Article

Enterprise Marketing Risk Control Based on Information Technology and Supply Chain Management

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Abstract: The overall economic development of today's society is showing a downward trend. In the process of operating and marketing, enterprises are affected by various factors. After the marketing risk reaches a certain level, enterprises would encounter various risks such as blocked marketing plans and failure to meet the estimated marketing goals. Enterprise marketing is affected by economic and market risks such as lack of information, decision-making errors, natural disasters, human factors, and other natural and social risks. This article combined information technology with supply chain management, applied radio frequency identification (RFID) technology to supply chain management, and controlled enterprise marketing risks through reasonable management of the supply chain. It also compared the effectiveness of enterprise marketing risk control between an information technology intelligent supply chain combined with RFID and a supply chain managed by ordinary artificial structures. The experimental results showed that the highest value of goods loss rate in the supply chain based on RFID technology and using traditional technology was 5% and 15%, respectively, according to the sample of goods loss experiments. For the information verification process of goods in supply chain management, the information identification accuracy rates of barcode and RFID technology were 89.98% and 97.7%, respectively. Therefore, applying the information technology intelligent supply chain management model combined with RFID technology to enterprise marketing risk control can save money for enterprises, ensure product quality, and effectively reduce the risks encountered in enterprise marketing by reducing information gaps, and reducing transportation and storage costs.

Keywords: Marketing Risk; Risk Control; Information Technology; Supply Chain Management

1. Introduction

Since 2021, the overall global economy has been in a state of depression and has generally fallen into a low ebb due to the epidemic and other multifaceted factors. Countries such as Germany and the United States have experienced unequal proportions of high or low inflation. Although China has made relatively good control over the inflation rate, the overall control is around 2%. However, the overall economic growth rate has gradually decreased, and the growth rate has declined. The socio-economic situation of various countries is full of turmoil. Influenced by the macro and micro enterprise environments, the marketing environment of enterprises has characteristics such as complexity, variability, and uncertainty. At the same time, the cognitive abilities of different enterprises are limited by the cognitive limitations caused by the size of the

enterprise itself, and have some limitations, either large or small. Therefore, if people want to win in the fierce market competition and achieve their expected profit goals instead of being the party that bears the losses of competition, people need to build a reasonable marketing risk management and control structure. The traditional marketing risk management and control methods typically focus on human resources, such as sharing responsibilities, establishing human resource risk management and control institutions, and improving the risk identification ability of enterprise employees. However, manual risk management and control is often accompanied by drawbacks such as incomplete information collection, imperfect decision-making methods, and untimely or inadequate decision execution, which has strong subjectivity and instability. It is also difficult to effectively control the marketing risks of an enterprise. In the era of big data, managing and controlling the sub processes of enterprise marketing through information technology can greatly improve the efficiency of various processes. Supply chain management is a very important part of enterprise risk management and control. Therefore, combining information technology with supply chain management, integrating RFID (Radio Frequency Identification) technology into supply chain management, forming an intelligent supply chain, and applying it to enterprise marketing risk management and control have high research value.

Whether a company's marketing risk control is good or not is directly related to its operating income. Reasonable control of marketing risks can increase the company's operating revenue. Therefore, scholars have demonstrated the importance of controlling enterprise marketing risks through experimental research. Rehman Amin Ur's research on performance data from multiple small and medium-sized enterprises showed that business strategy plays an important role in the operational performance of enterprise marketing risk management for small and medium-sized enterprises. Enterprise risk management plays an intermediary role in business strategy and small and medium-sized enterprises (SME) performance [1]. Li Jieyi found through research on the indicators under the risk early warning system constructed by eight indicators: management risk, operation management risk, human resources risk, marketing risk, supply chain management risk, financial management risk, national political risk, and macro environmental risk, that in the trade of multinational enterprises, building a reasonable risk early warning system can significantly reduce the probability of losses suffered by enterprises [2]. By constructing a risk assessment model, Hilorme Tetiana optimized the allocation of investment project resources at the optimal ratio [3]. Sheth Jagdish N drew conclusions through the construction of a framework system. He thought that establishing a reasonable marketing risk control system is an important part of promoting the sustainable development of the market [4]. Qiao R conducted research on supply chain financial risk management and found that supply chain risk management has a great impact on the financing performance of small and medium-sized enterprises [5][6]. The research results of the above-mentioned scholars highlighted the important impact of controlling corporate marketing risks on corporate performance. They discussed the importance of corporate marketing risk control from different perspectives such as business strategy, risk warning system, and risk assessment model, and provided support and support for this conclusion. This argument also provides reference for future scholars, but the actual implementation results of risk control are not ideal, and specific cases and empirical data are not provided to support the conclusion. There is also no in-depth discussion on the impact of different industries or enterprise sizes on marketing risk control.

Information technology is an abbreviation for information and communication technology, which is mainly used in the field of management and processing of information. The supply chain is composed of individuals or institutions such as suppliers, manufacturers, warehouses, distribution centers, and distributors, forming an entire logistics network. It is an important part of the enterprise's marketing risk control process. Through research, Saragih Jopinus found that strong supply chain operational capabilities can have a positive potential impact on the competitiveness of enterprises [7]. A survey by Hoffman Donna L found that companies that invest heavily in research and development related to information technology have greater advantages in market competition [8]. Rust Roland T pointed out that the development of information networks has provided great convenience for enterprise marketing, and enterprise marketing risk management should be transformed in a new direction of technology [9]. Syaifullah Jahid's research has learned that marketing through information and social media has a positive impact on the performance of small and medium-sized enterprises, helping to control enterprise marketing risks [10]. Alshurideh M and other scholars explored the impact of information security on the electronic supply chain in the logistics and distribution industry. The results showed that the impact of information systems is positively related to the electronic supply chain [11]. Reasonable use of information technology and planning of supply chain management can effectively control the marketing risks of enterprises. To understand its specific effectiveness, data should be compared with traditional enterprise marketing risk management and control models. The above-mentioned scholars demonstrated the positive impact of the application of information technology in different fields on corporate marketing risk control and elaborated on the role of information technology and supply chain management in corporate marketing risk control. It can be seen that it is feasible to introduce information technology and supply chain management to control risks in corporate marketing, and can fully reduce the risks encountered in corporate marketing.

Enterprise marketing risk management and control is of great significance in assisting the rapid development of enterprises against the backdrop of today's unstable economic conditions and turbulent markets. This article conducts relevant data experiments through the analysis and application of information technology and supply chain management in the field of enterprise marketing risk control. The results show that compared to traditional enterprise marketing risk management and control models, the use of technology that combines information technology and supply chain management has a significant positive impact on enterprise marketing risk management [12]. The marketing risk management system formed after joining is more efficient and stable.

2. Methods of Marketing Risk Control

The development of enterprises is influenced by various factors, which can be basically summed up at both macro and micro levels. Every company inevitably bears the risk of suffering certain losses. Marketing risk is essentially a possibility of loss. If a good management system and reasonable control are implemented, the probability of distress can be minimized, and the performance of the enterprise can be improved. On the contrary, as an important part of enterprise production and sales, excessive enterprise marketing risk coefficients can have adverse effects on the enterprise at the decision-making and execution levels [13].

In the international markets, the competition among various types of enterprises has entered a

white-hot stage. If people do not attach importance to building an efficient enterprise marketing risk management and control system, it is easy to lose in competition and bear the losses of competition. Therefore, establishing a reasonable enterprise impact risk management and control system is very important.

In the traditional way, goals are established; variables and factors are collected and analyzed; plans are formulated; effects are evaluated. Enterprise marketing risk management and control is a linear process. If there is a problem in risk assessment, it would inevitably exert enormous practical and operational pressure on the enterprise as the main body of market competition [14].

Improving risk awareness is an important cultural component of enterprise resource management systems [15]. The decision-making level of the company needs to have a clear understanding of its own corporate environment and develop a detailed and comprehensive process for managing and controlling corporate marketing risks. Otherwise, the company would suffer losses in the cruel competitive market.

2.1. Operation, Sales, and Risk Control of the Company

In the rapidly developing and changing market environment, controlling the marketing risks of enterprises has almost become the first important point of competition in the market. It can be said that whoever controls the marketing risks well can maximize the use of the market and obtain huge profits.

The composition of marketing risks in a market is multifaceted and can be roughly divided into two main directions: internal and external causes. The main components of external factors can be summarized into three key points: environment, information, and business, while internal factors can be mainly summarized as factors at the management level. Among them, the three internal factors can be said to be interlinked and affect each other. For example, in global market operations, different attitudes of governments may lead to completely different situations for the same batch of products. Relevant personnel have conducted analogy experiments and found that the policies faced by the same type of drugs in different countries or economic communities differ significantly [16]. In this case, in the United States and the European Union applications, evidence of confirmatory or clinical benefit is evident, while in Japan, approval is only based on non-confirmatory evidence.

Reasonable control of marketing risks requires establishing a stable control system. The construction of the risk control system is based on specific indicators for marketing risk reference [17]. Through research and investigation, it can be found that the evaluation system of marketing risk is a multi-indicator system. Among them, there are four levels of indicators that are more important, and the first level indicator has only one element, which serves as the primary goal of marketing risk control to demonstrate the overall situation of marketing risk control. The framework of marketing risk evaluation indicators is shown in Figure 1.

Since the nature of marketing risk is the possibility of loss, it is particularly important to design the correct marketing system control content to enable it to play its due role at the appropriate time. Facing the complex and volatile market environment, cultivating the marketing risk crisis awareness of internal personnel of enterprises is also a topic worthy of attention.

As a new sales model, live broadcasting displays products in real time through the live broadcast platform, and directly promotes product sales with the help of the anchor's influence and

recommendations. This model has developed rapidly in China and other places in recent years and has become one of the important marketing methods. In supply chain management, live streaming has also brought a series of impacts: first, the rise of live streaming has changed the sales channels and sales rhythm of goods. The supply chain needs to be adjusted according to the demand for live streaming to ensure that timely supply and delivery of goods. Second, the sales model of live streaming has a certain degree of suddenness and uncertainty. The supply chain needs to reasonably plan inventory to ensure that consumers' needs can be met during the live broadcast promotion period while avoiding inventory backlogs and slow sales. Third, the sales pace of live streaming is faster, which puts forward higher requirements for logistics and distribution. The supply chain needs to optimize the logistics and distribution network and improve the delivery speed and accuracy to meet the immediate needs of consumers. In summary, it can be found that new technologies and trends in supply chain management have a great impact on marketing risks.
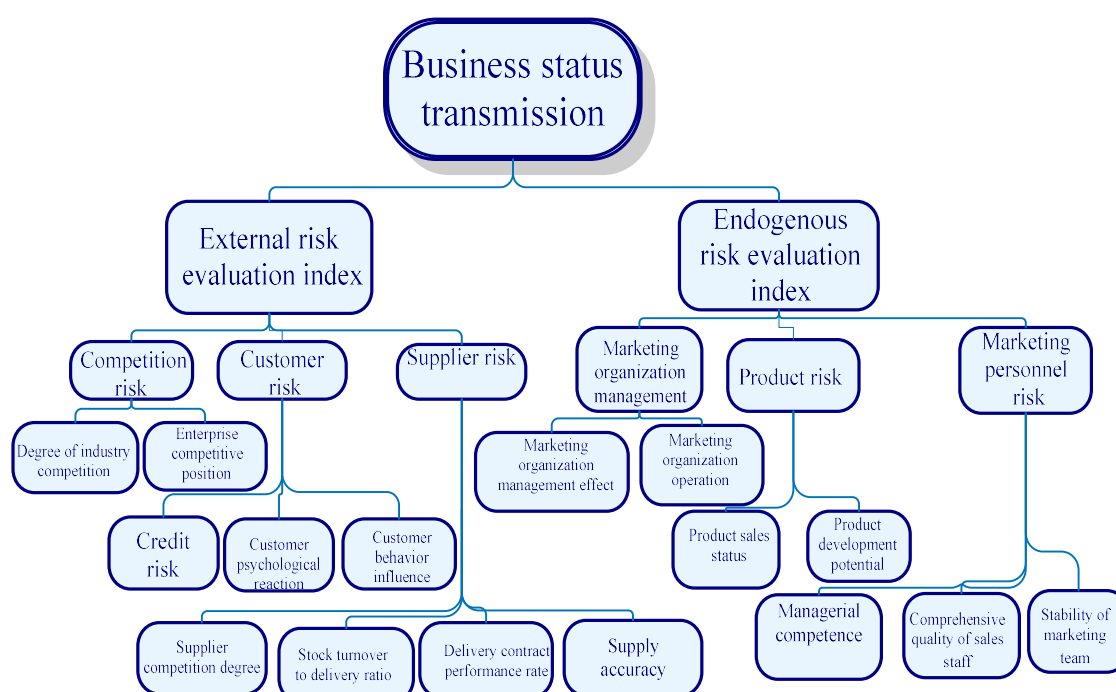

Figure 1. Framework of marketing risk assessment indicators.

2.2. Radio Frequency Identification Technology

Information technology is a very large and broad category, mainly including sensor technology, computer and intelligence technology, communication technology, and control technology. It can assist in establishing an intelligent supply chain management model, thereby achieving the goal of reducing enterprise marketing risks.

Radio Frequency Identification (RFID) technology is a kind of automatic identification technology. It performs non-contact two-way data communication through wireless radio frequency, and it can constantly update information. It also read and write to recording media using wireless radio frequency, thereby achieving the purpose of identifying targets and exchanging data. Through information tracking, information collection, and warehouse management applications for distribution logistics, the supply chain is managed reasonably. RFID

technology is often used in the field of supply chain operations, making a significant contribution. At the same time, RFID technology also maintains a significant positive impact on supply chain performance [18]. The strategy used to balance RFID technology depends on the intensity of competition, mismatch rate, and Radio Frequency (RF) technology tag costs [19]. The planning theory of using RFID technology for supply chain management to reduce marketing risks is to install electronic labels at the bottom of goods and conduct status management control and data tracking for goods in transit. At the same time, RFID has a strong energy saving ability, which can effectively reduce communication costs during transportation [20].

The general process of using RFID to manage the supply chain and thereby reduce enterprise marketing risks is to observe the status of items through real-time data and ensure the stability of logistics status through remote monitoring. It is necessary to improve ordering efficiency, conduct information management for real-time data observation, and reduce real-time information gaps among partners in the supply chain, thereby reducing related costs.

In this article, RFID technology is used in enterprise supply chain management to reduce marketing risks. Specifically, RFID technology is used to identify and track goods in logistics, thereby improving the efficiency, accuracy, and visibility of the supply chain, thereby reducing the company's marketing risks. In practice, RFID tags are attached to goods, and these tags contain unique identification information and other relevant data. As goods move through the supply chain, RFID readers scan these tags and read the information, thereby recording the location, status, and other important information of the goods. This data is then transferred to the company's data processing systems for processing and analysis.

When the output company uses RFID technology, the input company would increase the reward income, resulting in:

$$f_a = f^{(1-e^{\alpha})}, f > 0, \alpha > 0. \tag{1}$$

In the formula, f is the reward coefficient, and α is the transformation coefficient of market returns. When there is no RFID information, there is no reward; when the information tends to infinity, the reward tends to a certain value of f.

Fixed cost: the acquisition of information requires a fixed cost B, such as the purchase of electronic labels.

$$B > 0 \tag{2}$$

Variable cost: the amount of information collected by outputting is expressed in Z, and the variable cost brought about by collecting information is $C_{(Z)}$. For example, the labor and material resources required to collect information are:

$$C_{(Z)} = C^{(e^{\beta z}-1)}, c > 0, \beta > 0 \tag{3}$$

$C_{(Z)}$ increases exponentially as the amount of information increases. When z=0, the variable cost is 0. When there is infinite amount of information collected, such as recording information at each moment, the cost is infinite.

Therefore, the net income of the exporting company is:

$$g_{(x)} = -(b) - C_{(Z)} + f_a \tag{4}$$

or

$$g_{(x)} = -(b) - C^{(e^{\beta z}-1)} + f^{(1-e^{\alpha})} \qquad (5)$$

If RFID technology is not used, there would be a certain amount of loss during supply chain transportation, and the calculation of the optimal order quantity needs to be increased accordingly. The calculation of the substitution formula is convenient for comparison. The retailer's total inventory of remaining unusable goods is $(1 - k_1)W$, and the average inventory level is $\frac{(2-k_1)W}{2}$. Therefore, the retailer's profit formula can be obtained:

$$\mathbb{I}_R = A_s + \frac{(1-\lambda)A_P}{k_1} - \frac{ow}{K_1 w} - \frac{H_R(2-K_1)}{2} - \frac{VA}{K_1} \qquad (6)$$

Among them, the first part A_s is for retailers to obtain revenue from selling goods in the market, and the second part $\frac{(1-\lambda)A_P}{k_1}$ is for the residual value of residual goods after inventory losses; the third part $\frac{ow}{K_1 w}$ is the ordering cost; the fourth part $\frac{H_R(2-K_1)}{2}$ is the total inventory cost; the fifth part $\frac{VA}{K_1}$ is the purchase cost. The supply chain using RFID technology saves the time required to manually always survey data in terms of manpower, while real-time feedback technology reduces information gaps. The means of reasonable data control also minimizes the loss value during transportation, saving complex loss cost calculation time.

Big data analysis of radio frequency identification (RFID) technology has huge potential in supply chain management. In this experiment, RFID technology can provide real-time data. Big data technology can be used to quickly process and analyze these real-time data and detect abnormalities and problems in a timely manner. In addition, big data analysis technology is used to identify and evaluate risks in the supply chain and formulate corresponding risk response strategies to ensure the stability and reliability of the supply chain, which has demonstrated great application value in experiments.

3. Experiments on Marketing Risk Control

3.1. Build A Corporate Marketing Risk Control Organization

The purpose of enterprise marketing risk control is to be able to examine the company's marketing strategy, business policies, and market environment in real time, to avoid blocking, failing, or failing to achieve expected marketing goals due to the above factors. Solvency, operating ability, profitability, and development capabilities are key indicators in the business process, which directly reflect the company's strength and sustainable development potential in market competition, and these indicators cover all aspects of business operations, including financial, operations, markets and other aspects, which can comprehensively reflect the overall risk status of the enterprise. In addition, these indicators can usually be obtained through the enterprise's financial statements, market research data and other channels. The collection of data is relatively easy and reliable. More importantly, compensation debt capacity, operating capacity, profitability, and development capacity are usually related to each other. Changes in one indicator may affect other indicators. Taking these indicators into consideration can better grasp the overall operating status of the enterprise and discover potential risk points in a timely manner. Controlling enterprise

marketing risk should carefully refer to relevant indicator data, so this article would focus on the enterprise's debt paying ability indicators, operational ability indicators, profitability indicators, and development ability indicators.

Enterprise marketing indicators are shown in Table 1. For the weighting factors, this experiment used a questionnaire survey method to invite experts in the professional field and relevant stakeholders to evaluate the importance of each indicator and determine the weighting factors based on their professional knowledge and experience.

Table 1. Enterprise marketing indicators.

First-Order Index	Weight	Secondary Index	Weight
Financial Performance	0.321	Sales growth rate	0.437
		Profit margin on sales	0.210
		Sales return rate	0.269
		Marketing cost rate	0.084
Internal Operating Performance	0.238	Inventory turnover rate	0.287
		Just-in-time delivery rate	0.258
		Turnover rate	0.194
		Customer unit price	0.261
Market Competition Performance	0.247	Relative market share	0.417
		Relative customer satisfaction rate	0.176
		Promotion target achievement rate	0.268
		Relative search engine index	0.139
Customer Performance	0.194	Satisfaction degree	0.555
		Complaint rate	0.155
		Growth rate	0.290

Table 1 describes reference indicators for corporate marketing, with financial performance weighting the highest at 32.1% and customer performance accounting for the lowest at 19.4%. Internal operational performance and market competition performance are relatively close.

With the digitization of the market economy, past marketing risk data can be mined and compared to provide a reference for later risk avoidance. The indicators of marketing risk are shown in Table 2.

Table 2 lists the evaluation indicators of enterprise marketing risk. Among them, the number of competitive risk indicators is the highest, with five, while the number of risk indicators for marketing organizations and marketing organization personnel is relatively small, with two indicators each. It can be concluded that external risks accounted for a large proportion of the marketing risks faced by enterprises.

Table 3 can be obtained by conducting a questionnaire survey on employees of six companies and making statistics on the average value of factors that affect company marketing performance. In Table 3, a questionnaire was used to obtain the information. The survey objects were competitors, internal operations, customers, suppliers, and competitors. A total of 3215 questionnaires were issued, and 2932 were collected. From Table 3, in terms of competitor indicators, enterprises receive relatively low scores, and therefore often face complex and difficult tests in terms of competitors.

Table 2. Marketing risk indicators.

External risk		Internal risk	
Competition Risk	**Customer Risk**	**Marketing Organizational Risk**	**Marketing Personnel Risk**
Market Risk	New Customer Growth Rate	Marketing Target Completion Rate	Customer Complaint Resolution Rate
Relative Market Share	Sale Contract Performance Rate	Liquidity Ratio	Comprehensive Quality of Sales Staff
Price Competitiveness	Customer Loyalty	-	-
Sale Profit	-	-	-
Competitive Concentration	-	-	-

Table 3. Scoring factors affecting enterprise marketing performance.

Factor	Enterprise 1	Enterprise 2	Enterprise 3	Enterprise 4	Enterprise 5	Enterprise 6
Competitor	3	4	3.15	4.5	3.75	3
Internal Operation	5	3.5	4	4.5	4.5	3.75
Customer	5	4	5	3.5	3.75	4
Public	3.75	5	4	4.25	4.5	4
Supplier	4	4.5	5	5	4.5	4.75

3.2. Experimental Design of Enterprise Marketing Risk Control

The management and control of enterprise marketing risks can effectively help enterprises avoid some major business crises. It is convenient for enterprises to adjust their strategies and structures to the internal and external environment. This article combined information technology with supply chain management. RFID technology was applied to enterprise marketing risk management and control. Through comparative analysis of experimental data, the management and control of enterprise marketing risks were achieved. This article selected relevant data from companies that used RFID technology to analyze and compare them with companies that do not use RFID technology.

This technology is aimed at the management of supply chain links in the enterprise's marketing process, reducing the relative loss of the supply chain and reducing the marketing risk of the enterprise.

The experimental design steps are as follows:

(1) Companies that use RFID technology can be selected as the experimental group, while companies that do not use RFID can be selected as the control group to ensure comparability and representativeness between the two groups. Among them, 50 companies that use RFID technology and 50 companies that do not use RFID technology are selected as samples to ensure that the sample size is large enough and represents the industry and market under study. In addition, in the experimental sample, in order to enhance the generalizability of the research results, these 100 companies include manufacturing, retail, logistics, and service industries, and companies that use RFID technology and companies that do not use RFID technology are in different industries. The

sampling proportions are relatively close, making the research results more generalizable.

(2) Relevant data from the experimental group and control group can be collected through questionnaire surveys, including supply chain loss rate, marketing performance indicators, RFID technology application, etc.

(3) The collected data can be organized, cleaned, and standardized to ensure accuracy and consistency. Outliers can be removed, missing values can be filled in, and data from different sources can be standardized to convert them into the same units and ranges for comparison and analysis.

(4) During the experiment, other environmental conditions, transportation methods, warehousing management, etc., of the experimental group and the control group will be controlled to reduce the interference of external factors.

In this experiment, the following measures were taken to minimize data collection bias: first, in the experimental design, companies that used RFID technology were selected as the experimental group, and companies that did not use RFID technology were selected as the control group, ensuring that the differences between the two groups were comparability and representativeness. Moreover, by selecting 50 companies that use RFID technology and 50 companies that do not use RFID technology as samples, the sample size is large enough and represents the industry and market under study, thereby reducing the bias introduced by inappropriate sample selection. Secondly, relevant data of the experimental group and the control group were collected through questionnaire survey, including supply chain loss rate, marketing performance indicators, RFID technology application, etc. Through the extensive collection of data from multiple aspects, the impact of RFID technology on corporate marketing risks can be more comprehensively assessed, reducing the bias caused by a single data source. Finally, the collected data is sorted, cleaned and standardized to ensure the accuracy and consistency of the data. Outliers can be removed, missing values can be filled in, and data from different sources can be standardized to convert them into the same units and ranges for comparison and analysis. It also helps to eliminate noise and inconsistency in the data and improves the credibility and comparability of the data.

Data analysis program design: after preprocessing the data, use the mean statistical method for descriptive statistical analysis, the results can be evaluated from four aspects: supply chain loss rate, information transmission efficiency, information accuracy, and cargo management efficiency, and analyze the differences correlation between variables, such as the relationship between RFID technology application and supply chain loss rate, to understand the degree of correlation between them. Finally, we comprehensively evaluate the actual effect of RFID technology on supply chain management and marketing risk control, analyze the mechanism of RFID technology in reducing supply chain loss rates and improving marketing performance, and explore its influencing factors and potential opportunities.

4. Results of Enterprise Marketing Risk Control

4.1. Supply Chain Loss Rate

The traditional supply chain mainly uses manpower to assemble, transport, manage, and liquidate goods. During transportation, there is a proportion of loss in the logistics process, which increases the operating costs of enterprises and partners. The main reason for this is that people are

unable to deliver messages in real time due to distance during logistics transportation, resulting in certain information gaps. The more complex the intermediate links of logistics transportation (such as excessive sorting, unnecessary transfer, etc.), the greater the probability and degree of loss. Reducing the loss rate in the supply chain can effectively increase the company's reserve funds, thereby better responding to possible crises, and thereby reducing the company's marketing risks. This article took the loss rate of fresh fruits and vegetables as an example to compare the supply chain logistics loss rate based on RFID technology with that of enterprises without RFID technology. The results are shown in Figure 2.
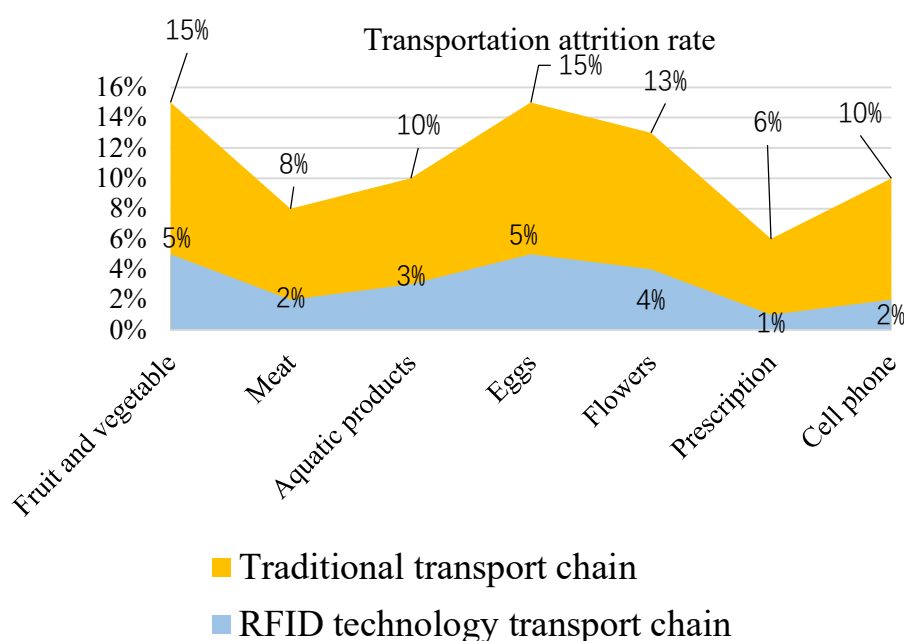

Figure 2. Fresh food transportation loss rate under different methods.

As shown in Figure 2, the average loss value of fresh fruits and vegetables in the traditional transportation chain was above 10%, with a maximum of 15%. However, enterprises that adopted RIFD had a maximum loss rate of no more than 5% and a minimum loss rate of only 2%. The loss rate of flowers in the traditional transportation chain is as high as 13%, but the supply chain logistics system using RIFD technology has a loss rate of only 4%. The loss rate of prescription drugs in the traditional transportation chain has reached 6%. The supply chain logistics system using RIFD technology has a higher loss rate. The loss rate of the supply chain logistics system using RIFD technology for mobile phones is only 2%, which reduces the loss by 8% compared with the traditional transportation chain. Therefore, supply chain logistics systems based on RFID technology had a lower supply chain loss rate compared to traditional supply chain logistics and transportation systems. It can better reduce the marketing risks faced by enterprises in the supply chain.
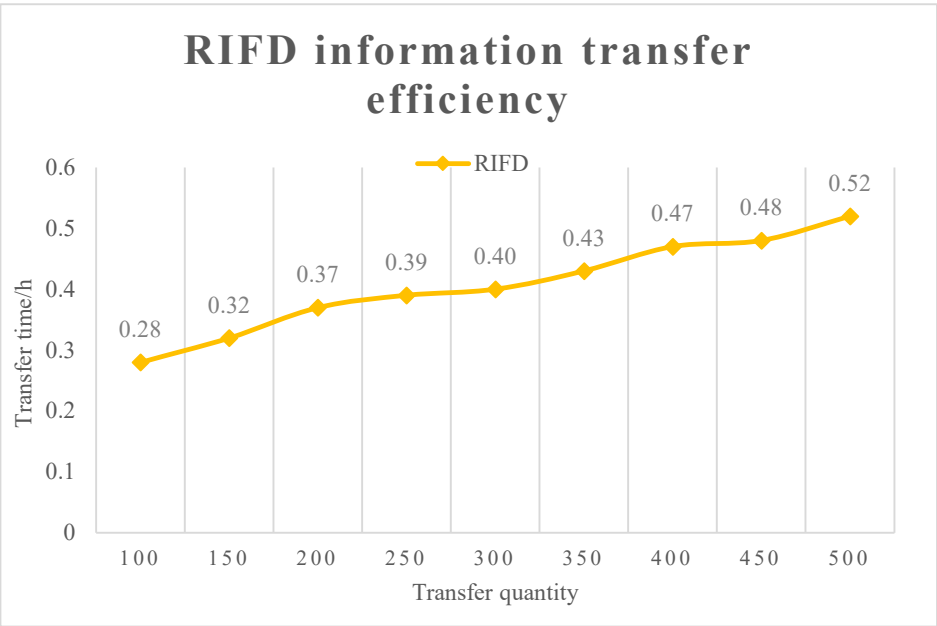
4.2. Information Transmission Efficiency

In the traditional supply chain, logistics and transportation mainly rely on barcode for information input and verification of goods. Although barcode has the advantage of low cost, its limitations are also obvious. The information stored by barcode is only tens of bytes, and basic

attributes such as the origin and specifications of goods can only be known through barcode, which inhibits the overall efficiency of the supply chain; electronic tags using RIFD technology can store tens of thousands to hundreds of thousands of bytes of data, reducing storage costs [21]. At the same time, using RFID technology can eliminate unnecessary links such as multiple transfers, and reduce the time required for material flow [22]. The efficiency of supply chain data transmission based on RIFD technology can be compared with that of traditional barcode supply chain data transmission, as shown in Figure 3.
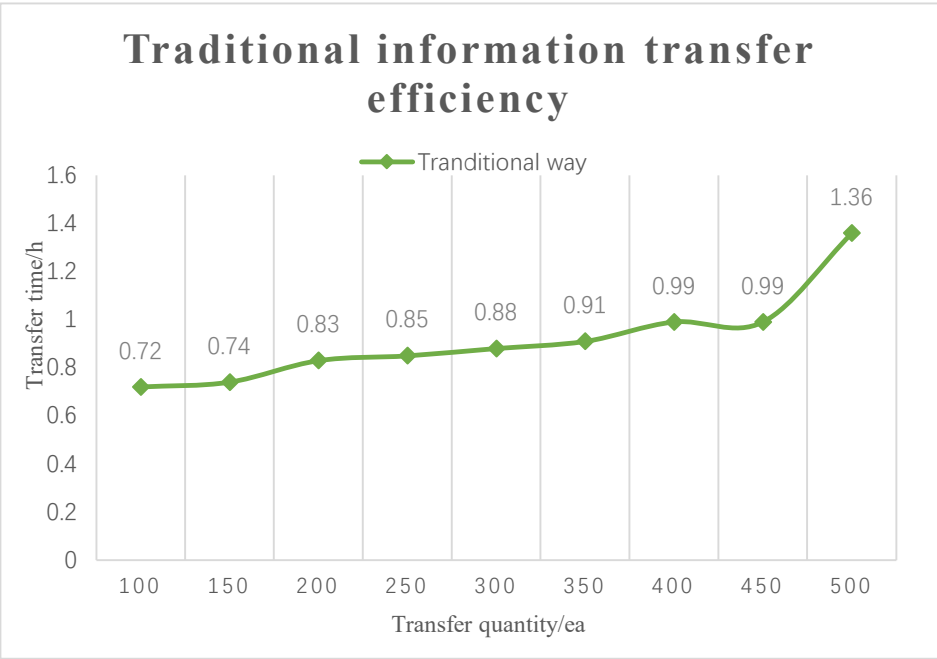
(a) Data transfer efficiency of traditional methods.

(b) RFID data transmission efficiency.

Figure 3. Comparison of data transfer efficiency under different methods.

Figure 3(a) shows the information transfer efficiency of manual management of data under the premise of using traditional barcodes. The information shown in Figure 3(b) is the information transmission efficiency using RFID technology. In Figure 3, it can be observed that the use of RFID technology has obvious advantages in data transmission efficiency compared with traditional barcode methods. In the traditional barcode method, the time required to scan 100 to 500 items ranges from 0.72 to 1.36 hours. When using RFID technology, the scanning time for the same number of items is shortened to 0.28 to 0.52 hours, which means that using RFID technology can greatly save time cost and improve the efficiency of data acquisition. In addition, data transmission using RFID technology is faster because RFID tags have the characteristics of rapid reading and identification. In contrast, traditional barcodes require scanning items one by one, while RFID technology can read multiple tags at the same time, thus speeding up data acquisition. Moreover, RFIF technology can not only obtain product information more quickly, but also achieve more efficient information transmission. RFID tags can store large amounts of data and can be read remotely, so information can be managed and delivered timelier and accurately, reducing the time delay in information delivery. Due to the efficiency and accuracy of RFID technology, the information flow in the supply chain can be managed more effectively, reducing information loss and errors, thereby reducing the information gap between buyers and sellers, which helps improve the supply chain transparency and stability.
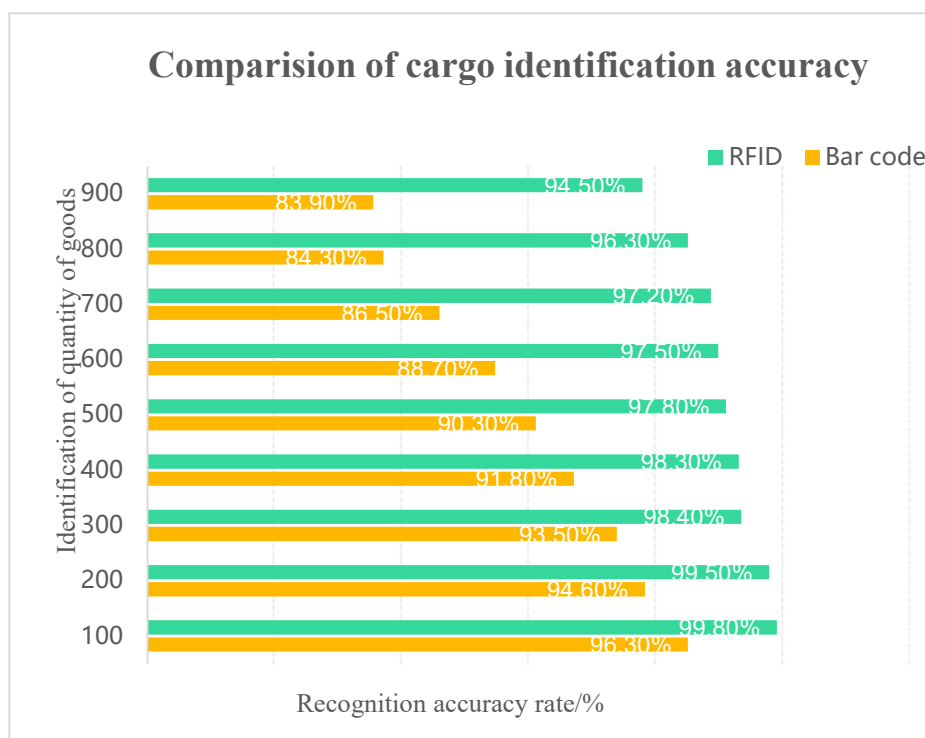
4.3. Information Accuracy

Figure 4. Comparison of cargo identification accuracy.

At present, the traditional barcode is still widely used in the transportation of goods. However, the barcode may be worn during transportation, resulting in missing information. RIFD electronic tags can prevent data from being tampered with, monitor in real time, and ensure the accuracy and security of information [23]. It can reduce the probability of theft incidents. It is also convenient for

enterprises and buyers to view the information of goods anytime and anywhere, make changes through non-contact reading and writing, achieve real-time update of information, store and delete information, reduce information asymmetry, and implement control over the quality of goods [24]. It reduces losses caused by poor information, reduces operating costs, and reduces marketing risk rates. This article selected relevant data from enterprises. Comparing the accuracy of RFID technology applied to logistics goods identification with traditional identification methods, Figure 4 can be obtained:

Figure 4 shows a comparison of the accuracy of identifying relevant information between goods using barcode and goods using RFID electronic tags during transportation, transit, and warehousing. It can be seen from Figure 4 that the accuracy of both cargo information identification methods was inversely proportional to the quantity of goods and decreased as the quantity of goods increased. The highest peak value of information recognition accuracy for barcode and RFID electronic labels was when the quantity of goods was 100. However, by comparing the data in the figure, the highest recognition accuracy rate for barcode was 96.3%; the lowest was 83.9%; the average recognition accuracy rate was 89.98%. The highest recognition accuracy rate for RFID was 99.8%; the lowest was 94.5%; the average value was 97.7%. The identification accuracy of RFID technology, regardless of the highest, lowest, or average value, was higher than that of barcode, with a higher accuracy rate. Therefore, it was concluded that RFID had more advantages over the use of barcode methods in the identification accuracy of supply chain logistics information.
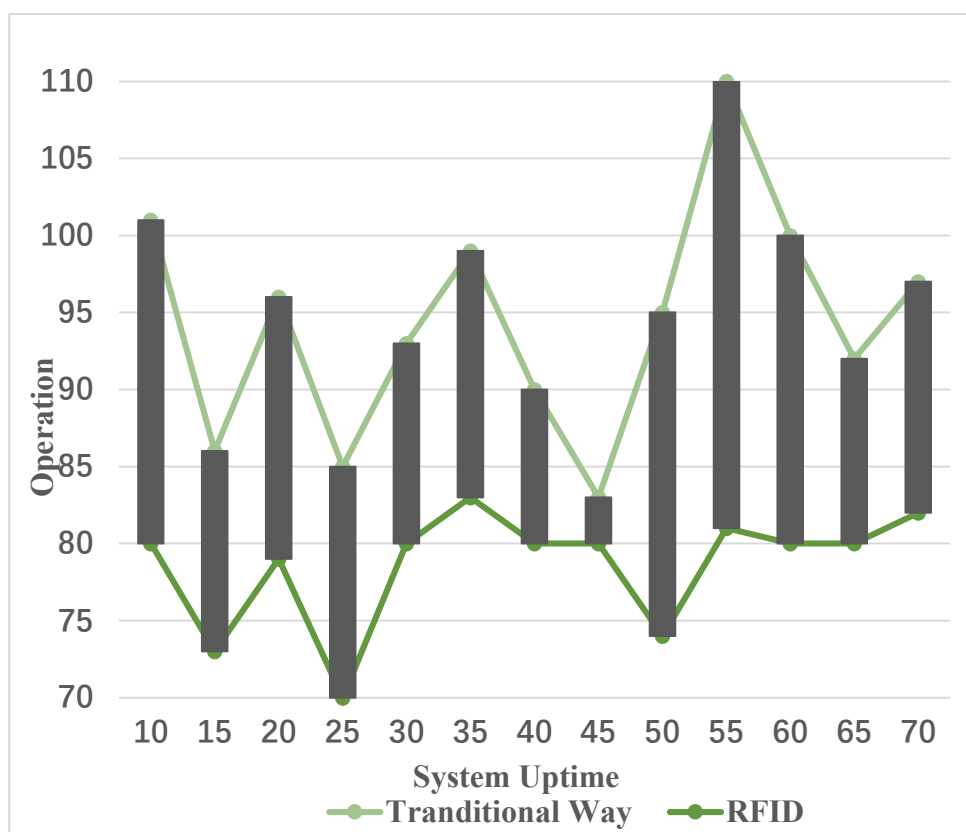
4.4. Goods Management Efficiency

Figure 5. Comparison of energy consumption during storage system operation.

RFID technology has efficient processing capabilities in the entire supply chain, not only in logistics. The utility of using it in the warehousing process is also obvious. Using RFID technology in the warehousing process can help administrators accurately locate goods and track them. The tracking and positioning error of the goods shall not exceed 0.5m. It is convenient for warehouse administrators to find and count goods, while effectively preventing loss and theft [25-26]. At the same time, RFID technology can also help save management energy consumption and reduce storage costs. Comparing the energy consumption of a storage system based on RFID technology with that of a traditional storage system without RFID technology, Figure 5 can be obtained.

As shown in Figure 5, the traditional energy consumption reached a maximum value of 110nJ/bit at 55s and a minimum value of 83nJ/bit at 45s, while the system using RFID technology had a maximum energy consumption value of 83nJ/bit at 35s and a minimum value of 70nJ/bit at 25s. Through data comparison, compared to traditional management systems, RFID based warehouse management systems consumed less energy, and their energy consumption level changed relatively stable with small fluctuations.

Due to the traditional method of manual operation, there are inevitably errors, including material losses, labor losses, and management costs, which invisibly increases the financial burden of the enterprise and increases the marketing risk of the enterprise. When RFID technology is applied to the warehouse storage management system, relevant data on storage costs from January to May before and after the adoption of RFID technology by an enterprise over two years is selected for comparison. The results are shown in Figure 6 (unit: US dollar).
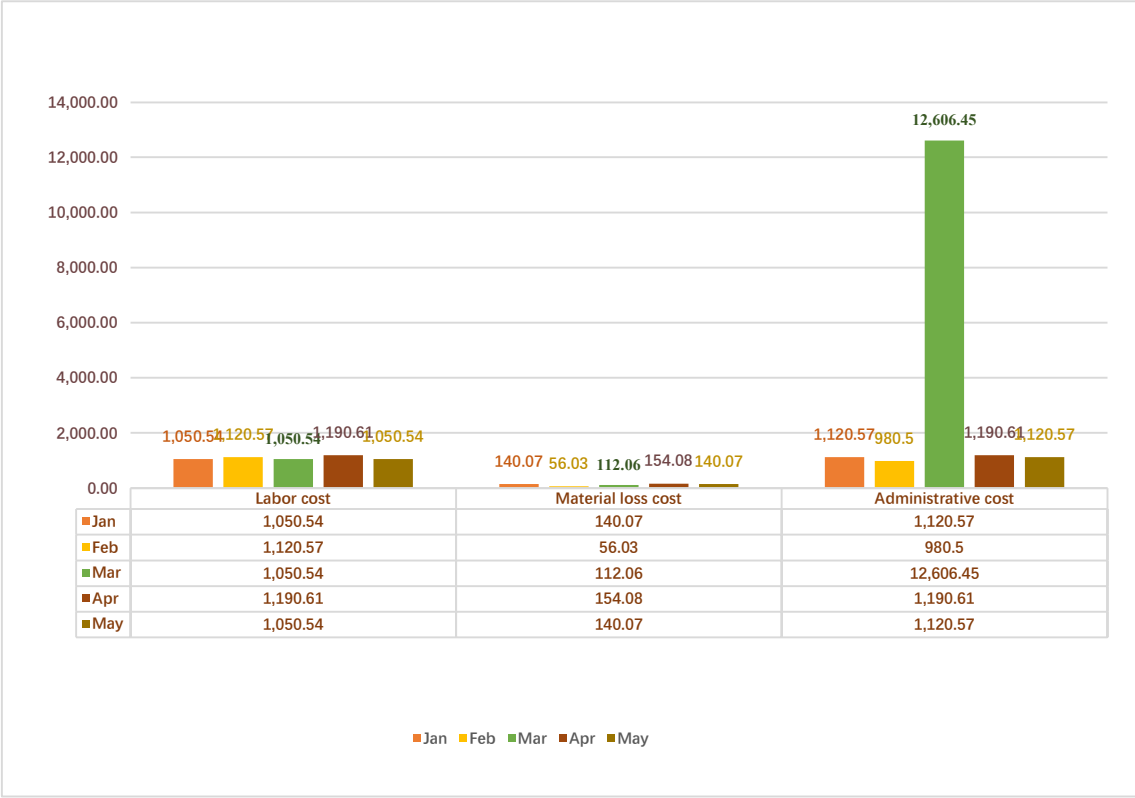
Figure 6 shows the comparison of storage costs between companies that adopt RFID technology and those that do not. Figure 6(a) shows the situation of labor costs, management costs and material loss costs for companies that do not adopt RFID technology, while Figure 6(b) shows the same aspects for companies that adopt RFID technology. First, from the perspective of material loss costs, companies that adopt RFID technology have significantly reduced material loss costs, with a maximum value of only US$154.08, a minimum value of US$56.03, and an average monthly cost of US$120.46. Companies that have not adopted RFID technology have higher material loss costs. This shows that the application of RFID technology can effectively reduce material loss, thereby reducing the company's operating costs and thus reducing marketing risks.

Secondly, although labor costs and management costs have also declined after the adoption of RFID technology, the magnitude of the decrease is relatively small. Labor costs dropped from an average of US$2,437.25 per month to US$1,092.56, and the average monthly cost dropped by US$1,344.69; management costs dropped from an average of US$19,000 per month to US$1,134.58, and the average monthly cost dropped by US$1,526.78. This may be because after adopting RFID technology, although labor and management costs are reduced, a certain degree of manpower and management are still required to maintain and operate the RFID system. Therefore, the decrease in labor and management costs is relatively small, but still shows a clear downward trend.

In summary, Figure 6 clearly shows the impact of adopting RFID technology on enterprise storage costs. By reducing material loss costs, labor costs and management costs, the application of RFID technology can significantly reduce an enterprise's operating costs, thereby reducing marketing risks.
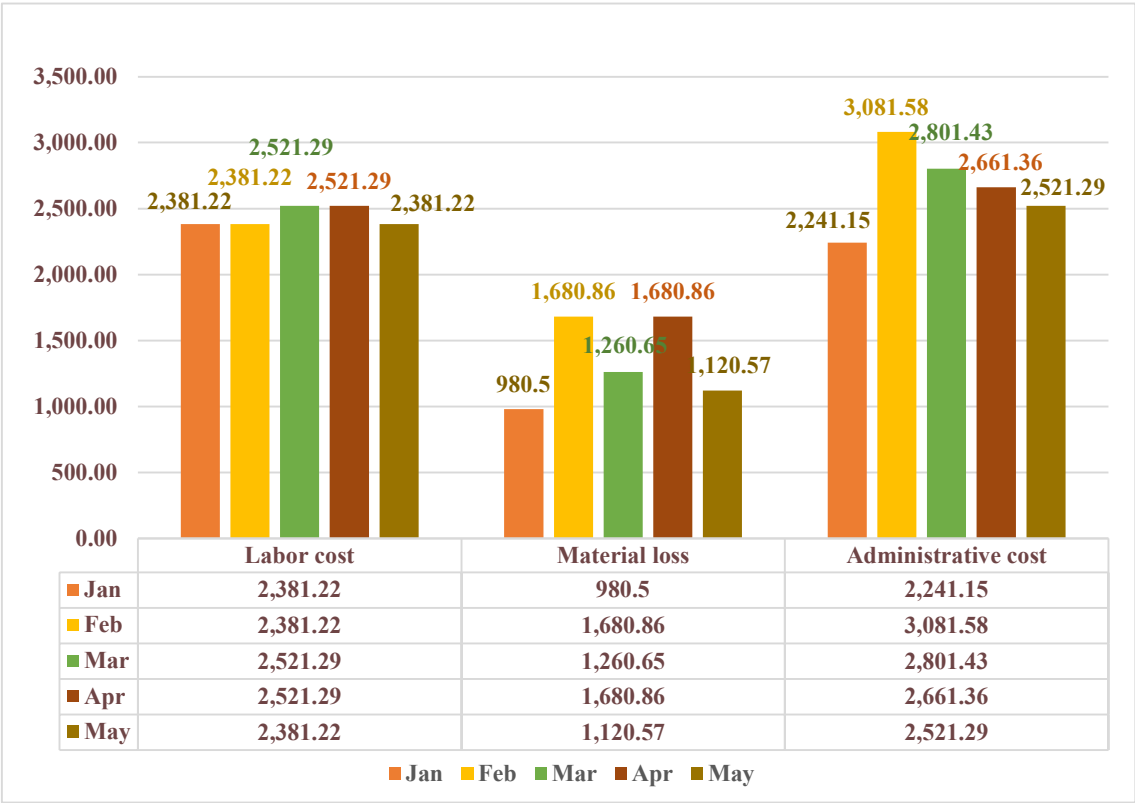
(a) Manual warehouse management cost statistics.

(b) RFID warehouse management cost statistics.

Figure 6. Comparison of storage costs.

The application of radio frequency identification (RFID) technology in supply chain management has significant cost-effectiveness and certain application limitations. In terms of cost-effectiveness, first, RFID technology can help companies realize automated data collection and tracking, reduce manual operations, and save labor costs. At the same time, the possibility of loss and damage of goods is reduced, and inventory costs and loss costs are reduced. Second, RFID technology can quickly and accurately identify and track goods, improving the efficiency and accuracy of logistics operations, thus improving labor productivity. Third, RFID technology can monitor inventory conditions in real time, help companies better grasp inventory information, reduce inventory backlogs and excesses, and reduce inventory costs and capital occupancy costs. Fourth, RFID technology can achieve fast and accurate order processing and logistics distribution, improve the timeliness and accuracy of delivery, and enhance customer satisfaction and loyalty. However, there are also some limitations. First, the initial investment and implementation costs of RFID technology are relatively high, including hardware equipment, software systems, training costs, etc. For some small and medium-sized enterprises, the return-on-investment cycle may be longer. Secondly, RFID technology involves a large amount of data collection and transmission, and there is a risk of data leakage and privacy leakage. If effective security controls are not implemented, information leakage and malicious attacks may occur. Moreover, the current standards and specifications of RFID technology are not unified, and RFID equipment and systems produced by different manufacturers may be incompatible, which brings certain difficulties to enterprises in their selection and integration. Finally, the cost of RFID tags is relatively high, especially low-cost tags used for disposable goods, which may increase the company's production costs.

5. Conclusions

The world economy is developing rapidly, and the world political situation is volatile. Enterprises encounter more and more internal and external risks in the marketing process. Many enterprises do not attach enough importance to marketing risk management when facing marketing crises, and do not have appropriate response policies, resulting in failure in the fiercely competitive market and bearing huge competitive losses. Enterprise marketing risk is essentially a possibility of suffering losses. By controlling the details of the marketing process, some risks can be effectively reduced or even avoided. Radio frequency identification technology belongs to a sub technology under the classification of information technology, with excellent information identification and transmission capabilities. This article applied RFID algorithms to enterprise risk management and control and analyzed the ability of RFID technology to reduce enterprise marketing risks from the perspective of supply chain management. By constructing a supply chain management link evaluation system, radio frequency identification technology and traditional supply chain management methods were compared into the management link system. The results showed that enterprises based on RFID technology outperform traditional supply chain management methods in terms of supply chain loss rate, information transmission efficiency, information accuracy, and goods management efficiency. It can ensure the accuracy, efficiency, and timeliness of data collection in all aspects of the supply chain and improve the management efficiency and transparency of logistics in the supply chain. It can also reduce the management costs of enterprises, save more funds for enterprises, and increase the reserves of enterprises, so as to better face the marketing risks faced by enterprises in the process of operation.

This study has huge potential implications for practitioners, policymakers and future research directions, specifically:

(1) Impact on practitioners: This study proposes an enterprise marketing risk management method based on RFID technology and proves its effectiveness in supply chain management. By adopting this method, practitioners can improve their ability to control marketing risks, reduce business risks, enhance corporate competitiveness, and thereby improve business performance.

(2) Impact on policy makers: Policy makers can learn from the results of this study to strengthen policy support and guidance for corporate marketing risk management. They can encourage companies to adopt advanced information technology and supply chain management methods by formulating relevant policies and regulations to improve the operational efficiency and risk management level of the entire industry chain.

(3) Impact on future research directions: This study provides a preliminary framework for enterprise marketing risk management based on RFID technology, but there are still many aspects worthy of further exploration. Future research can focus on in-depth analysis of the application effects of RFID technology in different industries and enterprise sizes and verify it with actual cases. In addition, the application of other emerging technologies such as the Internet of Things and big data analysis in marketing risk management can be explored to expand the research field.

Conflicts of Interest: The author declares no conflict of interest.

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(Executive Editor: Wang-jing Xu)