



Original article

Blockchain - an indispensable development trend of logistics industry in Vietnam: Current situation and recommended solutions

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Abstract

Vietnam is located in the centre of Asia - Pacific, on international maritime routes. With a long coastline of about 3260 km stretching from North to South, Vietnam has many favourable conditions to bring import and export goods to the world. Not only its production, but Vietnam is also an ideal place to conduct transshipment activities such as transit, border-gate transfer, and temporary import for re-export. Vietnam is a country with favourable natural conditions and geographical location to develop logistics services. Along with the process of opening and integration, the volume of goods produced, domestically circulated and exported and imported in recent years has grown strongly, which is the premise and driving force for the development of logistics services. Logistics is becoming an essential service industry of international trade activities and attracts extraordinary attention to the economic community. The role of science and technology in development has been widely accepted. In today's increasingly competitive international environment, technology is a vital strategic element for rapid socio-economic development. Thanks to technological innovation, businesses have many opportunities to improve productivity, product quality, as well as to improve the ability in designing new production lines, new products and improving the efficiency in business management and operation. In order to survive and develop sustainably, all countries have preferential policies to encourage businesses to innovate technology. Moreover, businesses also recognize the need for technological innovation to keep pace with the world's development trend; this is the experience gained from countries with developed economies. This paper presents some issues on trends and applications of information technology, blockchain technology in the field of supply chain management and logistics to improve the competitiveness and develop logistics services of Vietnam. On that basis, the article also proposes several recommendations to support businesses in innovation and technology application in managing and operating this critical economic sector.

Keywords: Vietnam, logistics, supply chain, blockchain, development trend

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1. Introduction

In the world economic development, especially in the era of Industry 4.0, information is very important. However, the issue of confidentiality and information asymmetry are currently issues of particular concern. The transparency in information creates trust for stakeholders when participating in transactions, and is also the basis for promoting the economic growth. Blockchain emerges as a phenomenon of technology, with the promises it offers as a data storage facility like the accounting ledger that records the business arose. However, this data is guaranteed to be safe, users cannot change it, so transaction information is confidential. Transactions occur without the need for an intermediary. The use of multiple ciphers, the information inserted above the block chains, provides exclusivity behind all interactions within the blockchain network (Christidis & Devetsikiotis, 2016). Blockchain with smart contracts brings many advantages to traditional transactions, but there are still many disadvantages. Therefore, analyzing the characteristics of blockchain and its advantages and existence will be of great help to bring blockchain into the development of many fields such as banking and finance, accounting, auditing, logistics, ...

In the logistics field alone, what happens when using blockchain, which means eliminating third parties in transactions? And what happens if transactions can be verified, recorded and coordinated without a third party? If this is done, it will eliminate the complexity of the global supply chain. And this is the promise of blockchain to the logistics industry (DHL, 2018). Blockchain is an emerging technology, so it still takes time to prove its true effectiveness. But its early applications in a number of areas such as finance, retail, etc shows that blockchain has a chance to achieve great growth in the future. Meanwhile, the business model will be streamlined, faster, traceable, transparent in the supply chain and increase the automation of the commercial processes of logistics.

With an important role in international trade, logistics activities face many opportunities for transformation as well as challenges in the industrial revolution 4.0. The current situation when there is a risk of overloading in documents of trading documents when goods go through hundreds of seaports before reaching the request, the need for information transparency in transactions and

information. In terms of goods, many stages of the logistics value chain are bound to manual processes due to regulatory requirements, companies must often rely on data entry guidelines and documents to comply with customs procedures. This makes tracking the origin of the goods and the status of the shipment difficult. All of the above for this area need an inevitable change. Therefore, with the positive effects that blockchain brings, logistics industry expects to have a big breakthrough in the near future.

Logistics is considered the lifeblood of the modern world, with about 90% of world trade being carried out by the international transport industry each year. Today, global logistics still involves a lot of paperwork, so it costs time and money. This long distance transportation process involves a lot of paperwork linked together. Additionally, Bill of Lading documents are at risk of being lost, fraudulent and fraudulent (Popper & Lohr, 2017). Blockchain can help reduce a lot of interaction in global commercial logistics, including transport management, trace and finance. Specifically, blockchain can help optimize costs and time associated with commercial documents and administrative management of shipments.

The world's largest shipping company Maersk in 2014 realized that transporting a cold shipment from East Africa to Europe could reach nearly 30 people and organizations, including more than 200 different sculptures and contact information between them. To improve the efficiency of ocean shipping, Maersk and IBM have started a joint venture to establish a global blockchain system to digitize business workflows and track shipments. The system allows stakeholders in the supply chain to look at the process of goods in the chain, knowing where the goods are being transported. Stakeholders can see the status of customs documents, can see the waybill and other data. Blockchain helps ensure the safety of fake data and archives for these documents (DHL, 2018).

Accenture - a technology consulting and service provider, one of the largest consulting companies in the world, is developing a blockchain system focused on replacing traditional logistics. Here, a network connects all parties in the supply chain and allows direct transactions, eliminating the need to rely on intermediaries. And the result of this will drive down

costs in the supply chain to stakeholders, including shippers, consignees, carriers, freight forwarders, ports, customs, banks and insurance companies.

In 2017, Walmart, IBM and Tsinghua University (China) piloted the use of blockchain to track food items, including pork in China and mangoes in the US, as they move through the supply chain to store on shelves. Walmart testing shows that applying blockchain reduces the time it takes to track a mango package from the farm to the store from day or week to two seconds. Walmart, together with partners, has tested on-site testing to identify and correct improper food storage during the farm-to-store process. The sensors are attached to the product and Walmart commits that this data is based on blockchain. Bridget van Kralingen, senior vice president of IBM, said that Blockchain holds the incredible promise of providing the transparency needed to help promote food safety across the supply chain. This is a basic reason that IBM strongly believes in the impact of this technology on business models. And by expanding IBM food safety with Walmart and China's Tsinghua University and adding new contributors like JD.com. This technology provides traceability and transparency to a wider network of food supply chain participants.

One of the first companies to apply smart contracts in logistics is ShipChain. ShipChain establishes a tracking system across the entire supply chain, from the moment the goods leave the factory, field or farm for complete distribution to customers. Shipchain agrees to track shipments on the Ethereum blockchain, using smart contracts. The ShipChain contract made on Ethereum can be used by anyone to set up a shipping margin. Once the shipment is completed and confirmed, the contract is stored on the main blockchain. ShipChain will primarily be an open market, where shippers and carriers can connect and conduct business more efficiently and with greater transparency. However, there will also be a ShipChain web platform, which allows booking and managing shipments using a variety of carriers and modes of transport (Liao & Wang, 2018).

With the promises that blockchain brings, with an ambition to develop the economy, it has become a push for many fields, including logistics. We hope to unlock this concept to get an overview of blockchain as well as its application in the economy and society in general and logistics in particular in Vietnam. The article will discuss

the advantages and disadvantages in the field of supply chain & logistics in Vietnam. Also, the authors discussed the difficulties and shortcomings of the current supply chain and logistics management methods and technologies. At the same time, the paper presents blockchain technology and its application in logistics and supply chain. Some software and specific application cases are presented in this article. Next, the article would suggest some recommendations.

2. Literature and methodology

2.1. Concept of blockchain

Blockchain can be defined as a distributed ledger technology that can securely and permanently record transactions between parties. By "sharing" the database between multiple parties, the blockchain eliminates the verification of trusted transactions from intermediaries (such as transactions via banks) and records it. By facilitating movement from a centralized point to a distributed system, the blockchain effectively frees up data that was previously kept in secure data warehouses (Tasatanattakool & Techapanupreeda, 2018). The blockchain is basically a distributed database of public records or ledgers of all transactions or digital events that have been made and shared between the participants. Each transaction in the public ledger is verified by the consent of the majority of participants in the system. In addition, once entered, information can never be deleted (Pilkington, 2016).

2.2. Operation of blockchain

Blockchain technology uses public key encryption and hash function to ensure the transparency, integrity and privacy of data. Use each node on the network as a client and also as a server to store application copies; and apply rules to nodes participating in the system must comply with the rules of consensus (SimplyExplained, 2017), (IBM, 2018). It is essentially block chains linked together as a linked list but can be retrieved from the last (present) block to the first block. It is really like a distributed ledger where each transaction (called a block) in a book consists of the information stored as Figure 1.



Figure 1. The structure of a blockchain (Iansiti & Lakhani, 2017)

2.3. Types of blockchain

Types of blockchain can be divided into three categories according to the principle of data read and write rights and participate in the system: Public; Private; and Permissioned / Consortium. With the public type, anyone can read and write data on the blockchain, for example, Bitcoin, Ethereum, etc. With the Private type, users only have read access to write data to the blockchain, only a trusted third party can write, such as Ripple. The Permissioned type adds a third-party combination when participating in public or private, such as banks or joint venture financial institutions using their own blockchain (SimplyExplained, 2017).

2.4. Main characteristics of blockchain

It is impossible to fake and cannot destroy blockchain chains: In theory, only digital computers can decode blockchain and blockchain technology disappears when there is no Internet on the globe. Immutable: Data in the blockchain cannot be edited (it can be repaired but it will leave a trace) and will be stored forever. Confidentiality: Information and data in blockchain are distributed and absolutely safe. Transparency: Anyone can track blockchain data going from one address to another and can statistics the entire history on that address.

Smart contracts: are digital contracts embedded in if-then-that (IFTTT) code, allowing them to execute without third parties. Specifically, the smart contract is

actually just a small process stored in a blockchain, this contract is made for supporters (supporters) to transfer money to the project team to create the product they expect. They will transfer money to the project via smart contracts and this contract automatically transfers money to the implementers. When the project reaches its destination, the money is automatically transferred back to the supporters. Smart contracts can also be used to automatically provide loans to customers of banks, in the process of making requests from insurance companies or distribution and payment companies. In this case, Ethereum is a special system created and designed for smart contract support on the Solidity programming language (SimplyExplained, 2017). Smart contracts are a protocol to adjust contracts. Smart contracts are special protocols for contributing, verifying, or negotiating or executing a contract. Smart contracts allow for reliable transactions without third parties. These transactions are trackable and cannot be reversed. Smart contracts contain all information about the contract terms and perform all expected actions automatically (Püttgen, Kaulartz, Claudia Willmer M Kaulartz, Püttgen, & Kaulartz, 2017).

3. Situation and context of supply chain and logistics sector in Vietnam

3.1. Opportunities and challenges supply chain and

logistics in Vietnam

According to the Vietnam Logistics Report 2018 of the Ministry of Industry and Trade, the macro-economic environment has improved with the excellent growth of production activities, transport infrastructure, especially highways. With efforts to reform administrative procedures, trade facilitation created favourable conditions for Vietnam's logistics sector to make more positive changes in 2018 (Banomyong, Thai, & Yuen, 2015). The volume of goods transport and circulation has increased, the revenue of logistics enterprises has improved, and the Vietnamese logistics market is becoming more attractive to foreign investors. FDI in this sector in the first 6 months has surpassed the figure of the whole of 2018 and an average of 5 years ago (Hiratsuka, 2006).

As of early 2019, Vietnam has about 3100 enterprises operating in the field of logistics. Logistics enterprises can be divided into 03 main groups (Khan, 2019):

(1) The first group is foreign-invested enterprises, including multinational corporations with established names. The field of activity focuses on shipping, aviation, integrated logistics services, high quality. The customers of these enterprises are foreign-invested production and trade enterprises operating in Vietnam and several domestic enterprises. These customers are very aware of logistics needs and need to use logistics services package;

(2) The second group is enterprises that are owned or equitized by the State, and the State also owns a part of the capital, operating in domestic forwarding and transportation. This group serves a variety of customer segments and primarily has strengths specialized in each segment;

(3) The third group is private, joint-stock companies. These enterprises have not been born long; their scale and capital are small but very active and have high growth rates. Operating mainly in the field of forwarding, warehousing, domestic transportation and providing some specific logistics services.

However, compared with the needs and market size, Vietnam's logistics enterprises are not large, small scale of capital, operating areas mainly in the country, the services provided are monotonous, the quality of translation low crop, low value-added, the management model and technology are rudimentary, ineffective, lack

of linkage - these are outstanding weaknesses of Vietnamese enterprises (Liu, Yuan, Hafeez, & Yuan, 2018).

Regarding the technological lag, most Vietnamese logistics enterprises are private or small and medium-sized enterprises, with small scale and capital (Kampan, 2017). Meanwhile, technology products, software in the field of management of foreign logistics enterprises often have very high costs. For example, the average to deploy SAP enterprise management software requires a minimum investment of 100 thousand USD (Streitz, Barnert, Kienegger, & Krcmar, 2018). Therefore, investment in technological innovation applied to the management and operation of logistics enterprises in Vietnam is generally limited. This has led to inefficient business activities and market development, making it difficult to compete with foreign businesses (Barai, Le, & Nguyen, 2017).

Regarding the lack of connectivity, in recent years, Vietnam's logistics enterprises have not found a familiar voice with import-export enterprises. Therefore, there is no close cooperation and coordination; import and export enterprises lack trust and want to share with Vietnamese logistics businesses (Yoon & Doan, 2018). The lack of connectivity is even evident among logistics service businesses. Therefore, 4PL logistics has not been formed yet (Mehmann & Teuteberg, 2016). There are integrated logistics service providers that use the services of individual businesses to create a typical service that closes most stages of the supply chain.

According to the Vietnam Association of Logistics Services Enterprises (VLA), Vietnam's total logistics expense in 2016 was 40.3 billion USD, equivalent to 20% of GDP (Tran & Luc, 2018). The revenue of the top 100 logistics companies in Vietnam in 2016 was 8.74 billion USD; the growth rate reached 15.6% (Thai, Yeo, & Pak, 2016). Besides, high transport costs are also a factor affecting domestic logistics costs. This cost is accounting for 30% -40% of the product cost, while this rate is only about 15% in other countries (Limbourg, Giang, & Cools, 2016). This has led many domestic import and export enterprises to bear high costs, reducing the competitiveness of Vietnamese goods on the international market. Logistics enterprises also grow slowly and difficult to reach out to the international market. Another cost that, according to VLA's Chairman

is very wasteful, is the cost of interdisciplinary testing (Bakker et al., 2017). Each year, businesses have to spend 28.6 million working days at the cost of 14,300 billion VND to inspect goods. In particular, the proportion of goods that go through the inspection procedure 2-3 times accounts for 58% (Banomyong et al., 2015).

This situation is also mentioned by the Country Director of the World Bank in Vietnam at Vietnam Logistics Forum 2017: Vietnam is emerging as a global industrial production center, attracting about 35 billion USD of registered capital in 2017 (Tran & Luc, 2018). The proportion of trade turnover to GDP is more than 170%, and the average export growth is 15%, 5 times the global trade growth. However, Vietnam is also among the countries with expensive freight rates compared to the region and the world. Logistics transportation cost as a proportion of GDP is about 18-20%, nearly double that of developed economies and 4% higher than the global average (Nguyen, 2016).

3.2. Difficulties in supply chain management and logistics

Supply chain management and logistics - from production to distribution to end users - are becoming increasingly complex. In the past, supply chain management was often quite simple because trade was often local in each country (Springer, 2018). However, since policies of globalizing the economy and manufacturing industry, the situation of international trade has changed a lot. In order to produce products, factories located in some countries (China, India, Vietnam ...) must import components and raw materials from suppliers from other countries, after production, the products are re-distributed to consumers around the globe (Guo, Shen, Choi, & Jung, 2017). As a result, supply chain management has become complicated and confusing.

Depending on the type of product, the supply chain can take up to hundreds of steps, across different geographical locations and countries, multiple payment steps and other types of invoices, documents and customs documents (Gligor, Tan, & Nguyen, 2018). Primarily responsible for many different organizations and individuals, so the supply chain management process can be extended to months. Specifically, payments between suppliers and manufacturers, or

between customers and distributors, can take days.

Contracts must be passed and handled by lawyers and banks, which leads to an increase in costs and a delay in contract performance and delivery of products to customers. Moreover, products and components are often difficult to trace, which makes it difficult to detect and eliminate counterfeit and fraudulent goods (Jahn, Kersten, & Ringle, 2018). Regardless of the type of goods from industrial equipment, consumer goods, food products or digital electronics, supply chain management is becoming a problem, and affects agencies (customs, taxes, banks,...) and businesses that produce supply, distribute and consumers.

Conflict in the supply chain is a complex and challenging problem. Because there is so much of each solidarity relationship, there is a lack of transparency in the current supply chains (Dallasega, Rauch, & Linder, 2018). Suppliers, manufacturers, distributors, and customers will have to exchange and negotiate with each other with a third-party intermediary, instead of directly exchanging and negotiating with each other. As a result, simple transactions have led to many procedures with many different processes and steps, which is a waste of time and resources (da Silva, Kovaleski, & Pagani, 2018).

5. Solutions to enhance the role of blockchain in Vietnam's logistics industry

5.1. Raise awareness of blockchain for communities and businesses, building a collaborative society

Due to the characteristics of the logistics industry, with the expected benefits of blockchain, most especially it is increasing transparency for the supply chain, reducing the time costs for a large volume of paperwork and shipping stages. Blockchain makes logistics operations faster and more streamlined, blockchain businesses need a roadmap to apply this very useful and practical technology solution. According to general judgment of many analysts, blockchain is very suitable for application in the field of logistics. Especially the smart contract, improve the efficiency and quickly for the contract of delivery of goods in international trade. In the rapid development of science and technology, especially in the era of industrial revolution 4.0, many blockchain systems will appear. The consequences of this lead to

the difficulty of the blockchain. Many teams will set up separate blockchains, aiming to increase market share and profitability. This is detrimental to blockchain application in logistics, when there is a lack of unity of individual blockchain chains.

When stakeholders participate in the blockchain ecosystem, they need to understand the relationship between their business value and the technical feasibility of blockchain. When understanding the benefits that blockchain brings to work together, these parties will promote the effectiveness of blockchain. Besides, the increase of cooperation of the business itself with many parties, including the state, partners, agencies, even competitors. Although the cooperation between competitors may not seem common or difficult to understand for many people, when they try to build a common blockchain platform.

In order to use a single blockchain solution, it creates more value for them and businesses need to improve their solid blockchain knowledge. Specifically, they need to have a firm grasp of the blockchain's operations to apply in accordance with the actual conditions of their business. Through this, they find a reasonable business model. From the current situation, Vietnamese importers and exporters prefer to buy CIF prices, sell FOB prices, it is necessary to have the cooperation of importers and exporters with logistics enterprises to switch to the trend of importing goods according to FOB form; Exporting goods in the form of CIF means that importers and exporters will be responsible for transporting goods, which is creating opportunities for the development of logistics industry.

5.2. Prepare technology and infrastructure for logistics businesses

Automation of processes and data digitization are the initial basis for businesses to start applying smart contracts, transparency of management processes, information security, ...using blockchain in your own business. In addition, improving the capacity of connecting infrastructure for logistics enterprises is also a feasible solution. When the processing speed in the blockchain system is improved, it will increase the efficiency of work processing. The characteristics of logistics activities with many stages of processing, delays in network systems and connecting businesses take a lot of time and cost more for businesses.

The main cost is the burden of logistics businesses. And in order to improve the competitiveness of Vietnam's logistics before it is left behind compared to foreign logistics enterprises, the first problem is to cut costs. And upgrading infrastructure to best apply blockchain technology is a promising solution for logistics businesses. If the infrastructure is not guaranteed, it will prolong the run time of the data, resulting in a bounced back effect.

Recently, several Vietnam's technology startups such as TomoChain5, Kambaria, Kyber Network ... have built effective blockchain platforms, and create a brand and high reputation and attract the great attention and investment of the blockchain community worldwide. Therefore, this is an excellent opportunity for Vietnam to take the lead in technology and develop ahead in the application of blockchain for supply chain and logistics, in order to reduce costs and improve operational efficiency, helping Vietnamese logistics businesses compete with foreign businesses. The article would like to propose some recommendations on supporting technological innovation as follows:

Firstly, support both in terms of policies and resources to research and develop software and information systems for supply chain and logistics based on new technologies such as blockchain technology, image recognition, and processing technology, artificial intelligence, Internet of Things.

Secondly, building an ecosystem to increase the closer connection between logistics enterprises or between logistics and technology businesses is very necessary. The formation of more 4PL logistics businesses is to have integrated logistics service providers. Use the services of individual businesses to create a typical service, which closes most stages of the supply chain, can compete with businesses in the region and internationally.

5.3. Building processes and policies for the application of blockchain technology

With the current technology trend and the strong support of the World Bank, blockchain is the technology of the future that all countries need to approach and have appropriate policies and right shift over time. Great new technology. Customs is the most important agency when technology is implemented, especially in the field of logistic cross-border countries. While large enterprises

in the world have been deploying models on cloud computing and blockchain; In Vietnam, it is still a new field, there are no policies and procedures for businesses that want to take the lead in this field.

To apply the blockchain, the interest, research and long-term investment solutions of the state are the driving factors for blockchain to promote its strengths. Specifically, the state needs to pay attention to reducing procedures, putting procedures on the blockchain system, helping businesses save time and costs. In addition, the construction of dedicated goods and service delivery centers also helps reduce the burden of procedures and costs for businesses.

6. Conclusion

Science-technology is the top national policy, the most important driving force for the development of productive forces. Striving to 2030, Vietnam's science and technology will reach the level of development of the group of leading ASEAN countries, and there are some advanced professions in the world. It is necessary to prioritize and focus investment one step ahead for technological innovation, and at the same time actively and synchronously renovate scientific and technological management mechanisms, especially the financial mechanism to accelerate the technological innovation of enterprises, applying scientific and technological advances in production and business.

In the turbulent flow of the 4.0 industrial revolution, blockchain has become a prominent technological trend and is expected to have many positive impacts on many socio-economic fields. In international trade, the influence of logistics is very large and convenient as well as the challenge that the industry faces is the problem that businesses in the industry need to consider to develop solutions. And blockchain is a potential breakthrough for this field. In particular, in Vietnam, with the prediction of many experts, which will become the destination of blockchain in the future, the applications of blockchain in logistics will have the opportunity to take the industry to develop at a new level. Based on the study of blockchain and its practical applications, the author has proposed a number of solutions to enhance the role of blockchain in Vietnam's logistics sector. The article also opens up new directions for researchers to assess the impact of

blockchain and the next directions of blockchain in many other fields.

References

- Bakker, S., Dematera Contreras, K., Kappiantari, M., Tuan, N., Guillen, M., Gunthawong, G., ... Van Maarseveen, M. (2017). Low-carbon transport policy in four ASEAN countries: Developments in Indonesia, the Philippines, Thailand and Vietnam. *Sustainability*, 9(7), 1217.
- Banomyong, R., Thai, V. V., & Yuen, K. F. (2015). Assessing the national logistics system of Vietnam. *The Asian Journal of Shipping and Logistics*, 31(1), 21–58.
- Barai, M. K., Le, T. A. L., & Nguyen, N. H. (2017). Vietnam: achievements and challenges for emerging as a FTA hub. *Transnational Corporations Review*, 9(2), 51–65.
- Christidis, K., & Devetsikiotis, M. (2016). Blockchains and Smart Contracts for the Internet of Things. *IEEE Access*.
<https://doi.org/10.1109/ACCESS.2016.2566339>
- da Silva, V. L., Kovaleski, J. L., & Pagani, R. N. (2018). Technology transfer in the supply chain oriented to industry 4.0: a literature review. *Technology Analysis & Strategic Management*, 1–17.
- Dallasega, P., Rauch, E., & Linder, C. (2018). Industry 4.0 as an enabler of proximity for construction supply chains: A systematic literature review. *Computers in Industry*, 99, 205–225.
- DHL. (2018). Blockchain in logistics. *DHL Customer Solutions & Innovation*.
- Gligor, D., Tan, A., & Nguyen, T. N. T. (2018). The obstacles to cold chain implementation in developing countries: insights from Vietnam. *The International Journal of Logistics Management*, 29(3), 942–958.
- Guo, S., Shen, B., Choi, T.-M., & Jung, S. (2017). A review on supply chain contracts in reverse logistics: Supply chain structures and channel leaderships. *Journal of Cleaner Production*, 144, 387–402.
- Hiratsuka, D. (2006). Outward FDI from and Intra-regional FDI in ASEAN: Trends and Drivers.
- Iansiti, M., & Lakhani, K. R. (2017). The truth about blockchain. *Harvard Business Review*.
- IBM. (2018). IBM Blockchain. *Www.Ibm.Com/Blockchain*.
<https://doi.org/10.1093/gbe/evr129>
- Jahn, C., Kersten, W., & Ringle, C. M. (2018). Logistics 4.0 and sustainable supply chain management: innovative solutions for logistics and sustainable supply chain management in the context of industry

- 4.0. In *Hamburg International Conference of Logistics (HICL) 2018*. epubli.
- Kampan, P. (2017). Strategic development of ASEAN logistics infrastructure. *The Open Transportation Journal*, 11(1).
- Khan, S. A. R. (2019). The nexus between carbon emissions, poverty, economic growth, and logistics operations-empirical evidence from Southeast Asian countries. *Environmental Science and Pollution Research*, 26(13), 13210–13220.
- Liao, D. Y., & Wang, X. (2018). Applications of blockchain technology to logistics management in integrated casinos and entertainment. *Informatics*. <https://doi.org/10.3390/informatics5040044>
- Limbourg, S., Giang, H. T. Q., & Cools, M. (2016). Logistics service quality: the case of Da Nang city. *Procedia Engineering*, 142, 124–130.
- Liu, J., Yuan, C., Hafeez, M., & Yuan, Q. (2018). The relationship between environment and logistics performance: evidence from Asian countries. *Journal of Cleaner Production*, 204, 282–291.
- Mehmann, J., & Teuteberg, F. (2016). Process reengineering by using the 4PL approach: A case study on transportation processing in the agricultural bulk logistics sector. *Business Process Management Journal*, 22(4), 879–902.
- Nguyen, T. T. (2016). An Investigation of the Vietnamese Shipping Industry and Policy Recommendations for Profound Participation into ASEAN Integration. *The Asian Journal of Shipping and Logistics*, 32(2), 81–88.
- Pilkington, M. (2016). Blockchain technology: Principles and applications. In *Research Handbooks on Digital Transformations*. <https://doi.org/10.4337/9781784717766.00019>
- Popper, N., & Lohr, S. (2017). Blockchain: A Better Way to Track Pork Chops, Bonds, Bad Peanut Butter? - The New York Times. *The New York Times*.
- Püttgen, F., Kaulartz, M., Claudia Willmer M Kaulartz, jur B., Püttgen, F., & Kaulartz, M. (2017). Versicherung 4.0 The use of blockchain technology and of Smart Contracts in the Insurance Sector. *ERA Forum*. <https://doi.org/10.1007/s12027-017-0479-y>
- SimplyExplained. (2017). How does a blockchain work - Simply Explained.
- Springer, C. (2018). Assessing energy intensity and retrofit opportunities for the aluminum industry: Lessons from Vietnam. *Resources, Conservation and Recycling*, 131, 235–246.
- Streitz, A., Barnert, M., Kienegger, H., & Krcmar, H. (2018). Performance Improvement Barriers for SAP Enterprise Applications: An Analysis of Expert Interviews. In *Proceedings of the 2018 ACM/SPEC International Conference on Performance Engineering* (pp. 223–228). ACM.
- Tasatanattakool, P., & Techapanupreeda, C. (2018). Blockchain: Challenges and applications. In *International Conference on Information Networking*. <https://doi.org/10.1109/ICOIN.2018.8343163>
- Thai, V. V., Yeo, G.-T., & Pak, J.-Y. (2016). Comparative analysis of port competency requirements in Vietnam and Korea. *Maritime Policy & Management*, 43(5), 614–629.
- Tran, T. T. H., & Luc, T. T. H. (2018). Reverse Logistics in Plastic Supply Chain: The Current Practice in Vietnam. In *Nachhaltige Impulse für Produktion und Logistikmanagement* (pp. 219–233). Springer.
- Yoon, D.-G., & Doan, T. B. T. (2018). A Study of the Logistics Development in Hai Phong Port. *Journal of Korean Navigation and Port Research*, 42(2), 137–142.