Ann. For. Res. 65(1): 9433-9444, 2022
ISSN: 18448135, 20652445

ANNALS OF FOREST RESEARCH
https://www.e-afr.org/

ANALYSIS OF THE MANAGEMENT MODE OF AGRICULTURAL PRODUCTS E-COMMERCE DISTRIBUTION CHANNELS BASED ON THE INTERNET

Zhifen Xu
Business School, Xinyang Normal University, Xinyang,464000, China
xzf8433@163.com

Abstract: The circulation channel management mode used today is mainly controlled from the macro level, which leads to low channel management efficiency and high management cost. In response to the above problems, the circulation channel management mode of agricultural products e-commerce based on the Internet is studied. Analyze the current trading environment of agricultural products e-commerce, formulate the supply strategy of agricultural products e-commerce under the Internet environment, and use algorithms to manage the logistics and distribution scheduling of agricultural products e-commerce. According to the feedback relationship between the agricultural products distribution channel and the e-commerce system, corresponding management measures are proposed to complete the management model research. The case verification proved that the management model of the study improved the channel operation efficiency by about 11.93% on average compared with the one of the study, and improved the farmers' income, with better practical application effect.

Key words: Internet; Agricultural products; E-commerce distribution channels; Channel management; Management mode;

0 Introduction

E-commerce is a new business model arising from the impact of the mutual integration of national economy, modern science and technology, residents' consumption level and consumption concept, etc., in order to meet the needs of the improvement of residents' quality of life and lifestyle changes. The increasing receptiveness of residents to the new business model and the rapid development of modern logistics industry have contributed to the development and improvement of e-commerce in China. With the continuous improvement of this transaction mode of e-commerce, the use of e-commerce for fresh produce sales has become another mainstream mode of fresh produce sales. The use of e-commerce platform to sell agricultural products not only expands the sales scope of agricultural products, but also improves the income of farmers at the supply side of agricultural products by effectively reducing the intermediate links of agricultural products sales. When agricultural products are sold by e-commerce mode, the management of agricultural products distribution channels is crucial to guarantee the quality of agricultural products, improve the sales volume of farmers and maintain the interests of farmers [1]. The continuous application of e-commerce has changed consumers' consumption habits and transaction patterns, which leads to the participants in the commodity distribution channel to carry out related activities around these changes, which has formed a new commodity distribution channel-e-commerce commodity distribution channel. The current e-commerce commodity distribution

channel is basically complete, but not yet mature enough to fully meet the needs of commodity distribution.

In e-commerce, the network is the root of all commodity trading activities, and the application of the network fundamentally distinguishes the technical environment of the commodity distribution channels in e-commerce and traditional business models. Effective management of agricultural products e-commerce circulation channels can improve the efficiency of agricultural products circulation in terms of system, management methods and commodity supply. The circulation of agricultural products is an important link connecting producers and consumers, and is the process by which the commodities produced by farmers finally reach consumers through each main body of the circulation channel. Circulation refers to the sum of circulation activities such as commercial flow, logistics, information flow and capital flow, which are directly or indirectly caused in or directly related to the circulation of commodities. In the literature [2], it is mentioned that the management mode of agricultural products circulation channel mainly focuses on the control of the supply chain of agricultural products, but ignores the connection between each link of agricultural products from production to sales, which leads to the poor effect of the management mode when applied to agricultural products e-commerce. The circulation channel management model mentioned in the literature [3] mainly focuses on the control of channel circulation efficiency from a macroscopic perspective, without targeting the management of different agricultural products' sales characteristics, resulting in the high cost of circulation channel management in this model.

At present, corresponding insights on the circulation channels of agricultural products have been proposed from the perspectives of the evolution, relationship, mechanism and mode of agricultural products circulation channels, but there is less research on the circulation channel mode of agricultural products e-commerce in combination with Internet technology [4]. Therefore, in order to enhance the overall sales of agricultural products e-commerce distribution channels and improve the income of farmers at the production end of agricultural products, with regard to the above analysis, this paper will analyze the management mode of agricultural products e-commerce distribution channels using the Internet, so as to propose a new management mode of agricultural products e-commerce distribution channels.

1 Analysis on Management Mode of E-commerce Circulation Channel of Agricultural Products

1.1 Development of agricultural products e-commerce supply strategy under the Internet environment

In the background of the Internet, in order to ensure a good connection of all aspects of the agricultural products' e-commerce circulation channels, the e-commerce supply strategy of agricultural products should be formulated according to the unique environmental background of the Internet, so as to build a good e-commerce supply chain of agricultural products. In this paper, we mainly develop the e-commerce supply strategy of agricultural products from the following aspects [5-7].

(1) Clear revenue and relationship goals in the agricultural products e-commerce supply chain, and accurately grasp the market situation. First of all, the revenue target should be clarified. The construction of agricultural products e-commerce supply chain aims to respond to consumer demand, plan, design and control logistics and information flow, optimize information sharing between buyers and sellers, form a flexible and robust supply and demand relationship, realize profit increase or cost reduction for each member of the supply chain, and enhance consumer satisfaction. Secondly, establish the relationship objectives. Supply chain contracts and other relationships supply chain stability and the stability of the relationship of each participant, through the contract formulation to improve the overall performance of the agricultural supply chain, to create a perfect institutional environment for the construction of agricultural e-commerce supply chain. Third, deep excavation of customer value and member value, and a comprehensive grasp of the factors influencing the internal and external environment of the supply chain.

(2) Expand retail channels. In the face of this problem, it is necessary to expand retail channels with the support of cloud computing, big data and other technologies, and gradually establish an omni-channel retail supply chain system, so that agricultural products can gradually move from single sales to omni-channel and digital marketing.

(3) In order to improve the efficiency of agricultural products e-commerce supply chain, it is necessary to face customer demand, clarify its value orientation, and build key supply chain processes based on this. We should select different products and services according to the differences of customers' positioning, and then complete the optimal allocation of key factors and resources.

According to the above, a good agricultural products e-commerce supply chain is built to lay a solid foundation for the management of agricultural products e-commerce distribution channels. From the above requirements of the supply chain, the management and control of e-commerce logistics and distribution of agricultural products is carried out.

1.2 Agricultural products e-commerce logistics and distribution scheduling management

1.2.1 E-commerce logistics distribution center site selection

In terms of actual agricultural products e-commerce logistics distribution, agricultural products distribution requires high timeliness, which not only requires fast delivery of agricultural products to buyers, but also requires suppliers to pack and deliver agricultural products to logistics transfer centers as fast as possible. Therefore, this paper chooses to establish the following discrete model to select the location of agricultural products e-commerce logistics distribution center [8].

The discrete model considers the target site selection area as a collection of discrete candidate locations, and the candidate locations are the points in the collection, and these points are generally limited to few points, and the discrete model is closer to the reality from the realistic consideration. The P-median model is chosen for the location selection of agricultural products e-commerce logistics distribution center.

P-median model takes minimizing transportation cost as the goal, and the total cost includes transportation and distribution cost and other costs of distribution center. Then the objective

function of e-commerce logistics distribution center site selection is shown in the following equation [9-10].

$$\min W = \sum_{i=1}^{m}\sum_{j=1}^{n} d_{ij}q_{ij} + \sum_{j=1}^{n} Y_j H_j \quad (1)$$

In formula (1), d_{ij} represents the unit transportation cost from distribution center i to demand point j; q_{ij} represents the traffic volume from distribution center i to demand point j; Y_j represents other costs after point i is set as the distribution center; H_j is a parameter that represents whether distribution center i is selected. If distribution center is selected, it takes the value of 1; otherwise, it takes the value of 0. When selecting an e-commerce logistics distribution center, the following constraints should be met:

$$\begin{cases} \sum_{i=1}^{m} q_{ij} \ge b_j \\ \sum_{j=1}^{n} q_{ij} \le Q_i \\ q_{ij} \ge 0 \\ \sum_{j=1}^{n} H_j \le m \end{cases} \quad (2)$$

In formula (2), b_j is the quantity demanded at point j; Q_i is the capacity of distribution center i; m is the number of distribution centers to be established. After the location of the logistics distribution center is determined, the agricultural products logistics distribution scheduling plan is formulated.

1.2.2 Logistics and distribution scheduling scheme for agricultural products e-commerce

The mathematical model of dynamic agricultural product logistics distribution scheduling problem at time t was established. Two decision variables x_{ijk} and y_{ki} were defined first. When value of x_{ijk} is 1, it means that the distribution vehicle k drives from point i to point j; Otherwise, x_{ijk} is 0. When y_{ki} is 1, it means that the distribution task of point i is completed by the vehicle k. Otherwise, the value is 0.

Then the objective function of the model is as follows [11-14] :

$$MinZ = F + \sum_{i,j \in W_{upo}(t)} \sum_{k=1}^{M} c_{ij} x_{ijk} \quad (3)$$

In formula (3), Z represents the objective function of the model; F is the fixed cost of distribution vehicles; i and j represent the ith customer and the jth customer respectively; $W_{upo}(t)$ represents the collection of dynamic customers, all key customer points, static customers who have not completed the delivery service and distribution centers that have re-proposed the

requirements at time t; k represents the kth vehicle ; c_{ij} represents the shipping cost from customer point i to j.

Constraints of logistics distribution:

$$\sum_{i \in W_u(t)} q_i y_{ki} \le Q - Q_{jk}(t) \quad (4)$$
$$j \in W_{uo}(t), k = 1, 2, \cdots, M$$

Formula (2) indicates that the sum of the cargo carried by the vehicle k is not greater than the maximum load of the vehicle. $W_u(t)$ represents the dynamic customer set that proposes new requirements at the moment t and the static customer set that does not complete the delivery service; $W_{uo}(t)$ represents the distribution center, dynamic customers who propose new requirements at time t, and the collection of all static customers who have not completed the distribution service; $Q_{jk}(t)$ represents the accumulated cargo weight of the delivery vehicle after departure from the customer at time t.

After the above model is established, BOFFOA algorithm is used to solve the above model, so as to get the dispatching scheme of the distribution vehicle. BOFFOA's algorithm flow chart is shown in the figure below [15].

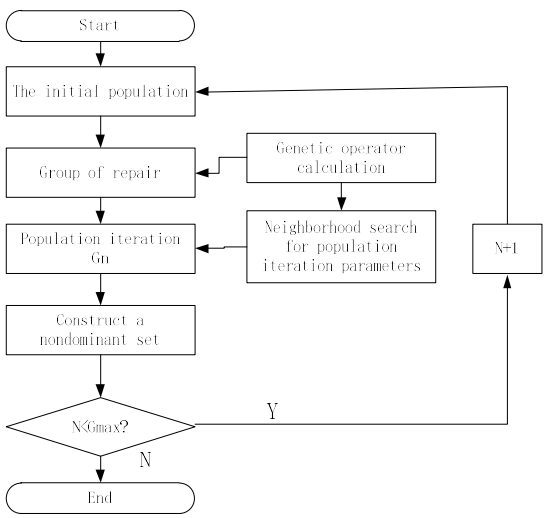

Figure 1 BOFFOA algorithm flow chart

After managing the logistics distribution scheduling of agricultural products from two aspects, namely the site selection of e-commerce logistics distribution center and the formulation of logistics distribution scheduling scheme for agricultural products, the feedback relationship between agricultural products circulation channels and the e-commerce system was analyzed, so as to improve the sales efficiency of agricultural products.

1.3 Determine the feedback relationship between agricultural product distribution channels and e-commerce system

E-commerce was created as a result of the combined effect of consumers' pursuit of convenience and producers' pursuit of profit, forcing commerce to use modern information

technology, and as an integral and organic part of commerce, commodity distribution activities are necessarily closely linked to modern information technology [16].

Because agricultural distribution e-commerce is susceptible to many disturbances in the external and internal environment, this makes the relationship between the agricultural distribution channel and the e-commerce system deviate from the original goal, and thus ensures a good feedback relationship between the agricultural products and the e-commerce system by introducing control measures to keep the goal intact. System dynamics theory clearly states that in a dynamic system, a feedback loop is a closed circuit or a closed path composed of a series of causal and interactive chains of information and actions. In the study of the feedback relationship between the agricultural distribution channel and the e-commerce system is also the case agricultural distribution channel feedback loop will have a decisive effect on the nature of the e-commerce system and the behavior of the agricultural e-commerce model. This feedback behavior is bidirectional in that it is influenced by both the historical behavior of the e-commerce system itself, feeding the results of that historical behavior back to the agricultural distribution channel itself, and then influencing future behavior through those feedback behaviors [17-18].

The underlying principle of system dynamics that constitutes a feedback loop is that in nature, cause and effect interact with each other. Therefore, the reason for creating a causal loop diagram of an agricultural distribution channel and an e-commerce system is that there are relative properties between cause and effect in this system, and the variables are interconnected. In the feedback loop of the agricultural distribution channel and e-commerce system, if a variable in this feedback system is elevated at any point in time under a time period, and this change increases further after a feedback is performed by this variable, then this feedback loop is a positive feedback loop, denoted by "+". Conversely, if the variable decreases after a feedback, then we consider this a negative feedback loop, denoted by "-". The feedback relationship between the specific agricultural distribution channel and the e-commerce system is shown in the following figure [19].

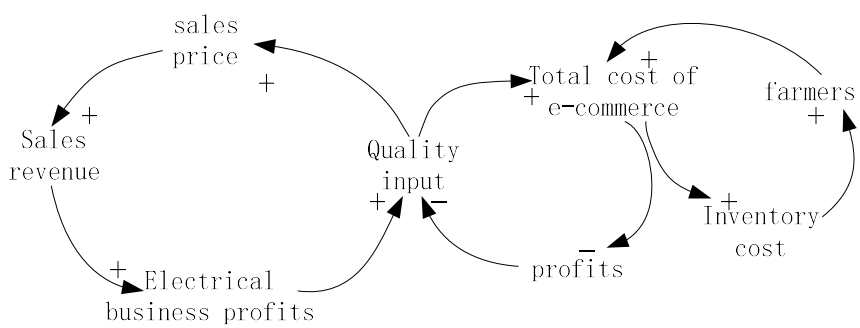

Figure 2 Agricultural products circulation channel and the feedback relations between the electricity system schematic diagram

The analysis of the above figure shows that after a positive feedback loop is a self-reinforcement of the variable, the same negative feedback loop is a self-reinforcement of the variable. With the help of this feedback loop, the feedback relationship between the agricultural distribution channel and the e-commerce system can be co-integrated to make it more stable. Through this feedback loop, it can be understood that in the overall system consisting of

agricultural products distribution channel and e-commerce system, the increase of sales revenue will lead to the increase of profit of e-commerce, which will lead to the increase of quality input of agricultural products, and then the sales price of fresh agricultural products will also increase, thus constituting a closed positive feedback loop. According to the above feedback relationship between agricultural products distribution channel and e-commerce system, the management mode of agricultural products e-commerce distribution channel is constructed by combining the other links of agricultural products distribution channel.

1.4 Complete management of electrical business circulation channels of agricultural products

Analyze the existing problems in the current agricultural products e-commerce transactions, combine the above research content, and put forward the following management measures for agricultural products e-commerce circulation channels.

1. Cooperate with multiple resources and improve network infrastructure construction. The information mechanism of agricultural products circulation with "resource integration and synergy sharing" is the guarantee of sustainable development of agriculture. First of all, the construction of agricultural network infrastructure is inseparable from the government's strong support, the government's effective guidance to ensure that the work is done systematically and orderly, so that the wisdom of agricultural distribution channels more smoothly. In the policy should be appropriate to local conditions, grasp the development trend, do a good job of special planning, the construction of information technology into the agricultural policy; for key demonstration of agricultural products Internet projects in financial subsidies, and actively guide agricultural enterprises, IT operators and other multi-funded into the construction of agricultural information technology. Secondly, the construction of specialized agricultural information technology construction and operation agencies and marketing and promotion agencies. In the construction of information technology to implement unified planning, unified management, unified standards, play a coordinating role. Agricultural products network marketing and promotion agencies are responsible for centralized procurement, technical guidance, the development of promotion plans to form a cluster effect. Again agricultural enterprises should change their business concept, innovate their business model, and increase investment and research and development of intelligent agricultural products distribution channels.

2, improve the legal system and safety supervision system construction. Agricultural products Internet marketing belongs to the new industry, the government should strengthen the system of formulating and improving relevant laws to ensure the fairness and safety of network transactions, to strictly enforce the law, and to strictly punish the unscrupulous elements who destroy the agricultural products network transactions to ensure the orderly online transactions of agricultural products. The system uses intelligent food safety monitors and barcode technology to inspect the safety and health of various agricultural products in production, processing, transportation, and on the shelves of shopping malls, and to organize and record the data and upload the results to the public service platform for food safety traceability. In this system, the safety information of agricultural products can be released centrally and uniformly through the agricultural products

logistics information platform, and carriers and consumers in various regions can grasp the origin, production date, and testing results of goods through this platform in a timely manner, and any mistake can accurately find the responsible link, so that responsibility and safety awareness can be carried through the whole fresh and live agricultural products circulation channel [20]. Once problems are found, effective control and recall can be carried out according to the traceability, so as to protect the legitimate rights and interests of consumers from the source.

3. Adhere to quality standards and create famous brands. The quality of agricultural products is related to the people's livelihood of the country, and while ensuring quality, we should strive to create famous brands, as follows: first, according to the green quality standards of agricultural products, produce green and pollution-free products, ensure the safety of agricultural products, and take quality as a hard indicator of agricultural products; second, improve the scientific and technological content of products, develop agricultural science and technology, strengthen the training of agricultural producers in the use of Internet technology, improve production efficiency, and Increase the added value of agricultural products and optimize the industrial structure; third, improve the brand awareness of agricultural producers through various ways, make standardized production into routine operation, guarantee product quality at the root, and strengthen brand protection awareness and crack down on counterfeit products.

4, Using a variety of ways to broaden the promotion channels of agricultural products. The full integration of Internet + agriculture can produce a variety of ways to broaden the promotion channels of agricultural products. The sales of agricultural products in the background of the Internet should make full use of the social media with wide influence, combine regional advantages, explore special resources, and use various modes such as Internet + mobile terminals to promote the sales of agricultural products.

Through the above measures combined with efficient logistics control of agricultural products distribution, the smooth flow of all links of the circulation channel of agricultural products e-commerce is ensured, and the interests of both farmers and consumers are effectively guaranteed. This paper effectively manages the circulation channels of agricultural products e-commerce and completes the analysis and research on the management mode of the circulation channels of agricultural products e-commerce based on the Internet.

2 Case validation study

2.1 Validation content

The above paper proposed an Internet-based management model for the distribution channel of agricultural products in e-commerce, and the distribution channel management model mentioned in literature [2] was chosen as a comparison item in this section to draw an intuitive and effective example to verify the conclusion by comparing the application of the two management models.

2.2 Data preparation and validation steps

Two e-commerce platforms A and B with close sales volume on the Internet were selected as the object of this instance validation, and the fresh agricultural products platforms of e-commerce platforms A and B were managed by applying the Internet-based agricultural products e-commerce

distribution channel management model studied in this paper and the distribution channel management model mentioned in the literature [2], respectively. Taking 6 months as the instance validation cycle, the data of three indexes, namely, the growth rate of e-commerce platform users, the operation efficiency of agricultural products e-commerce distribution channel and the growth rate of corresponding farmers' income, were counted for the two e-commerce platforms A and B. The experimental data were analyzed and processed to draw the final conclusion of this experiment.

2.3 Case verification results and analysis

During the experimental cycle, e-commerce platforms A and B apply the distribution channel management model, and the recorded experimental data are shown in the following table. Among them, e-commerce platform A applies the distribution channel management model studied in this paper, and e-commerce platform B applies the distribution channel management model mentioned in the literature [2].

Table 1 Instance validation data

Month	E-commerce platforms A			E-commerce platforms B		
	Platform user growth rate /%	Channel operational efficiency /%	Growth rate of farmers' income /%	Platform user growth rate /%	Channel operational efficiency /%	Growth rate of farmers' income /%
1	11.7	22.7	24.1	4.5	10.2	11.3
2	12.4	21.2	16.1	4.7	12.3	10.8
3	10.9	23.1	15.9	4.2	11.2	10.6
4	11.9	26.3	22.6	3.9	8.6	8.3
5	11.2	21.4	19.6	31	13.4	11.1
6	9.6	25.2	23.7	29	12.6	7.6

Analysis of the above table shows that the growth rate of platform users of e-commerce platform A is much higher than that of e-commerce platform B. Moreover, the growth rate of users of e-commerce platform B shows an obvious downward trend at a later stage. It indicates that users' satisfaction with the e-commerce platform has tended to fall. The two indicators from the channel operation efficiency and the growth rate of farmers' income also prove that consumers have a higher recognition of e-commerce platform A. Further processing the data in the above table, after applying different distribution channel management models, the channel operation efficiency of e-commerce platform A has increased by about 11.93% on average compared to that of the platform, which effectively promotes the returns of the platform to the farmers. That is, the Internet-based agricultural products e-commerce distribution channel management model studied in this paper can effectively improve the operation efficiency of the distribution channel when it is applied in practice, and can enhance the recognition of the platform by users, with better practical application effects.

3 Conclusion

The life of our residents has become inseparable from e-commerce. As a large volume business model, e-commerce not only brings convenience to residents' shopping and life, but also provides a wide sales space at the production end of commodities and effectively increases the income of suppliers at the production end of commodities. E-commerce of agricultural products is an important element of "Internet+modern agriculture", and is highly valued by governments at all levels. E-commerce is the result of the combined effect of consumers' pursuit of convenience and producers' pursuit of profit, forcing business activities to use modern information technology, and as an integral part of business activities, commodity distribution activities must also be closely related to modern information technology. This paper analyzes the management mode of agricultural e-commerce distribution channels by using the Internet, and verifies through examples that the management mode of agricultural e-commerce distribution channels studied in this paper can effectively control agricultural e-commerce distribution channels, improve farmers' income and provide better service experience for consumers.

Acknowledgement

This paper is funded by the youth core teachers Plan of Xinyang Normal University.

Reference

[1] Sehlin Helena, Hedman Ahlström Britt, Andersson Gerhard, et al. Experiences of an internet-based support and coaching model for adolescents and young adults with ADHD and autism spectrum disorder -a qualitative study.[J]. BMC psychiatry,2018,18(1) :15.

[2] Bouwsma Esther V A,Bosmans Judith E, van Dongen Johanna M, Brölmann Hans A M, et al. Cost-effectiveness of an internet-based perioperative care programme to enhance postoperative recovery in gynaecological patients: economic evaluation alongside a stepped-wedge cluster-randomised trial.[J]. BMJ open,2018,8(1) : e017782.

[3] Zarski Anna-Carlotta, Berking Matthias, Reis Dorota, et al. Turning Good Intentions Into Actions by Using the Health Action Process Approach to Predict Adherence to Internet-Based Depression Prevention: Secondary Analysis of a Randomized Controlled Trial.[J]. Journal of medical Internet research,2018,20(1) :e9.

[4] Gunther Eysenbach. Internet-Based Cognitive Behavioral Therapy for Children and Adolescents With Dental Anxiety: Open Trial[J]. Journal of Medical Internet Research,2018,20(1) :e12.

[5] Compen Félix, Bisseling Else, Schellekens Melanie, et al. Face-to-Face and Internet-Based Mindfulness-Based Cognitive Therapy Compared With Treatment as Usual in Reducing Psychological Distress in Patients With Cancer: A Multicenter Randomized Controlled Trial.[J]. Journal of clinical oncology : official journal of the American Society of Clinical Oncology,2018,36(23) :2413-2421.

[6] Mingjun Deng, Guocheng Xiang, Shuntian Yao. The Effectiveness of the Multilateral Coalition to Develop a Green Agricultural Products Market in China Based on a TU Cooperative Game Analysis[J]. Sustainability,2018,10(5) :1476.

[7] Liang Lu, Thomas Reardon. An Economic Model of the Evolution of Food Retail and Supply Chains from Traditional Shops to Supermarkets to E-Commerce[J]. American Journal of Agricultural Economics,2018,100(5) :1320-1335.
[8] Yulia W. Sullivan, Dan J. Kim. Assessing the effects of consumers' product evaluations and trust on repurchase intention in e-commerce environments[J]. International Journal of Information Management,2018,39 :199-219.
[9] Anetta Barska, Julia Wojciechowska-Solis. E-Consumers and Local Food Products: A Perspective for Developing Online Shopping for Local Goods in Poland[J]. Sustainability,2020,12(12) :4958.
[10] Joel Mero (Järvinen). The effects of two-way communication and chat service usage on consumer attitudes in the e-commerce retailing sector[J]. Electronic Markets,2018,28(2) :205-217.
[11] Stanley Frederick W.T. Lim, Jagjit Singh Srai. Examining the anatomy of last-mile distribution in e-commerce omnichannel retailing[J]. International Journal of Operations & Production Management,2018,38(9) :1735-1764.
[12] Vincent E. Castillo, John E. Bell, William J. Rose, et al. Crowdsourcing Last Mile Delivery: Strategic Implications and Future Research Directions[J]. Journal of Business Logistics,2018,39(1) :7-25.
[13] Yingyan Zhao, Yihong Zhou, Wu Deng. Innovation Mode and Optimization Strategy of B2C E-Commerce Logistics Distribution under Big Data[J]. Sustainability,2020,12(8) :3381.
[14] Khadijah N , Abidin S Z , Zandi G , et al. E-Commerce Logistic and Supply Chain Management: Evidence from Indonesian Perspectives[J]. Journal of Supply Chain Management, 2018, 7(6):2051-3771.
[15] Punit Ahluwalia, Mohammad I. Merhi. Understanding Country Level Adoption of E-Commerce: A Theoretical Model Including Technological, Institutional, and Cultural Factors[J]. Journal of Global Information Management (JGIM),2020,28(1): :1-22.
[16] Ruilin Zhu, Aashish Srivastava, Juliana Sutanto. Privacy-deprived e-commerce: the efficacy of consumer privacy policies on China's e-commerce websites from a legal perspective[J]. Information Technology & People,2020,33(6) :1601-1626.
[17] Paté-Cornell M-Elisabeth, Kuypers Marshall, Smith Matthew, et al. Cyber Risk Management for Critical Infrastructure: A Risk Analysis Model and Three Case Studies.[J]. Risk analysis : an official publication of the Society for Risk Analysis,2018,38(2) :226-241.
[18] E. A. Shikhov, G. F. Romashkina. Data Analysis Model for Comprehensive Management of the Production Process and Economic Performance of a Metallurgical Company[J]. Metallurgist,2018,62(1-2) :10-14.
[19] Sridhar Parupalli, K. Padma Kumari, Sreedhar Ganapuram. Assessment and planning for integrated river basin management using remote sensing, SWAT model and morphometric analysis (case study: Kaddam river basin, India)[J]. Geocarto International,2019,34(12) :1332-1362.

[20] Limakatso Lebina, Olufunke Alaba, Mary Kawonga, et al. Process evaluation of fidelity and costs of implementing the Integrated Chronic Disease Management model in South Africa: mixed methods study protocol[J]. BMJ Open,2019,9(6) :e029277.