Frontiers in Business, Economics and Management
ISSN: 2766-824X | Vol. 9, No. 1, 2023

Response Methods and Optimization Measures for Natural Disasters in The Context of Block Chain and E-commerce Platform Development

Yan Zhang, Yuxin Chen, Bo Sun, Yuhuan Zhou, Yue Yu

Nanjing Audit University, Nanjing, Jiangsu, 211815, China

Abstract: In recent years, the frequent occurrence of natural disasters has aroused people's attention all over the country, such as the recent rainstorm in Zhengzhou. We plan to design an emergency management mini program based on blockchain to cope with natural disasters, open up production, transportation and distribution channels of materials, achieve accurate distribution of materials, better meet people's needs, and shorten the period of post-disaster reconstruction.

Keywords: Natural disasters, Mini program, Blockchain.

1. Introduction

With the acceleration of global warming and urbanization, natural disasters occur frequently. For example, the heavy rainstorm in Zhengzhou, Henan Province, which caused hundreds of deaths, touched the hearts of the whole country. But at the same time, Zhengzhou rainstorm also exposed there are many problems in the emergency management system. In order to collect more information and public opinions, we conducted field research and summarized some problems in the existing emergency management system.

1.1. The statistical process of materials needed in disaster-hit areas is tedious

During the interview, we found that there were some problems in disaster statistics and materials distribution in disaster-hit areas. The current reporting system of disaster statistics relies on the step-by-step reporting system of districts, townships and villages, with specially-assigned persons responsible for initial reporting, follow-up reporting and verification in accordance with the prescribed time limit. Although the process is clear and the responsibility is clear, there may be time lag in the reporting process, and a lot of manpower and material resources are wasted.

1.2. The distribution of materials lacks precision

In the survey, we noticed that many people reported that the relief materials sent by the state basically met the needs of normal life, but some women and children's needs could not be met in a timely manner, because of their own physiological reasons, they still need "special" care. For example, in terms of special aid such as sanitary napkins and diapers, we believe that the distribution of materials needs to be more precise to meet the needs of the affected groups.

1.3. Information of emergency materials deployment is not shared and timely

Water and power cuts and food shortages caused by heavy rains have taken a huge toll on people both physically and mentally. The impact of the disaster is especially devastating in underdeveloped areas. Even during disasters, some underdeveloped areas lose access to the outside world, so we envision popularizing blockchain and using the non-network function of blockchain to provide a channel for people in underdeveloped areas to seek help.

As for the distribution of materials in a large area, as well as the distribution of materials in a small community or school, they all affect the hearts of every stranded people. In the face of major natural disasters, time is of the essence. If everyone can query the disaster situation and material allocation information in the most timely, direct and simple way, the physical and mental pressure of the masses can be reduced to the greatest extent, and the rescue activities can be better planned and implemented according to the disaster situation.

2. Blockchain Model Analysis

The blockchain system uses blocks as the basic unit to store data. Blocks form a chain data structure in chronological order according to cryptographic algorithms, and record nodes are screened out through consensus mechanism to form a database that can be shared by multiple parties. Blockchain technology has the advantage of cross-region, cross-department and cross-system in data management and control. Decentralization ensures the independence of operation of each node. Open data platform enables all parties to input or view data freely, and the trust mechanism based on algorithm and technology provides security protection for data. On this basis, in connection with the problems in the existing emergency management system mentioned above and the deepening of the project research theme, we put forward the following three ideas:

2.1. To undertake the construction of emergency supplies supply chain management platform

In view of problems such as overlapping costs and shirking responsibilities caused by tedious material information statistics, asymmetric supply and demand data, and lack of precision in the deployment process, a supply chain management platform for emergency materials can be built by relying on blockchain technology. The platform will stipulate dynamic standards for material distribution based on the blockchain consensus mechanism, set up the entry of supply and demand information registration, and simplify the material statistics process. Each endpoint will upload logistics

information in real time, and the chain structure running according to cryptographic algorithm will ensure the security and tampering of input information. The open attribute of smart contract makes the data transparent sharing at low cost and safe and reliable. The material flow record is saved in each node, supporting all parties to check the synchronized data at any time. Based on decentralized and distributed storage technologies, a traceable and efficient data guarantee system should be established between storage and viewing. Local government departments and relevant participants can jointly supervise and trace the route of material dispatching and the details of use.

2.2. Supply chain traceability of unmarketable products

Manufacturers and merchants in disaffected areas can publish purchase links of unmarketable products on the platform. Different from ordinary online shopping, it is difficult for consumers to distinguish the authenticity of products when buying. In order to ensure the authenticity of product sources, blockchain technology can be embedded into product traceability. The security and tamper-resistant performance of blockchain can guarantee the authenticity and accuracy of product information. Manufacturers and distributors can generate product electronic history through real-time backup of labels, and the process is transparent. This multi-chain structure enables consumers to query and compare the specific information of each link of products at any time. The combination of product supply traceability and unmarketable products can not only reduce the economic losses in the affected areas, but also deliver the public love to the people in the affected areas safely and reliably.

2.3. To establish intra-city supplies to help the passage

In case of sudden material shortage in the same city, the supply and demand sides can interact directly through the platform to break the original information island status, eliminate information barriers, share openly in real time, and realize transparent docking. The platform rapidly transmits and shares supply and demand information, realizes automatic matching of data in the system based on distributed storage and point-to-point transmission of blockchain, and realizes effective mutual assistance in the shortest possible time. The demander can quickly find the goods that meet their needs, and the supplier can better realize its value of help.

3. Relying on the Block Chain to Establish The "Chain" Mini Program

Small program is a new product of the Internet era. We plan to rely on blockchain and make use of relevant functions of blockchain mentioned above to design "link" small program to deal with materials and other related issues in the case of major epidemics and natural disasters. At the same time, the "1+1" mode, that is, the "public account + small program mode", gives the people in the affected areas to seek help, release emotions harbor; At the same time, online shopping mall service is provided to facilitate the sale of unsalable agricultural products in disaster-hit areas.

At the same time, the mini program will be linked to the local disaster warning center, and before the disaster occurs, it will send the warning information from the warning center to the user's mobile phone, and note the relevant risk prevention guidance. The use of small program to send disaster warning and provide timely guidance on the method of hedging, escape route guidance, can make the public know the disaster is coming in the first time, and make correct and effective hedging measures in the case of emergency, to minimize casualties

In "Link", we are divided into user side and administrator side. In the user side, we will design four sections, which are respectively: "registration section, block chain filling system, message area and agricultural aid area".

3.1. Registration plate

At the beginning of the small program when you can choose to use wechat or temporary landing, but the use of small program, users need to register, so as to ensure that the small program service a certain degree of security and integrity. When a problem occurs, the management side can quickly find the source of the problem and carry out solutions and accountability. Considering the public welfare of the small program, we set the management end as the government of the relevant disaster area and volunteers certified by the platform, and relevant personnel registered and certified

3.2. Blockchain filing system

After natural disasters or major epidemics, there is often insufficient or uneven distribution of materials, lack of medical supplies, and no timely assistance for serious diseases. On the one hand, because of the widespread and sudden occurrence of natural disasters and epidemics, material needs and personal health conditions cannot be accurately understood and plans cannot be made in advance. Based on this, with the help of modern information technology, we use wechat developer tools to develop a practical small program for real-time reporting and feedback of rescue objects, rescue information and other information, so as to realize information exchange, improve the precision of disaster relief, and provide convenience for relief work, in order to improve the efficiency and quality of disaster relief. Specific measures are as follows:

The blockchain is divided into the user end and the management end. The management end is the local government. The government can issue the blockchain filling link through the management end, and ordinary users can fill in the medical and daily supplies they need in the link. At the same time, the management personnel of the government or relevant disaster areas can log in the management terminal, use the blockchain of the management terminal to count the links needed by residents, screen the lacking materials, and make announcements to the society. The "e-commerce platform + blockchain" is adopted to realize the collection and distribution of materials, so as to better meet the needs of the people.

3.2.1. The shared database function of blockchain and the link filling system are used to count the materials needed by the people in the affected and severely affected areas

With the advantage of blockchain data storage across regions, departments and systems, government departments can quickly collect data and calculate the extent of damage in each region. The system divides the calculated data by dynamic standards set in advance and reports it to relevant government departments in real time. At last, the state and relevant regions release the information and solicit the lacking

materials.

3.2.2. The statistical data of the blockchain system is utilized to realize the accurate distribution of materials

After the situation is stabilized, the state allocates emergency supplies to the disaster-affected areas and the severely affected areas, and the affected areas take the community, village and town as the unit, and fill in the personal information of grid management. The platform will make full use of blockchain technology for security protection and transparent docking of data information, and precise distribution of emergency supplies. On the one hand to reduce the waste of emergency supplies, on the other hand to better meet the needs of the disaster victims.

3.2.3. Formulating disaster relief plans according to the actual development of underdeveloped areas

Due to the relatively backward development of transportation and electronic communication in less developed areas, less attention has been paid by the public, leading to the phenomenon of poor allocation of materials between developed and less developed areas. After the disaster, many people on the Internet called for attention to the less developed areas. For example, the heavy rain in Cuizhuang Township of Nanzhao County led to the collapse of houses, landslides, traffic and communication interruptions, and the lack of supplies and personnel in small towns, but most of the focus of attention may be in big cities like Zhengzhou. Therefore, measures corresponding to the level of development should be taken in underdeveloped areas. After the occurrence of natural disasters, compared with developed areas, less developed areas are often more severely affected and need more immediate assistance due to the imperfect response measures. Since communication signals in underdeveloped areas are often incomplete, people in underdeveloped areas can be transferred to a centralized contact point after communication companies basically restore the contact signal, and the management personnel of the centralized contact point will count the goods needed by people, combine with developed areas and report to the state for regulation. In addition, due to the poor electronic communication in underdeveloped areas, there may be no signal problem after natural disasters. For example, the rainstorm in Zhengzhou caused serious damage to base stations and communication cables, and the communication services of tens of thousands of users were affected. Without the network, information exchange would be difficult. Underdeveloped regions and some badly affected developed regions cannot even fill in the blockchain filling system in time. Therefore, we hope to promote the non-network use and storage of blockchain data and give full play to the role of blockchain in a more comprehensive way.

3.3. Comment area

In recent years, the Internet has evolved in a more interactive direction. Online messages (comments) are becoming more and more important in information. Therefore, the Link applet also has a message area for users to communicate with each other.

3.3.1. Set up a professional volunteer team

According to the investigation and the problem of personnel shortage in the process of disaster relief, the mini program can also be used for the recruitment and gathering of volunteers and the field exchange of over-the-counter drugs. After the occurrence of natural disasters, a large number of people with basic diseases who are rescued but need medicine cannot be taken into account. In the case of shortage of medical resources and drug supply, ordinary users can submit their needed or remaining drugs and specific address positioning through the blockchain function of the mini program. Specially recruited volunteers will collect the drugs provided by the unit of the street. After reviewing the authenticity and shelf life of drugs, drug distribution and distribution are implemented to avoid conflicts and errors in the offline face-to-face delivery process of ordinary users. In the process of assembling volunteers, interested personnel should be trained after registration, and the drug needs of mini program users should be collected and distributed on the spot according to regional division.

3.3.2. Popularizing knowledge of disaster reduction and prevention

According to existing research reports, the relevant knowledge of post-disaster rescue and reconstruction is not sufficiently popular and there is a lack of formal publicity channels. Meanwhile, wechat mini program is a new media form that has attracted particular attention in the current era. Mini program has added popular science knowledge of frequent disasters and first aid teaching for dangerous situations corresponding to the season and weather in the message area. By taking advantage of the frequently noticed advantage of wechat mini program, it can play a role in helping users to prevent emergencies in daily life, and gain attention for disaster prevention and mitigation science through the channels most easily seen by the masses, so that the masses can make the best risk aversion and disaster relief actions in a short time.

3.4. Agricultural aid area

For the agricultural sector, the main purpose is to help those farmers who have been affected by natural disasters or major outbreaks of disease because of the unmarketable produce. With the help of small programs to build a platform to sell goods, to help them sell unsold agricultural and sideline products, and to help post-disaster reconstruction. In the agricultural sector, commodities come from unmarketable crops that have been hit by epidemics or natural disasters. In addition, in order to make full use of the platform built by mini program for selling unsalable products in underdeveloped areas or severely affected areas, we have added purchase channels for emergency relief kits. These include folding emergency food that can be stored for four years and folding emergency relief supplies including but not limited to whistles, flashlights, disinfectants, in the hope of keeping people as safe as possible in the face of emergencies.

3.5. "1 + 1"

Public account + mini program: with the combination of the two, we will launch the product in the mini program, and publish the publicity video of the product and the video of our field research on the public account to ensure the authenticity of the product. At the same time, we will combine blockchain and use supply chain traceability to avoid the Internet confidence crisis. Different from the phenomenon that it is difficult to distinguish the authenticity of online shopping, products in the affected areas will use the supply chain traceability function of blockchain. Manufacturers can upload the standard product packaging and use information for consumers to query and compare, and can also upload the

distribution record for the convenience of material traceability query.

4. Conclusion

The dangerous rainstorm in Zhengzhou, Henan Province, has not only brought immeasurable losses to local people, but also affected the hearts of hundreds of millions of people. The problems of information asymmetry, lack of coordination efficiency and inefficiency of traditional emergency service system in disaster relief process are thought-provoking. The emergence of blockchain makes us realize that the development of The Times originates from science and technology. It transcends dimensions and brings infinite imagination to this diversified era. Based on this, this project aims to make full use of the characteristics of blockchain decentralization and shared database, to undertake the construction of an emergency supplies supply chain management platform, and to build an exclusive chain of smart cities. In order to realize effective early warning and popularization of safety knowledge before the disaster, maximize the utilization of resources in the disaster relief process, rationally allocate disaster relief materials, reduce the waste of human and material resources, and use the Internet + e-commerce platform after the disaster to establish a channel to help unmarketable products and intra-city materials, and commit to better post-disaster reconstruction. The purpose of the "link" mini-program proposed in this paper is to provide a formal platform for disaster relief work. Therefore, in order to realize its function more comprehensively and accurately, it still needs to be certified by official agencies such as the Central Meteorological Bureau and the National Seismological Bureau, and it will be widely promoted.

Acknowledgment

Fund Projects: 2022 Nanjing Audit University Spring College Student Innovation and Entrepreneurship Training Program "Response Methods and Optimization Measures of natural Disasters under the Background of Blockchain and E-commerce Platform Development -- Taking Zhengzhou City, Henan Province as an Example" (202211287101Y).

References

[1] Wu Ting. Challenges and coping strategies of blockchain-enabled smart logistics platform-based development [J]. Business and Economic Research, 2022(1):4.

[2] Rong Difeng. Study on the optimization measures of precise poverty alleviation audit in the context of rural revitalization - based on the perspective of blockchain [J]. Journal of Guangxi College of Education, 2022(5):4.

[3] Li Yanping Yang H. Analysis of the innovation and development of blockchain technology in Internet information security [J]. Science and information technology, 2021, 000(003):P.58-58.