

Factors affecting blockchain technology in routing-location of combined transportation in the Omnichannel distribution system

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Abstract

The aim of the present study is to determine the factors affecting blockchain technology in routing-location of combined transportation of the Channel Security Distribution System. The research method is applicable according to its purpose, and its method is qualitative, and of meta-synthesis type. By using a systematic review and meta-synthesis approach, the results and findings of previous researchers were analyzed and the effective factors were identified by performing the 7 steps of the Sandelowski and Barroso method. Out of 580 articles, 79 articles were selected based on the CASP method. In this context, in order to measure reliability and quality control, the transcript method was used; and its value was identified at the high agreement level for the identified indicators. Based on the coding performed in the ATLAS TI software, 8 categories and 51 primary codes were identified. The identified categories are: electronic network management, route management, environmental factors, transparency, trust management, technical infrastructure, information standardization and business intelligence; therefore, by combining these 8 criteria, all of which have specific resources and recurrence, it is possible to optimize transportation routing-location by combining blockchain and omnichannel distribution. The results show that today's companies communicate and interact with each other in a dynamic market that is undergoing fundamental change and transformation, which is created by the increasing speed at which digitalization and technological advances are advancing.

Keywords:

Blockchain technology,
Routing and location,
omnichannel distribution,
Smart management

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Extended Abstract

Introduction

Today, supply chains are experiencing intense competition due to increasing supply and decreasing demand (Awan et al, 2022). Each supply chain tries to attract more customers and increase its sales profits by creating a competitive advantage and reducing costs, which leads to a decrease in the final price. One of the important and significant issues in industries is transportation cost, which accounts for 30% of the total cost of a product (Gao et al, 2022). Considering this share, with a small reduction in transportation cost, the profit from product sales will increase significantly. Accordingly, many companies are seeking to improve their transportation systems (Abdulkader et al, 2018). In the supply chain, the distribution of a research product plays a key role to achieving higher profitability, because it has a direct impact on supplier costs and customer experiences (Cheng et al, 2021). As a result, companies in the same industry often use different distribution networks; one of the most widely used and useful distribution networks is cross-warehouse (Jin et al, 2020). Cross-warehouse is more applicable to supply chains that have many components, including suppliers and retailers. One of the issues involved in reducing transportation costs is research in the field of vehicle routing. In routing, vehicles seek the path that has the lowest cost while respecting all constraints (Dong et al, 2021).

The process of retail digitization has had a huge impact on the distribution and retail sectors of the supply chain, and has changed the structure of retail (Xu & Li, 2021). Although online commerce is expanding and mobile devices are playing an increasingly important role; physical stores still remain a key retail space. Customers with access to digital tools have more information and power to make their purchases; this describes the omnichannel shopper (Nilsson & Linn, 2019). The omnichannel shopper is always connected to the Internet through communication devices such as mobile phones or computers, and is aware of market changes and new products, finds the best deal and expects to receive each purchase at the desired time and place. The omnichannel approach is the logical evolutionary step after the multichannel approach and includes all shopping paths (Lazrag et al, 2020). In this approach, the consumer experience is the same in each channel and switching from one channel to another will not result in receiving new or different information. This coordination in the presentation of information makes omnichannel more sophisticated than the traditional multichannel approach. Omnichannel retailing has activated many businesses and given them the ability to capitalize on new opportunities. There are many different sales channels in the business process, but the term omni suggests that customers can shop through all channels and all information about the shopping process is ideally available in real time across all channels (Liu et al, 2021).

Therefore, this research seeks to answer the question: what is the trend of the effectiveness of blockchain technology for integrating hybrid transportation routing-location in an omnichannel distribution system?

Theoretical Framework

Omnichannel

Omnichannel marketing is an approach that provides customers with a fully integrated and seamless shopping experience from the point of contact to the end of the purchase process. This means that each channel works in conjunction with other channels to create a single message to introduce the brand or company (Maharjan & Honaoka, 2018).

Blockchain

Blockchain is an extended data structure that is replicated and shared among members of a network. Blockchain can allow individuals and companies to conduct instant transactions without any intermediaries in a network (Hu et al, 2019).

Impact of Blockchain on Omnichannel

By implementing blockchain technology, all partners involved in the network (e.g. retailers and customers) share the same verified information, which allows for the optimization of the omnichannel strategy and eliminates the need for trust and transparency among omnichannel parties. In fact, blockchain can be useful for implementing successful multi-channel strategies when supported by other digital technologies. Therefore, blockchain is becoming a very popular platform in digital technologies adopted by supply chains, while the associated competitive advantages clearly decrease with its maturity (Davis et al, 2020).

Valafar et al, (2023) investigated the identification of antecedents of blockchain-based digital marketing development from the perspective of marketing professionals in the aviation industry. The results of this study provide useful insights to managers and decision makers in the aviation industry so that they can strengthen and develop digital marketing in airlines by recognizing these factors.

Awan et al, (2022) investigated blockchain-based secure routing and trust management in wireless sensor networks and showed that the efficiency of the proposed model in terms of packet delivery ratio was high in simulation results.

Research Methodology

The research method is applicable in terms of its purpose, and its method is qualitative and meta-synthesis. By using a systematic review and meta-synthesis approach, the results and findings of previous researchers were analyzed and the effective factors were identified by performing the 7 steps of the Sandelowski and Barroso method.

Research Findings

Out of 580 articles, 79 articles were selected based on the CASP method. In this context, in order to measure reliability and quality control, the transcript method was used, the value of which was identified for the identified indicators at the excellent agreement level. Based on the coding performed in the ATLAS TI software, 8 categories and 51 initial codes were identified. The identified categories are: electronic network management, path management, environmental factors, transparency, trust management, technical infrastructure, information standardization and business information; Therefore, by combining these 8 criteria, all of which have specific sources and recurrences, it is possible to optimize transportation routing-location by combining blockchain and omnichannel distribution. The results show that today's companies communicate and interact with each other in a dynamic market that is undergoing fundamental change and transformation, which is created by the increasing speed at which digitalization and technological advancements are progressing.

Conclusion

The present study aimed to investigate the factors affecting blockchain technology in transportation routing-location of a combined omnichannel distribution system. The results of this study are consistent with the results of Valafar et al, (2023), Awan et al, (2022), GAO et al, (2022), Bhatia et al, (2020), Naclerio (2020), Bai & Sarkis (2019), Arias et al, (2018), Christopher (2016), Miller & Liberatore (2015), and De Giovanni (2019). Naclerio (2020) also showed that today's companies communicate and interact with each other in a dynamic market that is undergoing fundamental change and transformation, which is created by the

increasing speed at which digitalization and technological advances are advancing; Therefore, by combining these 8 criteria, all of which have specific sources and repetitions, it is possible to optimize transportation routing-location by combining blockchain and omnichannel distribution.

According to the research results, the following suggestions were made:

It is suggested that transportation companies increase their readiness to adopt blockchain and omnichannel. This readiness will be possible through the development of partnerships, identification of players and increased interaction with them, monitoring technology and events in the global community for companies and similar fields, flexibility and adaptability in terms of law, regulation and structural adjustment, as well as increasing operational efficiency and identifying and cultivating talented and relevant talents.