Design of Second-Hand Car SCF Platform Based on Block Chain Technology

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Abstract. At present, China’s used car consumption market is developing rapidly and has a bright future. Against the background of this era, the bank's used car credit business ushered in a major development opportunity. How to effectively carry out the used car credit business and provide more effective and high-quality services has become an important research topic. Among the related financing issues, there have always been problems such as difficulty in confirming rights, difficulty in transmitting information, and lack of credit enhancement measures. Therefore, we designed a financial product, hoping to give full play to the advantages of core enterprises in the supply chain, collaboratively apply new technologies such as Block chain technology, "Internet Plus", and big data, innovate financial products, and support and serve entity enterprises to revitalize accounts receivable, speed up the capital turnover of enterprises, reduce external liabilities, and reduce financing costs.

Keywords: Block Chain; Credit; Used Car; Supply Chain Finance.

1. Introduction

Based on the rapid development of information and mature consumption concepts, more and more people will choose relatively affordable used cars when buying cars. However, from the current situation, my country still has not established a complete market system. Moreover, the evaluation of used cars in my country currently mainly depends on the experience level of the evaluators, and there is a lack of unified evaluation standards, and the evaluation results are not objective enough to lay a good foundation for integrity. The profit-seeking nature of businessmen and the incomplete information held by consumers have caused information asymmetry between the two parties, which greatly restricted the development of the industry. How to make the used car market truly transparent and visualized has become an urgent problem for the entire industry. The difficulty of financing has always been the predicament of SMEs at the current stage. Due to the problem of operating costs, the inability of SMEs to provide the business endorsement required for bank credit has also exacerbated the survival dilemma of SMEs.

The emergence of block chain technology provides an easy-to-implement path for solving this pain point. The centralization of block chain technology, tamper-proof, traceability of historical records (in chronological order), multi-point backup to prevent data loss, information The advantages of openness and transparency. These characteristics show that, except in the field of encrypted digital currency, any scenario that requires public disclosure of information, tracing historical records in chronological order, or providing impartial information can use block chain technology to seek solutions.

At present, the total market financing scale of my country's supply chain finance is as high as 14 trillion, but the current development methods are still unable to meet the financing requirements of enterprises. Therefore, how to carry forward the advantages of the SCF platform and solve the financing difficulties of small and medium-sized enterprises has become a hot issue of common concern in the academic and practical circles.

Therefore, in this market, by using the characteristics of block chain technology, the authenticity of vehicle condition information can be ensured to the greatest extent, and real and effective data can be provided to consumers to solve the problems of non-disclosure, opacity, and lack of integrity in the process of second-hand car transactions. The problem of high bad debt ratio is defective. The use of SCF can solve the problems of long financing time, complicated procedures and information
islands. Therefore, we hope to start from the pain points and needs of the market, combined with the existing technology, to propose a block-chain-based used car SCF platform to solve the problems encountered in the current market and promote the healthy development of the industry.

2. Analysis of Used Car Market Problems

2.1 The Reasons For the Problem of the "Lemon" Market of Online Used Car

2.1.1 The Buyer Lacks Information Processing Capabilities

With the emergence of online second-hand car platforms, buyers' main problem has changed from the lack of relevant information in the past to the lack of relevant information processing ability now. Especially for second-hand goods such as second-hand cars, consumers cannot comprehensively process massive information to verify the quality of goods, nor can they judge the accuracy and authenticity of information, thus limiting consumers' desire to buy to a certain extent. After buying a used car is not accurate to process information effectively, think to buy second-hand vehicle quality does not meet their expectations and lowering consumer expectations of used-car market overall quality level, at the same time, the quality of the product and situation of using negative feedback after secondary transmission of network consumers, will also affect other consumers purchase desire.

2.1.2 Used Car Quality Information is Asymmetric

In online second-hand car trading, the two parties do not necessarily need to meet, so the two parties tend to have great differences on the quality information of second-hand cars, and there is a certain degree of information asymmetry, mainly for the following reasons: First, asymmetric information source. As the seller is the distributor of second-hand cars and enjoys the monopoly of information, the seller's exaggeration of high-quality information and hiding of bad information will have a great impact on the buyer's consumption desire. Second, there are deviations in information transmission. After second-hand car trading is transferred to online, compared with traditional offline trading, online evaluation mostly relies on text, image and other information, and its evaluation criteria and authenticity are subject to a certain degree judgment, resulting in consumers unable to accurately grasp the physical information of second-hand cars.

2.1.3 The Information Asymmetry of Used Car Quality

In the online second-hand car transaction, the two parties do not necessarily need to meet. Therefore, the two parties are prone to disagreement on the quality information of second-hand vehicles. There is a certain degree of information asymmetry. There are mainly the following reasons: First, the information Source asymmetry. Because the seller is the publisher of used cars and enjoys the monopoly of information, the seller's exaggeration of high-quality information and concealment of bad information will have a greater impact on the buyer's desire to consume; second, there is a deviation in information transmission. After the transfer of used car transactions to online, although the time and space for information transmission has been expanded, compared with traditional offline transactions, online evaluations mostly rely on text, images and other information, and their evaluation standards and authenticity are subject to a certain degree judgment, resulting in consumers unable to accurately grasp the physical information of second-hand cars.

2.1.4 Information Asymmetry Between Both Parties Credit

In order to quickly seize the market for used car trading platforms, sellers often increase the number of platform users by setting low barriers to entry. At the same time, they lack the review of the seller's reputation. The seller only needs to pay a certain fee or deposit to pass. The platform conducts the sale of used vehicles. In addition, the current second-hand car trading market has not yet formed a unified and complete credit evaluation standard, and the platform cannot verify the identity of the seller in real time, and there are problems such as information theft. Inaccurate and untrue information has greatly affected buyers' desire to buy and high-quality sellers' trust in the platform, and impacted the used car trading environment. In order to retain customers, the platform tends to
favor the buyer when safeguarding their rights and interests, which leads some consumers to be opportunistic, and there is a behavior of "replacement and replacement".

2.2 Other Problems with the Online Used Car Market

2.2.1 There is Resistance to Financial Leasing

With the increase of people's consumption demand and the change of consumption consciousness, people are more inclined to choose "advanced consumption" to alleviate the current economic pressure. However, when it comes to obtaining loans, consumers are often faced with the problem of difficult platform selection. Due to ineffective supervision and the potential for huge profits, there are problems such as "storms" and high interest rates. It affects consumers' loan desires and affects consumers' purchasing decisions. Due to information protection policies, most lending platforms cannot obtain data from major credit reporting platforms, and the fragmentation of information access channels greatly increases the cost of lending institutions. And the traditional centralized technology to share untrustworthy records also has problems such as information being easily tampered with, data cannot be traced, and there is a problem with the authenticity of information. It has greatly influenced the relaxation decision of the lending institutions.

2.2.2 The Seller's After-sales Guarantee is Insufficient

There are mainly used car brokerage companies, operating companies and auction companies for the trading channels of domestic second-hand vehicles. Among them, used car brokerage companies are the main used car trading channels in China. However, such intermediary companies are often small in scale, lack scientific management capabilities and professional operational capabilities, and cannot accurately identify the quality information of second-hand vehicles, so it is difficult to provide corresponding and complete guarantee services.

2.2.3 Market Supervision is Difficult

Since most of the transaction parties of second-hand vehicles are individuals, the entry threshold for sellers is relatively low and registration is not required, so it is difficult for platforms and relevant departments to supervise second-hand vehicles. In the C2C transaction mode, the commodity information is freely released by the seller, resulting in the platform's determination of the authenticity and accuracy of the information to consume a lot of manpower and material resources, which will increase transaction costs to a certain extent and affect consumers' desire to buy. The original intention of consumers to buy at low prices. For a series of technical measures launched by the platform, some sellers driven by opportunism also have corresponding countermeasures to avoid machine identification. In addition, the relevant laws and regulations are not perfect. There is a lack of identification of dishonest behavior and corresponding measures.

2.2.4 Weak Awareness of Privacy and Data Protection

Privacy and data protection refers to the ability to protect the personal privacy data of platform users or sensitive data owned by enterprises. One is the privacy protection for individual users. The platform should have strict protection for the privacy information of users who use the platform. Second, for the protection of sensitive data of enterprises, the platform should strictly protect the private data provided or obtained by enterprises such as lending and providing credit information on the platform. The wide application of big data technology in used car trading platforms makes platform users, including individual users and enterprise users, have serious hidden dangers of sensitive information leakage.

2.3 Analysis of the Impact of Online Used Car Market Problems

2.3.1 Impact on Buyer's Buying Behavior

Due to information asymmetry, buyers lack complete trust in sellers, which leads consumers to be cautious about displaying information, which prolongs the transaction time of second-hand vehicles and increases transaction costs to a certain extent. The information obtained by consumers through
other channels often cannot accurately reflect the information of a specific second-hand vehicle. The redundant information may also exacerbate the buyer's distrust of the seller. Widen the information gap. Once consumers decide that they do not meet their expectations after purchasing, it will also affect their second-time purchase behavior, and such dissatisfaction will follow consumers' evaluations. Spread on the Internet, and even affect the purchasing behavior of other consumers on a larger scale.

2.3.2 Influence on Seller's Sales Behavior

In the second-hand car trading market, the seller decides the authenticity of the information, which easily causes the buyer's natural distrust. Therefore, the buyer often reduces the price to avoid the risk of buying a second-hand car that does not meet expectations. At the same time, the low price will also reduce the willingness of sellers to provide high quality, which will ultimately reduce the efficiency of the market and cause the used car trading market to shrink. Of course, the seller can choose to conduct quality appraisal of the products sold through a third-party certification body with inspection qualifications to make up for the lack of consumer trust, but to a certain extent, it increases transaction costs.

2.3.3 "Bad Money Drives out Good"

As a special commodity, used cars naturally have the problem of information asymmetry. Buyers cannot obtain vehicle information accurately, and sellers cannot obtain consumer preferences. When the buyer lacks information about the quality or authenticity of the used car, they will try to lower the price, which affects the overall price level of the used car market. In turn, the sellers will also find ways to use lower-quality vehicles for delivery, which affects the quality of the supply of second-hand vehicles. The “survival of the fittest” competition mechanism is effective, and eventually the entire market is flooded with low-quality second-hand vehicles, which further compresses consumers’ desire to buy. Once the huge consumer base is lost, the market transaction scale will shrink sharply, and the bad money will drive out the good money, which will greatly hit the used car trading market.

3. Design of Second-Hand Car SCF Platform Based on Block Chain Technology

3.1 Analysis of the Limitations of Existing Products

First of all, from the perspective of enterprises, the blockchain platform built by each used car trading platform is independent, and it is difficult for the platforms built by different used car companies to achieve cross-validation, which increases the possibility of fraud by sellers. Therefore, realizing cross-chain integration in the used car industry can bring huge economic benefits to the entire used car industry.

Secondly, from the perspective of information acquisition, how to obtain information such as car maintenance information and mileage information is the core of the used car transaction blockchain. For the used car market, car owners cannot obtain appropriate credit endorsements, which increases the difficulty of transactions.

Third, from the perspective of the scope of application, the credit certificate of the used car trading platform cannot be shared, and it is difficult for weak small and medium-sized enterprises and ordinary buyers to easily obtain credit.

Finally, from the perspective of government supervision, each platform has not yet developed standardized regulatory rules, nor has it achieved industry standards, nor has it opened data interfaces for regulators, resulting in increased fraud risks and increased supervision costs.

3.2 Product Design Ideas

Therefore, this product hopes to solve the common defects of existing products by building a new blockchain used car SCF platform.
First of all, the platform we designed will use the open source cross-chain interface of the blockchain to realize the transmission, traceability and interoperability of information between the whole network and the whole platform, and get rid of the fraud dilemma that a single platform cannot achieve information interconnection.

Secondly, the platform will use the new changes in the automobile industry in the "5g" era - the Internet of Everything technology to record all the information of the car after it leaves the factory, so as to establish a digital twin consistent with the car's condition, and through the positioning technology, the driving information will be uploaded in time. Chain, forming "four streams in one" non-tamperable and accurate data, fundamentally solves the problems of the authenticity of information on the blockchain and the authenticity of transactions on the supply chain, so as to reduce the risk of car buyers and shorten the time for banks. Review time, reduce financing costs, and improve risk control capabilities.

Third, for the data collection of small and medium-sized enterprises and ordinary buyers, we will use a combination of strong and weak connections. In our platform, by using the weak connection and strong connection of the SCF network, financial institutions can obtain the transaction information of SMEs and other enterprises on the chain, as a credit endorsement for SMEs, which reduces the difficulty and difficulty of SME financing. cost, encourage more small and medium-sized enterprises to enter the supply chain, and essentially solve the problem of financing difficulties.

Finally, our platform will build a unified data warehouse to provide data interfaces for regulatory authorities. On the one hand, it guarantees the regulatory responsibilities of relevant departments, and on the other hand, it also uses the deterrent effect of government data interfaces to reduce the possibility of fraud.

3.3 Structural Design of the Platform

Based on the above ideas, the platform should first record all the information based on 5g Internet of things from the factory, including mileage, maintenance and other information, on the distributed ledger of the blockchain, and the four stream data will be linked in real time through digital twinning. After that, we can evaluate the real-time financing demand of the enterprise and make use of the real-time transaction data to match the transaction demand of the enterprise. In addition, through the accumulation of each transaction, gradually realize the evaluation and precipitation of the credit of small and medium-sized enterprises on the chain, automatically input it into the tamper proof and constantly updated warehouse on the chain, and open the corresponding channels supervised by government departments at the same time.

In terms of product architecture, this platform mainly includes used car status function system, credit evaluation function system, dynamic bidding system, enterprise credit warehouse function system, and government data interface function system.

The used car status function system is responsible for tracking the real-time status of used cars sold on the platform, including all relevant information that will affect the value of used cars after they leave the site. Therefore, the functional system uses the information interaction technology based on the Internet of things to record the maintenance, mileage, damage and other data of second-hand cars. At the same time, it will record every process of second-hand cars, when, where and why they need to be repaired. Moreover, the transaction needs to be tracked in all aspects to ensure that the transaction is open, transparent and honest at any stage of the transaction. It is not difficult to find that uploading the twin right confirmation data obtained from the sensor to the blockchain can reasonably determine the price of second-hand cars, and supervise the transaction stage to avoid false transactions. Especially in the "lemon market" where the information of used cars is seriously asymmetric, the use of the platform can curb the phenomenon of "bad money expelling good money" from the root. In addition, through the time monitoring and modeling of the transaction process, the risk is calculated in real time to determine its ability to fulfill the contract, so as to reduce the transaction time, reduce the transaction cost, and curb bad debts and non-performing loans from the source. Finally, these data can be uploaded to other systems in real time without gaps.
The credit evaluation function system scores the credit of enterprises, including small and medium-sized enterprises, through the previous transaction information, real situation and amount of enterprises, and this score is not absolute. It will be automatically adjusted with the dynamic process, and the updated score will be uploaded to other functional systems by BT as the credit endorsement of transactions.

The dynamic bidding system matches the transaction, determines the transaction amount and loan amount according to the user's purchase intention, and then according to the user's specific credit status and industrial and commercial information. For the fund demander, the system will mobilize the data of the enterprise credit warehouse to determine whether the applied fund demand is reasonable. If it is reasonable, the system will release information including interest rate, window period and so on. In addition, all kinds of information will be sent to the management synchronously to protect the reasonable interests of the management.

3.4 Blockchain Technology Adopted by the Platform

At present, most platforms still use the typical public chain technology, and the development cost is basically about 100 million yuan. In general, the platform adopts the blockchain technology of alliance chain and side chain. The participants in the alliance chain must be confirmed by our platform. Compared with the public chain, they can enter the chain only by reaching a consensus mechanism. They can enter the chain only after being determined on our alliance chain, which further enhances the information accuracy and reliability of this product and reduces the cost. In addition, this product also chooses to expand the main chain by adding side chains, which not only enhances the scalability and extensibility of our platform, but also reduces our operation and maintenance costs. According to the public data given in the 2020 blockchain industry white paper and our own reasonable calculation, adopting this platform can save 50% of the cost.

Use the easy connect connection of secondary innovation. By learning from ripple bank's open source connection agreement and realizing self secondary innovation on the original basis, easy connect introduces the mechanism of setting the buyer and the seller in the process of second-hand car transaction as the gateway, so as to keep the core account books of both parties unchanged in the transaction process, simplify the transaction restrictions, improve the transaction speed, and realize the final transaction on this product platform. In addition, all transaction contents in the process adopt RCA encryption and hiding algorithm technology to protect the privacy of both parties.

In addition, in order to reduce the use cost of the platform and distinguish it from the existing blockchain transaction mode, we have built a new storage in consensus mechanism, that is, we use the consensus mechanism to verify transactions and records in each transaction process, so as to facilitate the credit verification of small and medium-sized enterprises. Therefore, this product does not adopt the traditional mode of remitting all points on the chain into the general ledger, and uses the scalability of the side chain to set up an interface leading to the general chain and transaction records verified by us. Under this design, the transaction record verification of small and medium-sized enterprises becomes faster and more convenient, and real-time synchronization can be realized, which improves the operation efficiency of the product and reduces the transaction cost. Relying on this innovation, We can achieve uninterrupted credit verification.

3.5 Integration of Platform and BT

First, realize the combination of "BT and used car information storage". Therefore, the module uses the information interaction technology based on the Internet of things to record the maintenance, mileage, damage and other data of second-hand cars. At the same time, it will record every process of second-hand cars, when, where and why they need to be repaired. And use public chain and open source technology to realize the exchange of information on the chain, and solve the problem of adverse selection caused by information asymmetry from the root.

Second, realize the combination of "BT and used car transaction scenario". Because the data on the BT chain cannot be modified, the combination of BT and second-hand car transaction promotes
the information of second-hand car transaction on the chain. The platform uses BT to provide dynamic, point-to-point, high assurance and high accuracy transaction information, so that the participants in the transaction can make real-time adjustment, reduce the default rate of financing and increase the transaction speed.

Third, realize the integration of "BT and used car logistics". Based on the technical characteristics of BT timestamp, digital signature, digital identity confirmation and data tamperability, the integration of "BT and used car logistics link" module is constructed to realize the logistics information uplink, so as to truly achieve "four streams in one". In addition, this product uses BT's smart contract mechanism to provide transaction logistics for both parties in real time. All transaction members on the chain can realize real-time tracking of transactions, ensure the normal popularity of transactions, avoid malicious loan fraud from the source and reduce the bad debt rate of financial institutions.

Fourth, realize the combination of "BT and used car finance". Relying on the enterprise credit warehouse function system, the existing enterprise dynamic score and credit level are included in the transaction, and all kinds of information are integrated into the same chain to solve the problems of financing difficulties of small and medium-sized enterprises and high bad debt rate of financial institutions.

Fifth, realize the integration of "BT and used car supervision". Our platform will build a unified data warehouse to provide data interface for regulatory authorities. On the one hand, we will ensure the regulatory responsibilities of relevant departments, on the other hand, we will also use the deterrent effect of government data interface to reduce the possibility of fraud. In this product, all transaction information is recorded according to time. AML demand information realizes digital symbiosis and is easy to find. In addition, due to the use of open source technology, our data is backed up at every transaction node. Therefore, the whole process can be traced, break the traditional information island and realize sunshine supervision.

4. Advantage Analysis

4.1 Reduce Transaction Costs and Speed Up Transactions

With the improvement of economic level and the continuous expansion of automobile demand, under this background, the second-hand car market has also ushered in unprecedented development opportunities. At the same time, the massive and messy information released by the seller out of the intention to get rid of it as soon as possible has also seriously affected the purchase decision-making of second-hand car consumers and slowed down the transaction speed of second-hand cars. Moreover, due to the natural mistrust of the seller by consumers, the seller selects some third-party evaluation institutions to evaluate second-hand cars, which greatly increases the transaction cost of both buyers and sellers. At the same time, the credit voucher delivery of the used car trading platform can not achieve particle level penetration, and the sentiment of enterprises and individuals on the chain is not high, which limits the total number of chains and can not achieve economies of scale.

Through open source BT such as hyperledger, stellar, tendermint and Asch and new interface technologies such as relay, side chain, hash locking and notary, this platform realizes the transmission, traceability and interoperability of information between the whole network and the whole platform, breaks the chimney closed data system, realizes the good compatibility of heterogeneous data of different platforms, and realizes the unified processing and analysis of data, efficient, real-time Comprehensive data exchange. Through the upstream and downstream supply chain of BT enabled used car platform, this product realizes the communication and release of data, realizes the in-depth mining of data value with the help of cloud platform and big data, provides users with more accurate and effective information, evaluates the seller's credit level by obtaining credit investigation data, and BT can well solve the problem of data redundancy and greatly reduce the data storage cost. This platform applies BT to the used car trading platform, eliminating the third-party evaluation and intermediary links, so as to realize point-to-point direct docking, which can not only greatly reduce
the cost, but also ensure that both parties to the transaction can quickly complete the transaction payment.

4.2 Strengthen Credit Transmission and Reduce Default Risk

Relying on the decentralized characteristics of the blockchain, this product realizes the self verification, transmission and management of platform data, and fundamentally solves the problems of information authenticity in the blockchain and transaction authenticity in the supply chain, so as to reduce the risk of car buyers, shorten the Bank review time, reduce the financing cost and improve the risk control ability.

Small and micro enterprises and individuals are generally unwilling to share data and increase costs, so they cannot objectively evaluate credit investigation, resulting in great difficulty in financing. In our platform, financial institutions can use the weak connection and strong connection of SCF network to obtain the transaction information between small and micro enterprises and other enterprises in the chain, which can be used as the credit endorsement of small and micro enterprises. And we ensure the security of data through decentralized point-to-point transactions, and store, verify and update data through encryption technologies such as hash algorithm to prevent malicious tampering. The transaction information stored and disseminated in this form more truly reflects the repayment ability and operation status of small and micro enterprises, and expands the credit transmission radius in the supply chain. The information between users in the supply chain is unblocked, so that all upstream companies can obtain credit endorsement through their original transactions, and lenders can easily obtain complete information of enterprises, which stimulates the relaxation enthusiasm of lenders, Reduce the difficulty and cost of financing, so as to encourage more small and micro enterprises to enter the supply chain and solve the original problems in essence.

4.3 Hide Private Information and Protect Users' Privacy

Privacy and data protection refers to the ability to protect the personal privacy data of platform users or sensitive data owned by enterprises. Due to the fuzzy boundary of the data responsibility subject of the second-hand car trading platform, it is difficult to protect it by classification. At the same time, due to the weak awareness of users and platforms on the protection of privacy data, there are serious information security risks in the traditional second-hand car trading platform.

By using the asymmetric encryption technology of blockchain, this product highly encrypts the user's privacy information while disclosing the transaction data. Therefore, the identity information of each block node can be transmitted without disclosure or high-risk verification, so as to ensure the security of data and personal privacy, reflecting good anonymity.

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