value proposition model innovation in the business model innovation. Enterprise business model innovation should not only pay attention to the collaborative innovation between different elements within the enterprise but also pay attention to the overall coordination mechanism of the company's external interest network, pay attention to the different value propositions of stakeholders through the enterprise network, and cultivate the enterprise's rapid response to market changes. Network centrality has the greatest positive impact on the supply chain process. The company develops new products, manages customer relationships across departments, and implements supply chain management across departments.

1. Introduction

Business model innovation is an exploration process of initiative, trial and error, and reshape. It is not only an important tool for companies to commercialize technology and expand into new markets but also a key driving force for companies to create competitive advantages [1]. Effective means to adapt to environmental changes. In recent years, Tencent, Alibaba Group, and other companies have achieved catch-up with leading companies through business model innovation [2]. IBM has used business model innovation to successfully transform from a global hardware giant to a world leader in information technology and business solutions. And the competitive business model has achieved leapfrog development. However, it is still unclear how companies carry out business model innovation and how to grasp the key elements of business model innovation. It is urgent to establish a logical framework for effective interpretation of business model innovation [3]. The issue of business model innovation has aroused widespread concern and discussion from scholars at home and abroad, and many results have been achieved [4]. In the existing research, scholars have defined the concept and connotation of business model innovation based on different perspectives and summarized the business model innovation path through case analysis or existing theoretical integration research, which provides a useful reference for enterprises to carry out innovative practices [5]. However, in-depth analysis of the formation logic of business model innovation and literature on business model innovation from a methodological level are relatively rare. Therefore, it is of great significance to summarize the experience and skills in existing research, analyze the formation mechanism of business model innovation, and build a set of methods that can inspire or guide enterprises to carry out business model innovation.

No matter in the aspect of item information identification or in the aspect of cargo information tracking, radio frequency identification technology has great advantages [6]. This technology is also called RFID technology. It can not only realize fast reading of item information but also realize the modification of item-related information, so that electronic tags can be reused. Moreover, the electronic tag also has the advantages of large storage capacity and nonvisual identification, which can realize remote cargo information reading, which is convenient for the staff to manage the cargo [7]. In addition, the goods with electronic tags can realize real-time tracking and positioning of goods information when they are out of storage or transfer. And the use of this technology can realize the intelligentization of warehouse management, reduce manual operation management, improve the information accuracy of warehoused goods, and to a certain extent avoid the favoritism of some people, thus bringing the greatest benefits to the enterprise [8]. However, RFID technology still has many problems in the actual application environment, among which the collision between tag data is a key issue that needs to be studied. In the RFID system, the mutual transmission of information between the tag and the reader is the same channel. When multiple tags to be identified respond at the same time, it may cause the phenomenon of information transmission conflicts, so that the information of some tags will not be transmitted for a period of time [9]. The occurrence of such label conflicts will seriously affect the integrity of the collected physical information, cause data loss, and reduce system efficiency. Therefore, how to effectively solve the collision problem in the RFID system is an important content that needs to be solved in the further development of RFID technology.

This article has made a detailed design of the tag anticollision algorithm in the settlement environment and proposed a new tag anticollision algorithm. Based on the common query tree algorithm, adaptive query bits are added to make the algorithm in the full time slot state. It has a faster tag recognition capacity and uses collision bits and total response bits to estimate the number of tags. According to the continuous situation of the highest collision position, the number of query forks is automatically adjusted, which reduces the generation of idle time slots and collision time slots and improves the efficiency of the anticollision algorithm. This research is aimed at exploring a specific path to drive and enhance business model innovation based on the dynamic capabilities of corporate networks and marketing and is closely focused on this research purpose and theoretical mechanism. We constructed and proposed a theoretical research model of corporate network-marketing dynamic capabilities-business model innovation and used service industry companies as the research object to obtain large samples of primary data. The hypothesis of the relationship between variables is tested by empirical test and structural equation model analysis. When the network members are more densely connected with each other, it will provide a lot of convenience for managing the relationship between stakeholders including customers, then deeply explore the potential value needs of users to achieve customer segmentation and target market, and then clarify the direction for realizing the innovation of enterprise value proposition model. Based on the network scale and product development process, it can promote the value creation model innovation in the business model innovation. Through different cross-departmental business processes, market resources are transformed into enterprise's enterprising advantages, and network resources are reset and allocated again. On the basis of effectively meeting customer needs, the company's own organizational competitiveness is improved.

2. Related Work

A general RFID system contains an RFID reader and multiple RFID tags. Each electronic tag has its own unique ID. When the reader transmits a signal, the tag within the signal range will feed back its ID sequence to the reader for identification and complete tag identification. Due to the shared channel used by the reader to read the tag ID, when multiple tags feed back the ID at the same time, data transmission may be blocked, causing tag collisions, and the tag information to be identified cannot be correctly identified by the reader. The time division multiple access method has the advantages of simplicity, easy implementation, and low cost. It is widely used in most RFID systems. In the time division multiple access method, the anticollision algorithm is divided into two categories: deterministic and probabilistic.

Related scholars have proposed a binary split tracking algorithm, which effectively improves the identification efficiency of large-scale RFID systems [10]. The researchers proposed an M query tree algorithm to optimize the RFID system in terms of energy consumption and recognition speed [11]. By optimizing the binary query tree algorithm, scholars have effectively reduced the problem of data redundancy in the information transmission between the tag and the reader [12]. Researchers propose a Bayes-based query tree algorithm, which improves time efficiency by 78.5% compared to traditional query tree algorithms [13].

Related scholars pointed out that business model innovation is, in a sense, a high degree of integration of social capital, and social capital will enhance the innovation capabilities of enterprises [14]. Through case study analysis, it is believed that companies in different competitive positions choose different paths of business model innovation. Generally, companies that are in a dominant position in competition are more inclined to adopt radical methods to carry out business model innovation, and companies that lack the right to speak in competition tend to be more inclined to business model innovation for defensive purposes. Relevant scholars collected and sorted out the operating data of 334 companies and found through model empirical research that relational and structural embedding played a key role in promoting the innovation of modern enterprise business models [15]. Researchers have concluded through empirical analysis that integrated companies can achieve long-term resource cooperation with external companies to complement resources, which will help companies to carry out process reengineering and business model innovation [16].

Relevant scholars have used the structural equation model of the influencing factors of the "Internet+" business model innovation and found that the changes in the connection, the upgrade of consumer demand, the application of network technology, and the social dividend have a significant impact on the "Internet+" business model innovation [17]. Among them, the upgrade of consumer demand, network technology application scenarios, social dividends, technology drive, and the company's willingness to innovate in the future are the main influencing factors.

Relevant scholars pointed out that the business model mainly includes elements of transaction content, transaction structure, and transaction governance to create more value for focus companies and other participants and proposed four business model design themes of efficiency, novelty, lock-in, and complementarity, and past empirical analysis found that efficiency and novel business models have a significant impact on corporate performance, while lock-in and complementary business models have no significant impact on performance [18, 19]. Researchers believe that a business model is the process of value creation, value transfer, and value acquisition by an enterprise [20]. Relevant scholars define the business model based on the perspective of value creation as the complementary combination, transaction structure, profit model, and revenue and expenditure methods formed by producers, consumers, and partners in R&D, production, marketing transactions, and service experience based on resource capabilities. Relevant scholars believe that the business model is based on the profitability of the enterprise, which gathers relevant elements to form a business "ecosystem" and a logical system that accompanies the development of the enterprise [21].

Relevant scholars have compiled a large number of academic documents and compared various viewpoints fully and pointed out that business model innovation is a comprehensive innovation and breakthrough that integrates value creation, value concept proposition, and value resource acquisition [22]. Therefore, in the process of business model innovation, it is necessary to comprehensively consider all aspects such as suppliers, purchasers, customers, and stakeholders. We must not only consider the various components but also pay attention to the management and reintegration of internal and external resources. At the same time, we must also take into account the direct or indirect impact of the micro- and macroenvironments on it. Business model innovation is a kind of business value derived from the idea of meeting consumer needs. The importance and significance of business model innovation lies not only in creating new technologies or new products but in creating new value for customers.

3. Method

3.1. IoT Platform Architecture. This design uses the Internet of Things model as the overall design framework and connects traditional devices with various sensors to the Internet to achieve information sharing and interaction between things. The Internet of Things architecture is composed of a perception layer, a network layer, and an application layer. Based on the Internet of Things architecture, the system is divided into three parts: the device side, the server side, and the monitoring side. Being equipped with RFID as the sensing layer constitutes the device side. The server is placed in the cloud, and the data is transmitted to the cloud server using 5G or Wi-Fi transmission. The web management platform is realized through the background monitoring system.

(1) *Device-side architecture design*. The device side is mainly used to realize the functions of data collection and logic control of the perception layer of the Internet of Things. The collected data and various communication protocols or business logic operations and other data will eventually be collected into the IoT gateway. In addition to the device-side and server-side data interaction, the IoT gateway can also process some raw data to complete the operation.

(2) *Server architecture design*. In this design, the server is arranged in the Alibaba Cloud server. The cloud server is usually composed of three parts: web front-end, web back-end, and middleware. The web front-end mainly implements the following functions: dynamically display the actual device data status on the site through the page, generate various data reports, and save; the main functions are user management, role management, role matching, and project template management.

(3) *Architecture design of the monitoring terminal*. As a traditional and commonly used monitoring device, a PC can be used as a network front end to monitor and control the system status. However, because of its large size and inflexibility, this design chose to place the server in the Alibaba Cloud, so that not only PCs can be used as monitoring devices but also smartphones, tablets, etc. can be used regardless of location through a web browser. It is convenient to complete the monitoring of the on-site equipment status.

3.2. The Overall Design of the System. The RFID-based intelligent tool management system is composed of an intelligent tool cart and a system back-end. Among them, the intelligent tool cart completes the life cycle tracking link of tool information collection, positioning tool from storage to scrapping, and the circulation link of daily borrowing and returning of tools. The system backstage realizes intelligent management of tools by summarizing various data of tools. Figure 1 shows the overall design of the system. The system is composed of equipment, servers, and system back-ends.

In view of the fact that some workshops did not construct the local area network, the wireless router did not

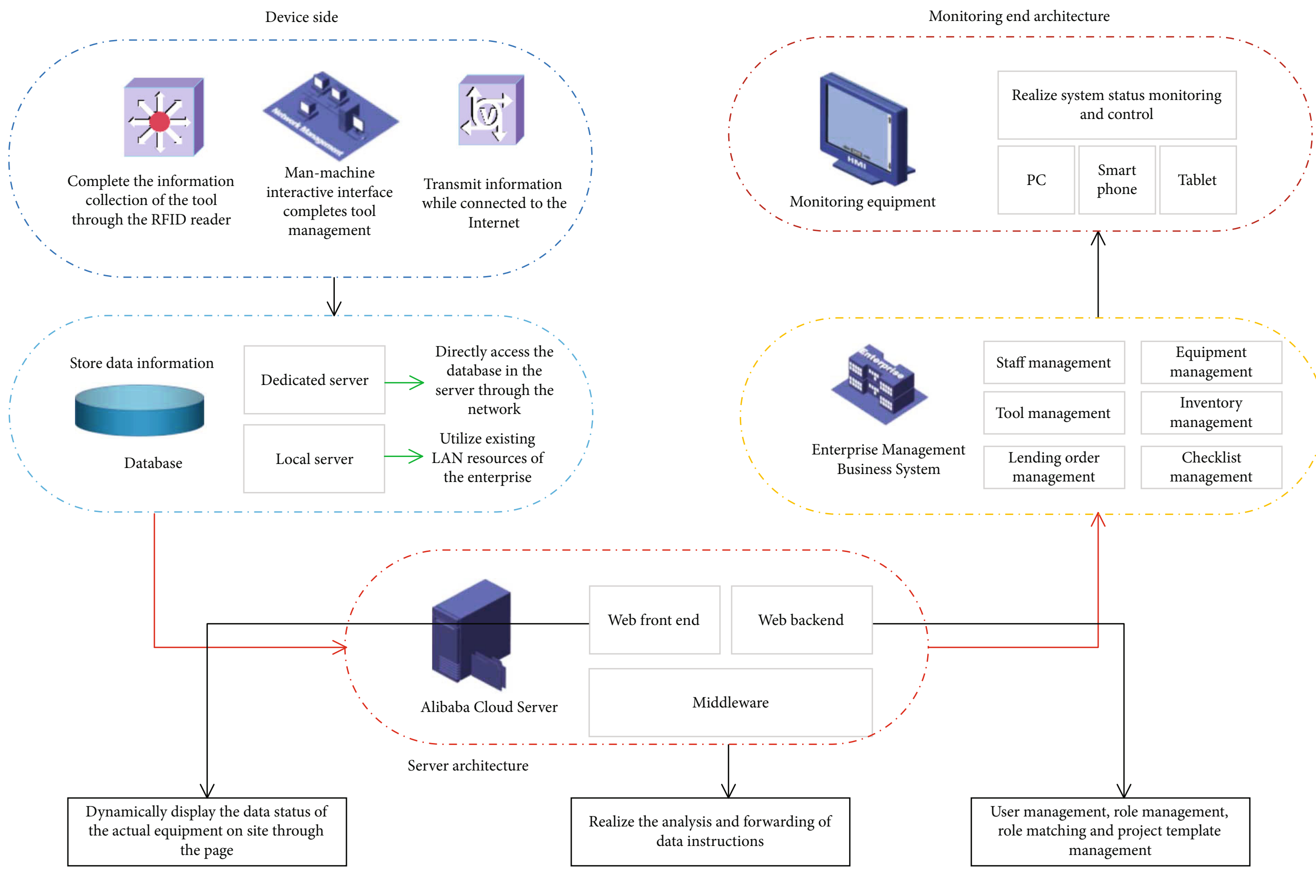

Figure 1: Overall system design scheme.

achieve full coverage, and if the local area network was rebuilt in order to implement tool management, a large amount of capital would be required, and the cost would be too high. Therefore, this prototype design chose to place the server on the cloud and adopt 5G for transmission. Considering factors such as security and convenience, the Alibaba Cloud server was finally selected.

The system background can generally be divided into mobile devices and PCs, etc. This design combines the actual situation inside the workshop, and the administrator or background operators can achieve control through the PC-side management web page. The system background is mainly used to display and operate the basic information of the operating system, complete the input of the initial data of the tools and equipment, realize the remote management and view of the intelligent tool cart, process the system logic business, and statistically summarize the various management data of the system. The system client has set up six sections of content, including employee management, equipment management, tool management, inventory management, loan order management, and inspection order management.

In order to reduce the storage pressure of the tool cart and the system back-end, this design sets the database in a dedicated server, and the tool cart and the system back-end directly access the database in the server through the network to complete information interaction. For workshops with full coverage of the enterprise's basic unit network, local servers are used, Wi-Fi is used for information transmission, and internal addresses are selected to be physically isolated from the external Internet. In this case, no changes will be made to the internal network structure of the enterprise, no new network equipment will be purchased, and all existing LAN resources of the enterprise will be used.

The application of the server is divided into two aspects: on the one hand, it provides a server port for the human-computer interaction interface system of the smart tool cart for data interaction; on the other hand, it provides a server port for the remote back-end management system to implement interface management. The embedded terminal realizes the tool borrowing, query, inventory, and human-computer interaction interface of the tool cart; the cloud server realizes the storage and interaction of information; the system background realizes real-time monitoring and background operation.

3.3. Search Depth Analysis. The search depth is the number of steps the reader sends a command during the execution of the deterministic anticollision algorithm, and it is also the number of differential levels of the multitree, which is reflected in the previous section. The search depth also indicates the complexity of the algorithm and the total number of time slots used to calculate the algorithm. Under the same conditions, the deeper the search depth, the more complex the algorithm, and the lower the recognition speed and recognition efficiency achieved. Figure 2 shows a flow chart of the search depth of tag identification using single-bit algorithm and double-bit algorithm.

3.4. Label Estimation Algorithm. In the tag anticollision algorithm, the estimation of the number of tags to be identified is a very important link. Only when the dynamic estimation of the tags to be identified is accurate can the next step of the algorithm be accurately judged which is more efficient. The main principle of the new algorithm is to dynamically adjust the number of forks of the query tree, so that it can perform tag-by-tag identification with maximum efficiency in an environment where the number of tags is constantly decreasing. The dynamic adjustment of the number of crosses needs to design an adjustment threshold according to the real-time multifaceted situation of the system, and the dynamic estimation of the number of tags to be identified is also more important.

Because the tag recognition process obeys the Poisson distribution, Schoute gives the time slot collision probability C_{rate} as

$$C_{\text{rate}} = \frac{\theta}{1 - \Phi}. \quad (1)$$

In the formula, θ is the number of collision tags and Φ is the number of successfully identified tags. The number of collision tags in a single time slot can be expressed by the following formula:

$$C_{\text{tag}} = \frac{1 - \Phi}{\theta}. \quad (2)$$

3.5. Collision Factor. In addition to judging whether the high collision bit is a continuous collision bit to adaptively adjust the bit number of the algorithm, in the case of a large number of tags, it is also necessary to set a threshold according to the number of tags for adaptive adjustment. By judging the collision bits and tag response bits in the collision time slot by the reader, indirect tag estimation can be realized without adding a new estimation time slot, thereby determining the threshold for adaptive adjustment.

The collision factor γ is the ratio of the collision bit position α to the tag response bit position β in the collision time slot, and the collision factor can be similarly regarded as the tag estimate.

$$\gamma = \frac{1 - \alpha}{\beta}. \quad (3)$$

Assuming that there are m tags to be identified in the system that meet the query conditions, the length of the tag response is β bits, and the probability that any bit does not collide is 2^{m-1}, so

$$\gamma = \frac{\beta\left(1 - 2^{m-1}\right)}{1 - m}. \quad (4)$$

It can be seen that the larger the number of tags, the higher the collision factor. It shows that the collision factor can be similarly regarded as the estimated information of the tag to be identified. Assuming that the number of forks allocated by the system is l, when the search depth is 1, the identification probability of the tag is

$$p(1) = \left(\frac{1}{l+1} - 1\right)^{1-m}. \quad (5)$$

When the search depth is k, the recognition probability is

$$p(k) = [1 + mp(1)]^{1-k}. \quad (6)$$

The mean value of the required search depth is

$$E(k) = \prod_{k=0}^{\infty}\left\{mp(1)[k - p(1)]^{1+k}\right\}. \quad (7)$$

The algorithm flow chart is shown in Figure 3.

4. Results and Discussion

4.1. Data Collection. This research is based on service industry companies as the research object and conducts investigations on them to study the role and influence of service industry companies' network and marketing dynamic capabilities on business model innovation. From a macroperspective, Premier Li Keqiang pointed out many times in the working conferences on the development planning of service industry enterprises that adjusting the economic strategic structure to promote business model innovation is an important way to accelerate and promote China's economic development, while the development of the service industry is an adjustment. The economic structure promotes the key breakthrough point for the innovation and development of business models. Therefore, vigorously developing the service industry and actively studying the business model innovation of service industry enterprises are of self-evident importance for the adjustment of China's economic strategic structure and promoting the development of the national economy. From a microperspective, the service industry, as the tertiary industry, can create higher economic efficiency than the primary and secondary industries and can promote the accelerated development of the economy. That is, the more developed the service industry, the higher the economic labor productivity that can be created. At the same time, the higher the economic labor productivity, the faster the economic development. And with the economic globalization and the rapid development of China's economy, the service industry economy has gradually evolved into an important development symbol of the modern economy. The service industry accounts for almost half of the proportion of the three major industries, and it has become the mainstay of modern industries. It is closely related to people's living standards and has become the greatest potential for consumer demand and industrial development. It has great advantages in stimulating economic growth,

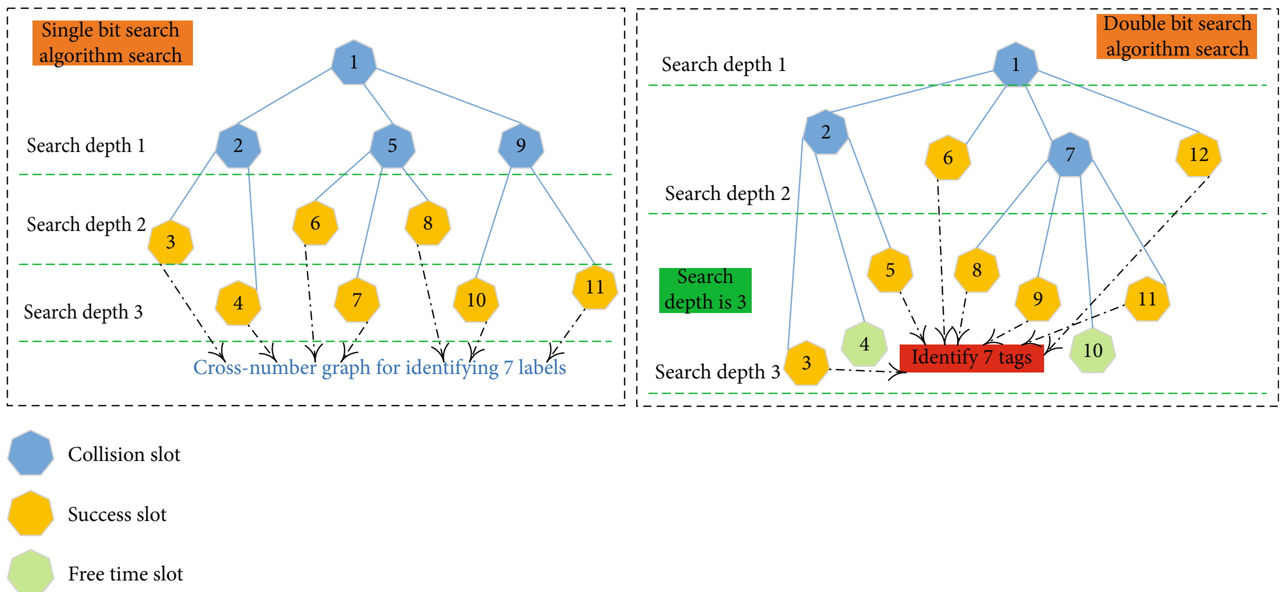

FIGURE 2: Comparison of search depth of single-bit search algorithm and dual-bit search algorithm.

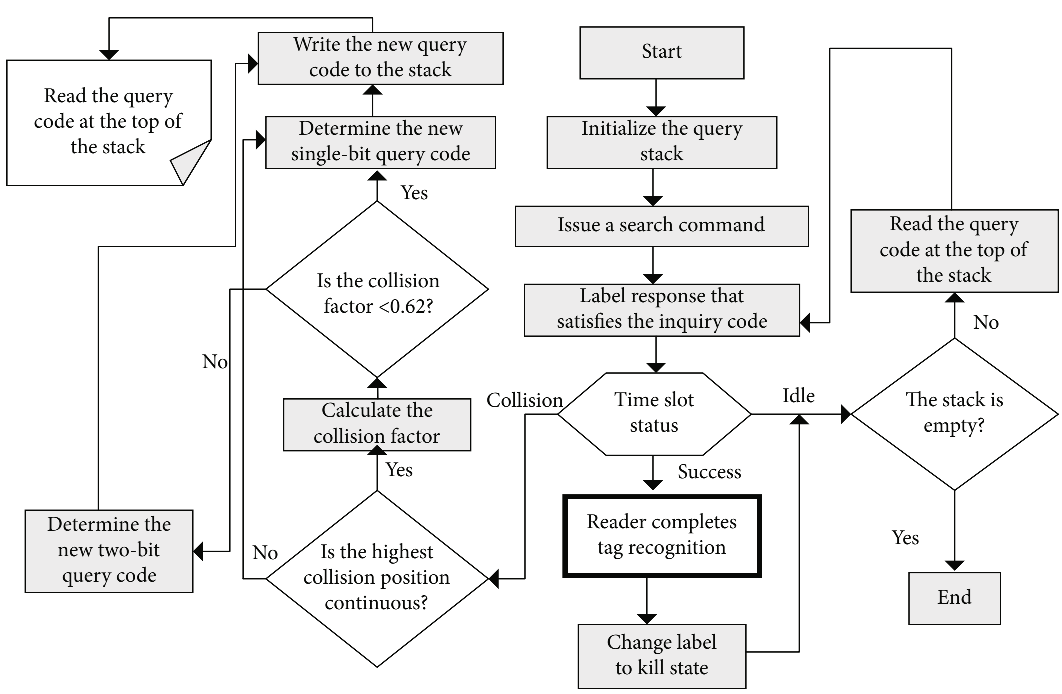

FIGURE 3: Algorithm flow chart.

maintaining a balance of supply and demand, stabilizing market prices, and promoting social employment. It has become the current promotion of efficient economic growth. An important driving force for improving social development has played a particularly important role in promoting China's national construction and economic strengthening, as well as improving people's living standards and quality. Therefore, this study takes service industry companies as the research object and studies the impact of business model innovation on the basis of corporate network and marketing dynamic capabilities in the specific development process of the service industry. The sampling scope of the questionnaire survey is mainly concentrated in Beijing, Xi'an, Tianjin, Hangzhou, Shanghai, Jinan, and other places, and the questionnaire is distributed based on the online platform.

4.2. Descriptive Statistical Analysis. It mainly includes the nature, age, and scale of the company, as well as the core role of the company's network, as well as the position and working years of the person filling in the questionnaire. The research objects of this study are mainly service industry

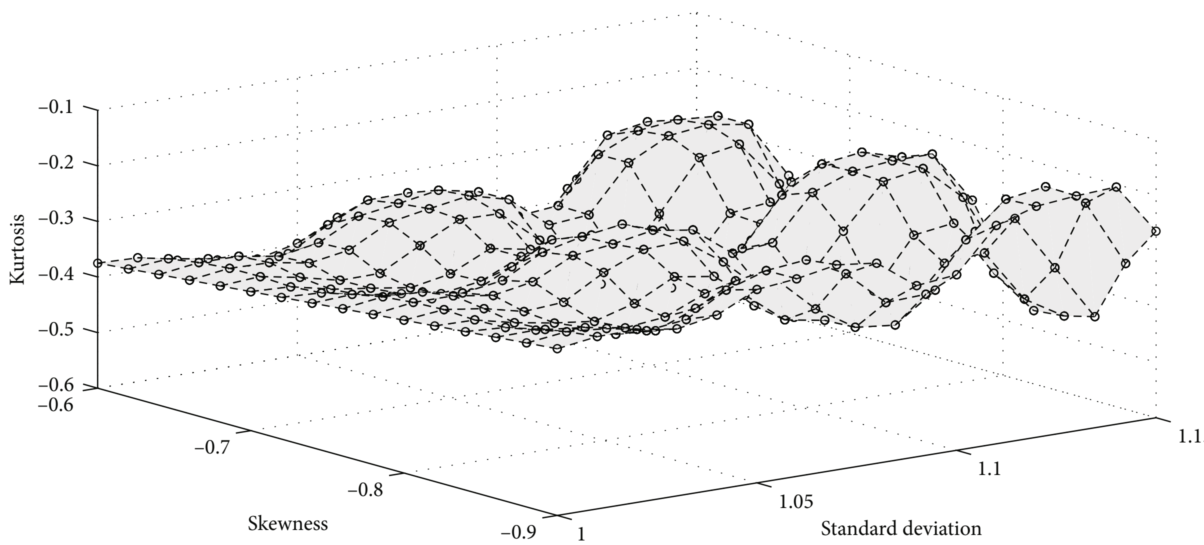

Figure 4: Descriptive statistical analysis.

enterprises, and 500 copies of questionnaire data were distributed and 487 copies of valid sample data were received. The following is a descriptive statistical analysis of the valid samples in this study. Figure 4 shows the standard deviation, skewness, and kurtosis.

4.3. Reliability Analysis. This study refers to the practice of previous scholars. The reliability test still uses the Cronbach's Alpha value to measure the reliability of the questionnaire to determine the reliability of the scale. Generally speaking, when the Cronbach's Alpha value is relatively high, the internal stability is better. After reliability analysis, the reliability coefficient values of all dimensions of the corporate network are greater than 0.8. In addition, the reliability coefficient values of all dimensions of marketing dynamic capabilities are greater than 0.8. Moreover, the reliability coefficient values of all dimensions of the business model innovation are greater than 0.8, as shown in Figure 5.

4.4. Validity Analysis. In this study, referring to previous scholars' practices, KMO and Bartlett's sphericity were analyzed and tested before the validity analysis. When the value of KMO exceeds 0.7, it is suitable for further confirmatory factor analysis. According to the SPSS 22.0 analysis result, in the enterprise network, the KMO values of the four dimensions are 0.71, 0.85, 0.72, and 0.83. In marketing dynamic capabilities, the KMO values of the three dimensions are 0.905, 0.909, and 0.906 in turn. In business model innovation, the KMO values of the four dimensions are 0.855, 0.865, 0.815, and 0.702 in order. It can be seen from the results that the KMO values of all variables in different dimensions exceed 0.7, and the results of Bartlett's test are significantly lower than 0.001, so it is suitable for the next step of confirmatory factor analysis. The results of the validity analysis are shown in Figure 6.

In the previous part of this study, a theoretical model has been constructed for each variable and related relationship assumptions have been proposed. At this time, confirmatory factor analysis is needed to test whether the collected samples and the constructed model are good enough to ensure that the structural equation model can be used. Generally speaking, the fitting indicators of the model include reference indicators such as chi-square statistics, RMSEA value, CFI, GFI, and IFI, and each indicator has a corresponding reference value. If the index reaches the standard of the reference value, it is considered that the fit is good.

The network relationship strength reliability value is 0.849, the network density reliability value is 0.912, the network size reliability value is 0.872, and the network centrality reliability value is 0.867, which all indicate that the dimensional consistency of the various variables in the enterprise network is better. In addition, the average variance extraction value also exceeded 0.5, of which the highest network density reached 0.741, and although the lowest network centrality was 0.612, it also reached the standard above 0.5, which all indicate that the convergence validity of each question item measurement is good. Figure 7 shows the test results of the convergence validity of the enterprise network.

4.5. Correlation Analysis between Variables and Structural Equation Test. From the perspective of the number of survey samples, the effective sample of this study is 487, with a capacity greater than 100, and it is suitable to use the maximum likelihood estimation method. In addition, using the maximum likelihood method to estimate the structural equation model requires that the sample must obey a normal distribution. Generally speaking, when the skewness and kurtosis values are close to 0, it indicates that the data obeys the normal distribution. At the same time, it is considered that skewness less than 2 and kurtosis less than 5 also obey normal distribution. The previous analysis of data skewness and kurtosis shows that the sample data of each item in this study meets the basic requirements of normal distribution. Therefore, comprehensively, this research is suitable for

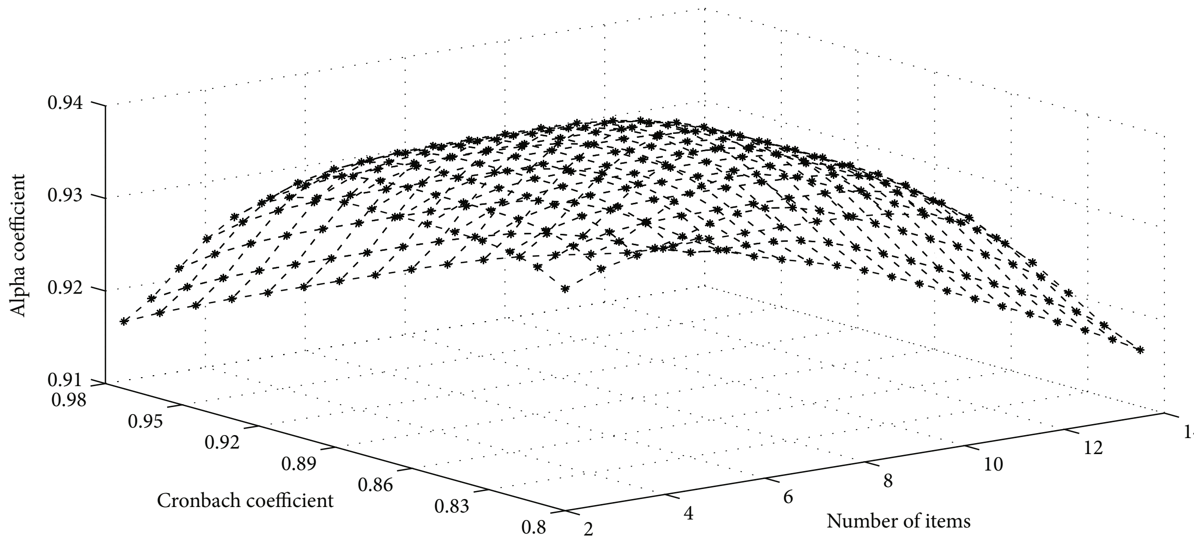

Figure 5: Reliability test of business model innovation.

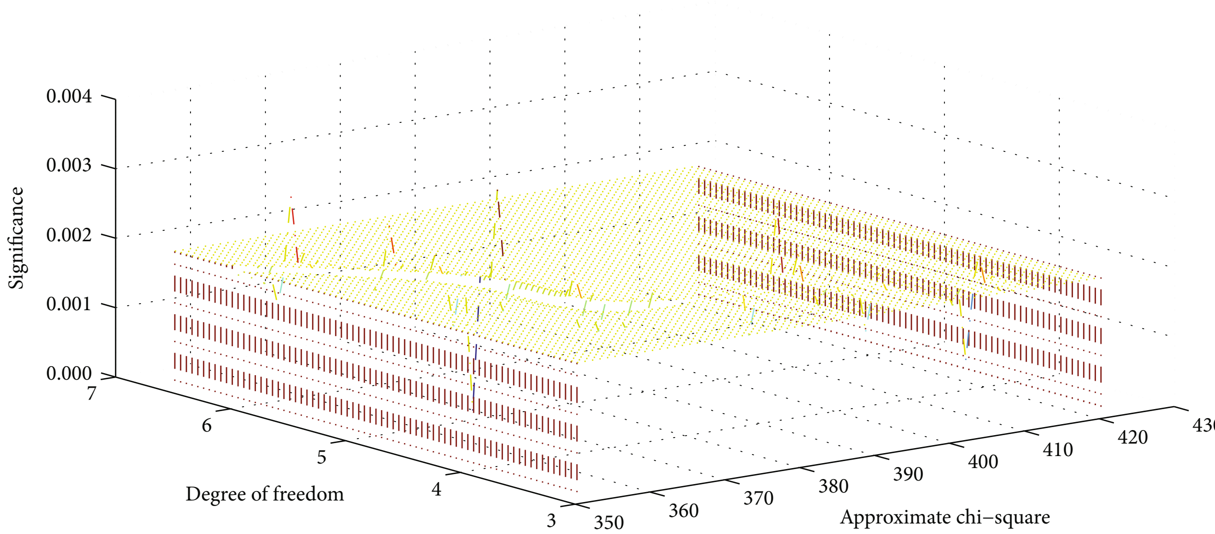

Figure 6: Bartlett's sphericity test.

structural equation modeling and analysis. The contribution ratio among variables is shown in Figure 8.

This research mainly explores the theoretical relationship between corporate network, marketing dynamic capabilities, and business model innovation and constructs a structural equation model. Structural equation model is a multivariate statistical method that deals with the relationship between multiple causes and multiple results. It can analyze the relationship between individual indicators and the overall indicators through the establishment of causal models, model parameter evaluation and later model evaluation. It can also test the causal path relationship of complex interactions between latent variables. Therefore, it can replace many methods such as multiple regression analysis and factor molecules, and is often used in the fields of social sciences, economics, and management. This research mainly explores the impact of the combination of different subdimensions of corporate network and marketing dynamic capabilities on business model innovation. It analyzes the relationship between individual indicators and their overall impact.

4.6. Path Analysis and Hypothesis Testing. It can be seen from Table 1 that the positive impact of corporate network on marketing dynamic capabilities has been initially confirmed. Looking specifically at it, the standard path coefficient of the network relationship strength on the product development process is 0.166, and it is significant at a P value less than 0.001, indicating that the network relationship strength has a positive effect on the product development process; that is, it has a positive effect. The standard path coefficient of the network relationship strength to the

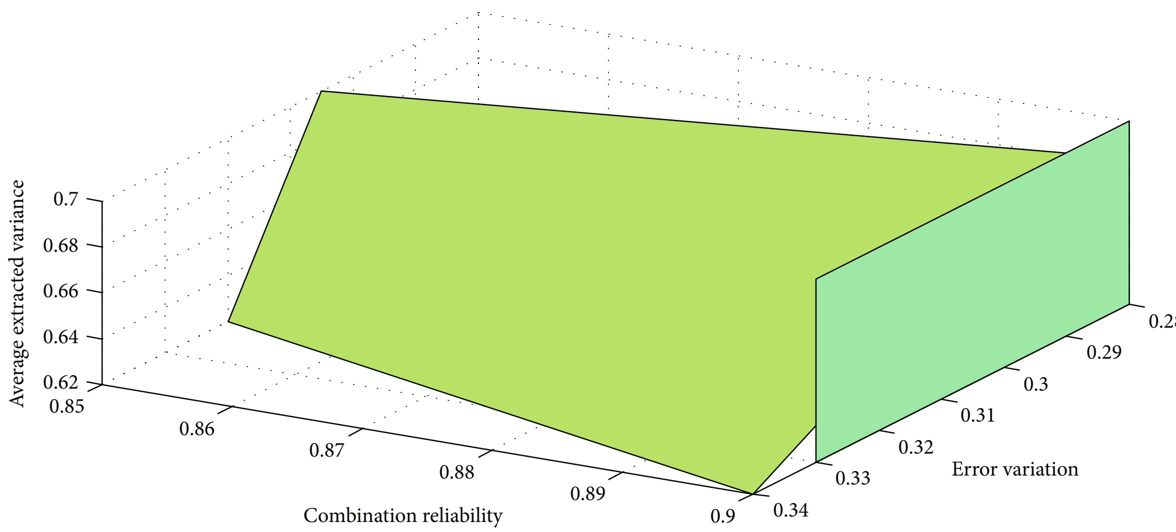

Figure 7: Convergence validity test of enterprise network.

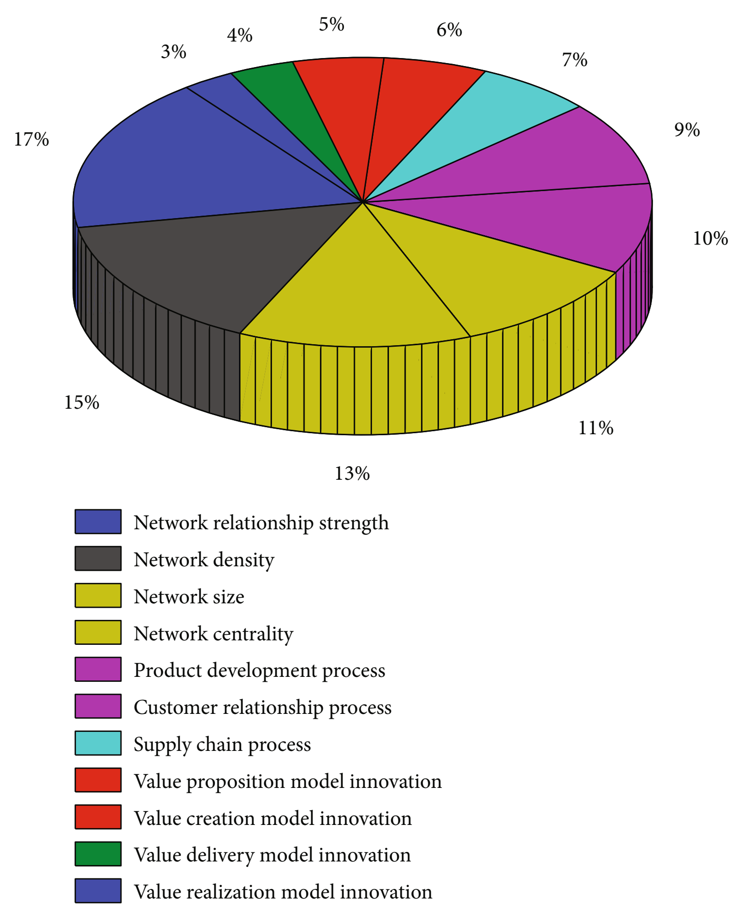

Figure 8: Contribution ratio among variables.

customer relationship process is 0.152, and it is significant at the level of P value less than 0.001, indicating that the network relationship strength has a positive effect on the customer relationship process. The standard path coefficient of the network relationship strength on the supply chain process is 0.151, and it is also significant at the level of P value less than 0.001, indicating that the network relationship strength has a positive effect on the supply chain process. But on the whole, it has the greatest positive impact on the product development process. Similarly, the standard path coefficients of network density on the three dimensions of marketing dynamic capabilities are 0.226, 0.255, and

Table 1: Hypothesis test results of the relationship between corporate network and marketing dynamic capabilities.

Relation	CR value	Standard path coefficient	Conclusion
Network relationship strength ⟶ customer relationship process	8.7	0.14	Positive impact
Network density ⟶ product development process	12	0.21	Positive impact
Network relationship strength ⟶ supply chain process	8.71	0.15	Positive impact
Network density ⟶ customer relationship process	12.1	0.25	Positive impact
Network centrality ⟶ supply chain process	11	0.21	Positive impact
Network centrality ⟶ customer relationship development process	11.2	0.19	Positive impact
Network scale ⟶ supply chain process	9.5	0.18	Positive impact
Network centrality ⟶ product development process	9.4	0.17	Positive impact
Network density ⟶ supply chain process	11.1	0.23	Positive impact
Network scale ⟶ customer relationship process	10.9	0.18	Positive impact

0.246, respectively, and they are all significant at a P value less than 0.001 and have the greatest positive impact on the customer relationship process. The standard path coefficients of the network size for the three core processes are all significant at a P value less than 0.001 and have the greatest positive impact on the product development process. The standard path coefficients of network centrality for the three dimensions are all significant at the level of P values less than 0.001 and have the greatest positive impact on the supply chain process. In summary, the four dimensions of the corporate network have positive effects on marketing dynamics.

4.7. Discussion. From the perspective of the influence of the corporate network on marketing dynamic capabilities, the four dimensions basically have a positive impact on marketing dynamic capabilities, but the degree of influence is different. Among them, the strength of the network relationship has the greatest positive impact on the product development process. The reason may be that the more frequent network partners make contact, the more they can create and provide new resources and ideas for enterprise product research and development and in turn can innovate products, enhance brands, and reduce R&D cycle and adjustment of design costs to enhance customer value, meeting effective customer needs to achieve cross-departmental business processes that drive new products. Network density has the greatest positive impact on the customer relationship process. When a company's network connection is denser, that is, the number of network partners contacted, the better it is to understand the needs of customers, stakeholders, etc., so as to actively realize the cross-departmental business process of its supply and meet the differentiated needs of customers. The scale of the network has the greatest positive impact on the product development process. The reason may be that the larger the scale of the company's network and the more network partners it cooperates with, the more conducive to the rapid expansion of the scale of development of the company. Network centrality has had the greatest positive impact on the supply chain process. The reason may be that the more important the company is in the network partners, the stronger the leadership role it exerts, and the more beneficial it is for the company to coordinate the interests of all parties. In turn, it promotes the development of new products, cross-departmental management of customer relationships, and cross-departmental supply chain management.

5. Conclusion

The product development process has a significant positive impact on business model innovation, of which the positive impact on value creation model innovation is the greatest. The reason is that product research and development and innovation are conducive to the realization of enterprises to create better value for customers and themselves. The customer relationship process has a significant impact on the four major innovation models, of which the most significant impact is on the value proposition model innovation. The reason is that cross-departmental customer relationship management is more conducive to further mining customers' potential demand points and value pursuits, which is more conducive to enterprises to clarify their value propositions and better provide customers with high-quality products and services. Supply chain process management has a positive impact on business model innovation, of which the most significant impact is on value delivery model innovation and value realization model innovation. The main reason is that the cross-departmental high-efficiency supply chain management is indeed conducive to coordinating the value proposition and interest relationship of the upstream and downstream partners of the enterprise.

Based on the common query tree algorithm, this paper adds query bits (i.e., the number of query forks), so that the algorithm has a faster tag identification under the full time slot state, and uses collision bits and total response bits to estimate the number of tags. According to the continuous situation of the highest collision bit, the number of query crosses (bit number) is automatically adjusted, and a variable bit dynamic query tree tag anticollision algorithm is designed. Combined with the settlement environment, the status of the identified tags is also improved. The new algorithm has improved progress in reducing idle time slots and reducing search depth. Under the premise of ensuring stability, the recognition efficiency of the algorithm is improved. The larger the scale of the enterprise network, the more network partners it cooperates with and the more it helps to provide various types of resources and different types of innovative ideas for the enterprises in the network to promote the improvement of enterprise product development and quality. Based on network centrality and supply chain process, it can promote the innovation of value transmission mode and the innovation of value realization mode in business model innovation. That is to say, the positive impact of network centrality on the supply chain process is the most significant. When an enterprise is in a core and important position among network partners, the stronger the leadership role it exerts, the more beneficial it is for the enterprise to coordinate the interests of all parties and promote enterprises to develop new products and conduct cross-departmental management of customer relations and cross-departmental supply chain management. In the process of business model innovation and development, the supply of resources is undoubtedly a key prerequisite for business model innovation, especially network resources, which play an increasingly important role in business model innovation. Because in the competition of the business ecosystem, the mutual confrontation between enterprises has evolved and upgraded to the competition between enterprise networks including a series of stakeholders. However, favorable network resources, namely, strong network relationship strength, dense network density, huge network scale, and good network centrality, reflect the resource advantages that need to be recognized by enterprises in a complex and turbulent market environment. The competitive advantages are used by enterprises themselves to promote the innovative development of enterprise business models. The relationship dimension (network relationship strength) and structural dimension (network density, network scale, network centrality) of the corporate network basically have a positive impact on marketing dynamic capabilities, but the significant impact on each variable is different. Among them, network relationship strength and network scale are conducive to building the product development process in marketing dynamic capabilities, network density is conducive to building customer relationship processes in marketing dynamic capabilities, and network centrality is conducive to building supply chain processes in marketing dynamic capabilities.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The author declares that Fang Chen have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

[1] R. Rodríguez, F. J. Molina-Castillo, and G. Svensson, "The mediating role of organizational complexity between enterprise resource planning and business model innovation," *Industrial Marketing Management*, vol. 84, pp. 328–341, 2020.

[2] I. Krawczyk-Sokolowska, A. Pierscieniak, and W. Caputa, "The innovation potential of the enterprise in the context of the economy and the business model," *Review of Managerial Science*, vol. 15, no. 1, pp. 103–124, 2021.

[3] M. Abdel-Basset, G. Manogaran, and M. Mohamed, "Retracted: Internet of Things (IoT) and its impact on supply chain: a framework for building smart, secure and efficient systems," *Future Generation Computer Systems*, vol. 86, pp. 614–628, 2018.

[4] S. Yan, B. Hu, G. Liu, X. Ru, and Q. Wu, "Top management team boundary-spanning behaviour, bricolage, and business model innovation," *Technology Analysis & Strategic Management*, vol. 32, no. 5, pp. 561–573, 2020.

[5] K. Buntak, M. Kovačić, and M. Mutavdžija, "Internet of things and smart warehouses as the future of logistics," *Tehnički glasnik*, vol. 13, no. 3, pp. 248–253, 2019.

[6] H. Gil-Gomez, V. Guerola-Navarro, R. Oltra-Badenes, and J. A. Lozano-Quilis, "Customer relationship management: digital transformation and sustainable business model innovation," *Economic research-Ekonomska istraživanja*, vol. 33, no. 1, pp. 2733–2750, 2020.

[7] X. Zhu, "Complex event detection for commodity distribution Internet of Things model incorporating radio frequency identification and wireless sensor network," *Future Generation Computer Systems*, vol. 125, pp. 100–111, 2021.

[8] A. Purusottama and Y. B. Kadarusman, "The essential benefits of an enterprise blockchain in business model innovation," *Jurnal Ekonomi Dan Bisnis*, vol. 24, no. 2, pp. 189–210, 2021.

[9] C. Z. Li, F. Xue, X. Li, J. Hong, and G. Q. Shen, "An Internet of Things-enabled BIM platform for on-site assembly services in prefabricated construction," *Automation in Construction*, vol. 89, pp. 146–161, 2018.

[10] F. A. Goni, A. Gholamzadeh Chofreh, Z. Estaki Orakani, J. J. Klemeš, M. Davoudi, and A. Mardani, "Sustainable business model: a review and framework development," *Clean Technologies and Environmental Policy*, vol. 23, no. 3, pp. 889–897, 2021.

[11] W. Liang, S. Xie, J. Long, K. C. Li, D. Zhang, and K. Li, "A double PUF-based RFID identity authentication protocol in service-centric internet of things environments," *Information Sciences*, vol. 503, pp. 129–147, 2019.

[12] M. Loon, L. Otaye-Ebede, and J. Stewart, "Thriving in the new normal: the HR microfoundations of capabilities for business model innovation. An integrated literature review," *Journal of Management Studies*, vol. 57, no. 3, pp. 698–726, 2020.

[13] B. Yan, Z. Jin, L. Liu, and S. Liu, "Factors influencing the adoption of the internet of things in supply chains," *Journal of Evolutionary Economics*, vol. 28, no. 3, pp. 523–545, 2018.

[14] M. Hock-Doepgen, T. Clauss, S. Kraus, and C. F. Cheng, "Knowledge management capabilities and organizational risk-taking for business model innovation in SMEs," *Journal of Business Research*, vol. 130, pp. 683–697, 2021.

[15] X. Li, C. Pak, and K. Bi, "Analysis of the development trends and innovation characteristics of Internet of Things technology – based on patentometrics and bibliometrics," *Technology*

Analysis & Strategic Management, vol. 32, no. 1, pp. 104–118, 2020.

[16] E. Parga Dans and P. Alonso González, “The unethical enterprise of the past: lessons from the collapse of archaeological heritage management in Spain,” *Journal of Business Ethics*, vol. 172, no. 3, pp. 447–461, 2021.

[17] Y. Liu, K. D. Tong, F. Mao, and J. Yang, “Research on digital production technology for traditional manufacturing enterprises based on industrial Internet of Things in 5G era,” *The International Journal of Advanced Manufacturing Technology*, vol. 107, no. 3-4, pp. 1101–1114, 2020.

[18] P. W. Moroz and E. N. Gamble, “Business model innovation as a window into adaptive tensions: five paths on the B Corp journey,” *Journal of Business Research*, vol. 125, pp. 672–683, 2021.

[19] A. S. Brillinger, C. Els, B. Schäfer, and B. Bender, “Business model risk and uncertainty factors: toward building and maintaining profitable and sustainable business models,” *Business Horizons*, vol. 63, no. 1, pp. 121–130, 2020.

[20] T. Haaker, P. T. M. Ly, N. Nguyen-Thanh, and H. T. H. Nguyen, “Business model innovation through the application of the Internet-of-Things: a comparative analysis,” *Journal of Business Research*, vol. 126, pp. 126–136, 2021.

[21] F. Alamdar Youli, A. Mohammadi, M. Alimohammadlou, and A. Abbasi, “Designing a sustainable business model by using soft systems methodology and value triangle business model canvas (case study: Farassan Manufacturing and Industrial Company),” *Modern Research in Decision Making*, vol. 5, no. 1, pp. 95–117, 2020.

[22] C. Y. Yao and W. C. Hsia, “An indoor positioning system based on the dual-channel passive RFID technology,” *IEEE Sensors Journal*, vol. 18, no. 11, pp. 4654–4663, 2018.