

## The Impact of Implementing New Technologies in International Trade and Logistics

Mihaela Gabriela Belu<sup>1</sup>, Ramona Iulia Dieaconescu<sup>2</sup>, Dorel Mihai Paraschiv<sup>3</sup> and Ioan Popa<sup>4</sup>

<sup>1)2)3)4)</sup> *The Bucharest University of Economic Studies, Bucharest, Romania.*

E-mail: belumihaela@gmail.com; E-mail: ramona.tartavulea@rei.ase.ro

E-mail: dorel.paraschiv@ase.ro; E-mail: ioan.popa.rei@gmail.com

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### Abstract

The paper aims to identify new technologies (big data, blockchain, Internet of Things, 3D printing, 5G technology etc.) and their impact on the specific activities related to international sales contracts: international logistics and international payments. In this context, it should be noted that Revolution 4.0 offers participants in international trade new opportunities for easier management of the transactional mechanism.

The study is based on theoretical and empirical research aimed at investigating the impact of new technologies on international trade flows and the development of international businesses. The findings confirm that these new technologies are rapidly developing and spreading and they have a positive effect on promoting international trade relations and on the environment. The results of our survey on the implementation of new technologies in the Romanian business environment show that employees are familiar with most of them, but the percentage of actual utilisation in companies is rather small.

### Keywords

international trade, logistics, blockchain, supply chain management, international payments and finance

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### Introduction

The implementation of new technologies is promoting technical progress and allowing the configuration of more efficient logistic solutions and innovative payments, having an impact on costs and transparency of the global supply chain. The digitization of business processes began in 1960 with the first efforts to promote electronic data exchange. These processes have become more complex over time, new applications have emerged and new technologies have been implemented that have improved the flow, speed, reliability and security of information transfers. Data management and exchange between participants in the global supply chain are essential sources of innovation and allow a better understanding of customer needs. Digital interoperability is a key aspect for information exchange between participants in international supply chains (Pan, et al., 2021).

Technological progress leads to the redesign of current business models and according to Raj and Seamans (2019), “the nature of business activity has shifted dramatically over the past decade”. The scale of these changes requires a profound change in the global supply chain, in terms of cybersecurity and the incorporation of resilience objectives into all supply chain processes. In the field of foreign

trade, the business model is evolving, the emphasis is on the continuous management of information, on the collaboration of the participants involved in the transactional mechanism, but also on the quality of services.

One of our objectives is to highlight the importance of applying new technologies in international trade activities. It is necessary for the actors involved in international commercial transactions (exporters, importers, international trade auxiliaries, commercial banks, etc.) to understand the advantages offered by these new technologies (simplification of the transaction mechanism, transparency, cost reduction) and to implement them in activities related to international commercial contracting, logistics activities and international payments (IHS Markit, 2018).

**Review of the scientific literature**

*New technologies and the 4.0 Industrial Revolution*

The 4.0 Industrial Revolution is the term used to describe the main trends and technologies in manufacturing, automation and data exchange with huge impact in process improvement, increase of efficiency and optimization of resources use. These technologies are driving forces for the development of international trade, making it much easier for businesses across the globe to connect with each other and with their customers. Flexibility and rapid response became the main strengths in the eyes of global customers.

In Table 1 we identified the main technologies and synthesized the most important characteristics of each one, in order to understand their potential impact in international business.

**Table no. 1. New technologies – main characteristics and benefits**

Technology	Main characteristics
E-commerce platforms	- use a set of technologies that support big volumes of e-commerce transactions. The main types of e-commerce platforms are based on web sites, Electronic Data Interchange, e-procurement systems and Business-to-Business hubs (Albrecht, 2007).
Digital documentation	- conversion of physical documents into digital ones. The storage of data in digital format brings many positive effects like streamlining activities, reducing storage space, faster access to information and less negative environmental effects induced by extensive paper use.
Internet of Things (IoT)	- allows the interconnection, via the Internet, of smart devices that share specific information and data with each other and with other digital remote platforms for real-time decision-making by users or other smart devices through machine communication. The global base of installed IoT devices is expected to experience an exponential growth by 2025: estimates are around 73 billion devices (IHS Markit, 2018). In the field of logistics, IoT offers a huge opportunity to make services more efficient and cost-effective by: (a) obtaining real-time data, which allows for flexible asset management and added value for the customer; (b) shipment monitoring; (c) optimizing routes; (d) improving the delivery of goods. This technology also allows data collection in order to optimize storage capacity, planned maintenance of fixed assets and adaptation of logistics configuration in line with dynamic market variations.
Industrial Internet of Things (IIoT)	- specific IoT application for the industrial environment, used to obtain the data needed to improve product traceability and make real-time production decisions. In both cases, the reliability and security of the data are fundamental. Processing large volumes of data obtained from different sources helps to improve decision-making and process automation by setting appropriate parameters.
5G technology	- is the latest standard for broadband cellular networks which can provide internet access speeds 10 to 100 times faster compared to previous existing technology, improves cloud-based services and favors the widespread use of IoT.
Cloud computing	- allows users access to technology infrastructure (hardware) through external providers that offer shared and unlimited access to data servers, storage, applications and services over the Internet, based on a pay-as-you-go model. This model has undeniable advantages in terms of infrastructure costs and scalability, although it requires uninterrupted high-speed internet access and strict security controls to protect critical applications and data (McKinsey, 2018).
Big data	- consists of large volumes various of data that can be considered complementary to IoT technology. This data is managed and converted into information that are useful for strategic planning and decision-making processes. Big data has four basic characteristics (the 4 V): (1) volume: the amount of information stored (gigabytes, terabytes, petabytes, exabytes); (2) speed: the speed at which data streams are created and captured; (3) variety refers to the diversity of data, their

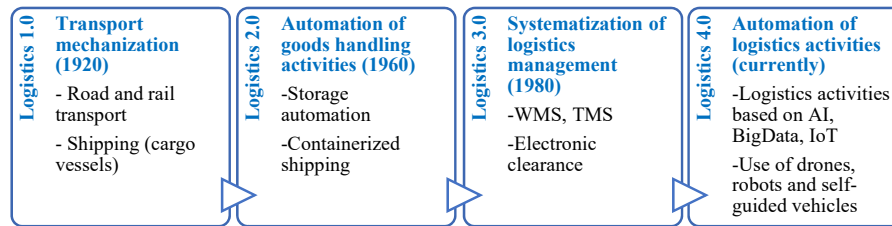
	mode of representation; (4) the veracity, ie the accuracy and precision of the data. Big data can be generated by sensors and the collection, modelling and interpretation of sensor data plays a critical role in the process of understanding and capitalization of this valuable resource (Perera et al., 2013).
3D printing	- creates objects by overlapping (printing) successive layers of material based on a 3D model or drawing. 3D printing in an industrial setting involves the printing of polymer parts locally, which could bring significant changes in some value chains. For example, in car production, it could change the operating model by shortening the value chain, making it easier to make parts and finished products in the same factories, saving time and transportation costs, while also providing greater flexibility in production as a response to changes in customer demand or preferences.
Robotics and automation	- automation refers to the use of systems and machines in manufacturing that can replace several tasks that were previously done manual. This is not a new concept, but the latest trends imply that the systems and machines are computer-controlled, which brings even more efficiency and replaces human labor to a much larger extent than it was possible before. Robotics refers to machines that are capable of carrying out complex tasks in an automatic manner. Industrial robots may be automatically controlled and reprogrammable (Raj and Seamans, 2019).
Artificial intelligence	- a machine learning system that allows reproduction of human skills and is generally used for tasks that require repetitive movements, replacing human labor with that of machines that operate independently. Artificial intelligence also facilitates the identification of models and triggers specific actions based on the interpretation of a large volume of data from different sources. In logistics, artificial intelligence is mainly used to forecast demand, which allows flexible and rapid adjustment of stocks and optimization of product distribution in order to reduce costs and delivery times.
Augmented Reality	- a technology that uses visualization devices to combine reality in an environment with 3D information and vital computer information that are superimposed on a screen to improve decision making processes. In logistics, it is mainly used in warehouse management to improve the selection, quality control and packaging processes of products, which are routine tasks, time consuming and financial resources. The use of AR could substantially reduce logistics costs and eliminate errors (for example, packaging errors that delay deliveries or lead to product returns), improving delivery times and the quality of customer service.
Blockchain technology	- is based on networks that allow non-trusting members to interact in a decentralized way, without the need of a central authority or a trusted intermediary, making reconciliation between transacting parties faster; a characteristic of blockchain networks is the use of cryptography; blockchain can be viewed as a log whose records are batched into timestamped blocks (Christidis and Devetsikiotis, 2016).

*Application of new technologies in activities specific to international trade*

In the current context - the industrial revolution 4.0. and the specific conditions under which international commercial transactions take place, the implementation of new technologies is a solution for parties involved in international trade: international trade companies, international logistics companies, customs authorities, commercial banks, government institutions and agencies.

*New technologies and innovation in logistics*

The process of innovation in logistics started a long time ago: in a first phase (logistics 1.0) the mechanization of road, rail and maritime transport took place; in the second stage, in the 60s, the automation of products handling activities took place, by introducing containerized transport (logistics 2.0); the third phase (logistics 3.0) had as main results the introduction of electronic customs clearance, the Transportation Management System (TMS) and the Warehouse Management Systems (WMS); in the last stage, currently, the automation of logistics activities takes place (logistics 4.0) by implementing new technologies, big data, IoT, blockchain, robotics, artificial intelligence and augmented reality.



**Figure no. 1. Innovation in logistics**

Source: adaptation after Turan, et. al., 2021

The application of blockchain technology in logistic activities specific to export-import operations could lead to the following results (Hackius and Petersen, 2017): transparency - you can easily track the path of products from producer/seller to final consumer and all the processes that the products have gone through are visible, from the manufacturing phase to packaging and delivery (Williams and Gerber, 2015); easy management of the documents necessary for the transaction, both in the stage of delivery of goods and collection of the value of goods and in the phase of taking possession of purchased goods; supply chain optimization and cost reduction; document management and transport tracking storage of large amounts of data in a decentralized way, information is processed quickly and is accessible in a timely manner (Dobrovnik, et al., 2018); improving security, as the information stored in blocks is unalterable and immutable, which means that it is almost impossible for someone to partially modify it, because the necessary calculations are performed by several computers in a decentralized way. Several researches have been conducted for proposing solutions to improve security in IoT networks using blockchain technology (Raj, et al., 2021).

In customs clearance processes, those activities required in the case of extra-Community trade, the advantages of blockchain are the following: physical control of goods is much easier, the number of physical documents is reduced and allows end-to-end tracking. Customs fraud is significantly reduced, thanks to blockchain technology, because it is not possible to change the information entered in the documents (Dobrovnik et al., 2018).

#### *Implementing new technologies in payments and international financing*

In international trade, the parties - the exporter and the importer - are in the situation of opposition of interests, specific to the parties in a sales contract: the seller prefers to deliver after being paid, the buyer prefers to pay after receiving the goods. The international dimension of the transaction - it takes place in the global space, the parties are part of different cultures, conflict of laws may arise, etc. - emphasizes the trader's dilemma: to be the first to fulfill his commitment, trusting that his partner will fulfill, in turn, the contractual obligation, or not to trust and ask his partner to perform the delivery/payment, transferring to him the risk of trust. Therefore, either the parties rely on trust, and then the transaction can take place directly (with the risk of failure of the trusting party), or the parties prefer not to assume this risk and resort to a mechanism to guarantee the execution of the counterpart service (Popa and Belu, 2018). Starting from the merchant's dilemma, the parties of an international sales contract can opt for simpler but riskier payment options, or they can opt for payment methods that offer greater security, but which involve a more complex management and rather high costs. The most used traditional method of payment in international trade is the documentary letter of credit, followed by payment in open account terms. In the classic version, the procedure of payment/financing by documentary letter of credit is a complex one, which involves a large number of participants, a lot of documents and high costs. The adoption of blockchain technology in the case of payment by documentary letter of credit would simplify the payment process, document management and reduce the costs related to this payment method (Shuchih et al., 2019). The development of a framework that integrates blockchain and IoT technologies can provide data security for decentralized payment (Yu, et al., 2018).

Financing is essential for international trade. According to a study, approximately 80% of export-import transactions are financed through traditional techniques (e.g documentary credit) (WTO, 2016). These financing techniques usually involve high costs and complicated procedures due to the required documents and the large number of participants involved in the process of an export-import operation.

The application of blockchain technology in the international financing process results in the simplification of financing procedures and obtaining financing in a shorter time.

*Impact of new technologies in international trade*

New technologies are increasingly used in the global value chains, in the phase of raw materials acquisition, in the production process, but also in the marketing of products on the global market. In international logistics activities, both inbound logistics and outbound logistics, blockchain technology is used; companies in the field (eg Maersk, Kuehne+Nagel) together with IBM have launched solutions designed to simplify and secure all logistics activities. Thanks to this technology, transport costs are reduced, all delivery information is integrated on a single secure platform, which is accessible to the parties involved in the supply chain (carriers, shippers, exporters, importers etc.).

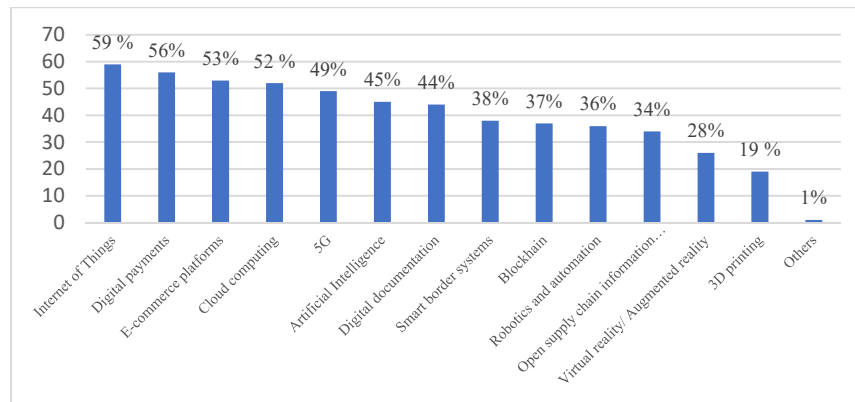
In the process of financing, respectively payment in international trade, blockchain-based applications have been developed. For example: in 2016, Barclays and Wave funded an export-import operation using blockchain technology; Digital Trade Chain Consortium, renamed We.trade; Batavia is a trade finance platform, founded by a consortium of Bank of Montreal, CaixaBank, Commerzbank, Erste Group, IBM and UBS (Belu M., 2019). Blockchain offers a secure manner of exchanging goods and services, makes value chains more agile and lowers the cost of trade in general (Ahram, 2017).

Paperless trading is promoted by framework agreements between countries to facilitate cross-border trade (Hong, 2017). The role of the document circuit is to make the connection between the two phases - logistic and financial - of the export-import operation: the delivery of the goods is attested by documents and the payment of the goods is made against documents (Popa, 2008). As shown in the literature (Barelier et al., 2020), success in international trade is largely determined by an efficient management of commercial and financial documents.

The use of blockchain allows digitization of documents specific to international trade transactions. There are initiatives in this regard: (1) Smart Bill of Lading provides solutions for digitizing the transport document; (2) CargoX platform allows companies to store and make available original transport documents using the Ethereum network - the largest blockchain platform for smart contracts (Hu et al., 2021).

Implementing both blockchain and IOT technologies can facilitate the „sharing of services and resources leading to the creation of a marketplace of services between devices and allow the automation in of several time-consuming workflows, in a cryptographically verifiable manner” (Christidis and Devetsikiotis, 2016); blockchain-based IoT ecosystems provide modularity, data parsimony and availability (Lockl et al., 2020). There is an increasing number of applications for smart contracts, but there are still security related issues that need to be addressed by code analysis and testing by software engineers (Vacca et al., 2021)

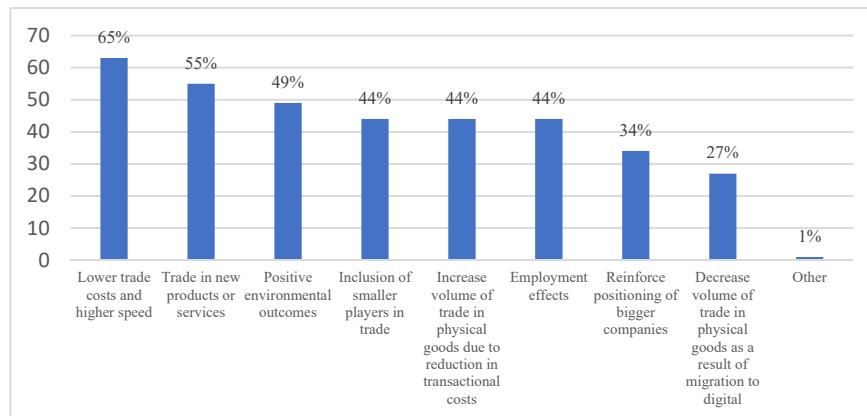
To see to what extent companies with international trade have adopted new technologies, we first consulted a study conducted by the World Economic Forum, based on the responses of 340 companies involved in the field (World Economic Forum, 2020). The most transformative technologies implemented in the international trade activity were identified (see Figure 2), namely: Internet of Things, digital payments, e-commerce platforms, cloud computing - voted by over 50% of respondents and 5G, artificial intelligence, digital documentation, smart border systems, blockchain, robotics and automation, open supply chain information system - voted by over 30% of respondents (World Economic Forum, 2020).



**Figure no. 2. Most transformative technologies for trade**

Source: World Economic Forum, 2020

Among the results expected by the respondents following the implementation of new technologies in the activity of international trade are: reduction of costs associated with international trade transactions and ease of conduct (65%), an increase in the volumes of trade for new products and services (55%), the possibility for smaller companies to be more involved in international trade (44%). Also, approximately half of the respondents consider that the implementation of new technologies will also have a positive impact on the environment (see Figure 3).



**Figure no. 3. The Impact of TradeTech**

Source: World Economic Forum, 2020

### Research methodology

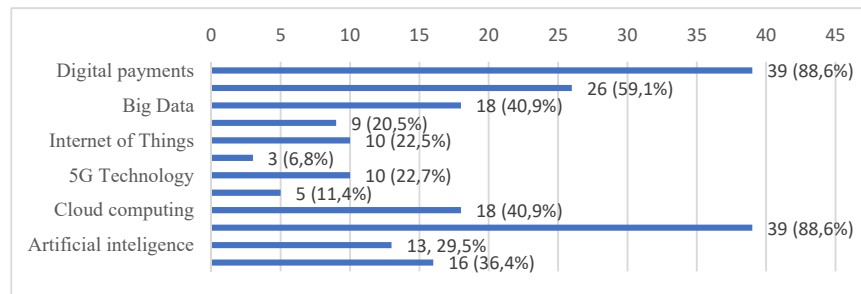
Our research methodology is based on two main approaches, theoretical and empirical, thus it consists of two stages. First we used a theoretical approach to gain indepth knowledge about the main trends in new technologies and how they are impacting the development of global trade and international business. We selected the most relevant articles in the scientific literature, sintetized the esential information about the new technologies (The Internet of Things, big data, cloud computing, 5G technology, 3D Printing, blockchain technology etc.) and then analyzed their impact on activities related to international trade. Subsequently, the main challenges faced by companies with foreign trade activity were presented, using the synthesis and method of logical research.

The second part of our research consisted of conducting an online survey. Our questionnaire is structured in two main parts: the first one consists of questions aimed at collecting basic data about the company where the respondent is employed (main sector of activity, headquarters location etc) and the

second one has key questions that aim to gather information about the degree of implementation of new technologies in those companies and the perceived impact from the employee’s point of view. Also, the last question addresses the options/recommendations that the employees have for future implementation of modern technologies in their company, in order to further develop their activity. Prior the start of the survey, we conducted a few interviews with some of the respondents in order to eliminate sources of misunderstanding with regards to the questions included in the questionnaire. Our respondents are employees from companies that operate in the Romanian market and also have international operations. The main scope of this survey is to see if the new technologies are familiar to Romanian employees, if they are implemented in companies from our country and what is the employee’s perspective on the future trends of new technologies implementation in their companies. The survey was conducted in March 2021, and the total number of respondents was 45. We employed convenience sampling and our sample is not representative from a statistical point of view, but we consider it offers a glimpse on the extent to which new technologies have entered the Romanian business environment.

**Results of the study regarding the use of new technologies in the Romanian market**

Using the study published by World Economic Forum (WEF, 2020) as a starting point, we conducted a survey, at a much smaller scale: 45 respondents from companies operating on the Romanian market. The profile of our respondents shows that approximately half of the companies have the main headquarter in Romania and the other half have the main headquarter abroad; the sectors of activity are very diverse: Logistics, FMCG, Energy sector, Agriculture trading, IT, Online retail, Telecommunications, Automotive, Business process outsourcing, Customer service, Fashion, Gas & Oil, Import – Sales, Pharmaceutical, Trade and services and others. Based on the answers given for our first question, we eliminated from our analysis the responses given by employees from companies which have only local operations and are not involved in international trade. So, we analyzed a total of 40 responses and we will further present our results. The employees that completed the survey were largely familiar with the new technologies, and knew about most of the ones included in our questions. The technologies which are most widely known to our respondents are: digital payments (90,2%), e-commerce platforms (80,5%), blockchain (75,6%), digital documentation (75,6%), artificial intelligence (75,6%), robotics and automation (75,6%). The technologies that are the least known are augmented reality (only 39% are familiar with what this means) and big data (48,8%). Our next question was directed at finding out which of these new technologies are currently implemented or under implementation in the companies which participated in the study (Figure 4).

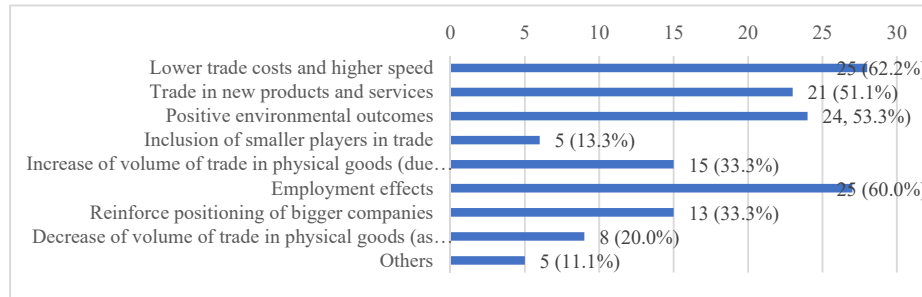


**Figure no. 4. Current state of implementation of new technologies in companies from the Romanian market**

As seen in Figure 4, there is a high degree of implementation of digital documentation and digital payments (88,6%), followed by e-commerce platforms (59,1%) and cloud computing (40,9%). The least accessible technologies among companies in Romania are 3D printing (only 6,8% are using it), augmented reality (11,4%) and blockchain (20,5%).

Respondents expect that implementing new technologies in the activity of their company will result in lower trade costs and higher speed (62,2%) and have an impact on employment (60%). Regarding the effects on the global environment in general, the perception is that the the new technologies will rather

reinforce positioning of bigger companies rather than help the inclusion of smaller players in international trade. Over half of our respondents (53,3%) consider that the implementation of new technologies will generate positive environmental outcomes. More details about the expected results of new technologies implementation are detailed in Figure 5.



**Figure no. 5. The impact of new technologies on companies and the global market**

To find out which is the future perspective of these companies, our last question referred to identifying the best options for further development, in terms of new technologies implementation. Most respondents consider that robotics and automation (53,5%) is the most beneficial technology for the development of their company, followed by artificial intelligence (51,2%) and blockchain (48,8%).

### Conclusions

Currently, in the practice of international trade we can talk about the implementation of solutions based on new technologies, meant to help the process of planning and managing activities at the level of the global value chain. New technologies, such as blockchain and artificial intelligence are promoters that can lead to innovative solutions in the fields of international logistics and international payments. If the parties involved in international trade - companies, government decision-makers, international organizations - adopt applications / solutions based on new technologies, this will lead to a change in the business model for international companies.

The results of our study present the modern trends in new technologies and the extent to which companies worldwide and especially in Romania, have adopted them in international trade activities. Though employees that completed our survey, are familiar with most of the new technologies (11 out of 12 technologies are known to over 50% of respondents), the current state of implementation is rather small scale in Romania (only 3 out of 12 technologies are implemented in over 50% of companies included in our study). According to our findings, the implementation of new technologies is expected to generate positive environmental effects, lower trade costs and higher speed for international trade activities and increase of volumes for new products and services.

Under current conditions, new technologies can be a solution for relaunching international trade. The reconfiguration of global logistics chains, a topical issue, must take into account the implementation of these technologies in both inbound logistics and outbound logistics, as well as in international payments.

For our future research we want to extend our survey by increasing the sample of respondents and adding new questions regarding the impact of new technologies implementation on the sustainability of businesses.

### References

Ahram, T., Sargolzaei, A., Sargolzaei, S., Daniels, J., Amaba, B., 2017. Blockchain Technology Innovations. In: IEEE, *IEEE-Technology-and-Engineering-Management-Society Conference (TEMSCON)*. Santa Clara, 8-10 June 2017. New York: IEEE.

Albrecht, C.C., Dean, D.L. and Hansen, J.H., 2007. An Ontological Approach to Evaluating Standards in E-Commerce Platforms, *IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS—*



- PART C: APPLICATIONS AND REVIEWS, 37(5), [online] Available at: <<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.665.7900&rep=rep1&type=pdf>> [Accessed 22 March 2021].
- Bartodziej, C. J., 2017. *The Concept Industry 4.0 An Empirical Analysis of Technologies and Applications in Production Logistics*. Wiesbaden: Springer Gabler Verlag.
- Belu, M., 2019. Application of Blockchain in International Trade: An Overview, *The Romanian Economic Journal*, 22(71), pp.2-16.
- Chang, S.E., Luo H.L., Chen, Y., 2019. Blockchain-Enabled Trade Finance Innovation: A Potential Paradigm Shift on Using Letter of Credit. *Sustainability*, 12(1), Article number: 188.
- Christidis, K. and Devetsikiotis, M., 2016. Blockchains and Smart Contracts for the Internet of Things. *IEEE Access*, 4, pp.2292-2303.
- Dobrovnik, M., Herold, D., Fürst, E. and Kummer, S. 2018, Blockchain for and in Logistics: What to Adopt and Where to Start. *Logistics*, 2(3), Article number: 18.
- Hackius, N., Petersen, M., 2017. Blockchain in Logistics and Supply Chain: Trick or Treat?. In: Digitalization in supply chain management and logistics, *Hamburg International Conference of Logistics (HICL)*. Hamburg, Germany, 11 – 13 October 2017, Berlin: epubli GmbH.
- Hu, T., Liu, X., Chen, T., Zhang, X., Huang, X., Niu, W., Lu, J., Zhou, K. and Liu, Y., 2021. Transaction-based classification and detection approach for Ethereum smart contract. *Information Processing & Management*, 58(2), Article number: 102462.
- IHS Markit, 2018. *8 in 2018: The top transformative technologies to watch this year*. [pdf] London: IHS Markit. Available at: <<https://cdn.ihs.com/www/pdf/IHS-Markit-2018-Top-Transformative-Technology-Trends.pdf>> [Accessed 12.01.2021].
- Kennedy, A., 2020. 1PL, 2PL, 3PL, 4PL, 5 PL, 6 PL - The Advancement of Party Logistics. *AK Logistics and Supply Chain*, [online] Available at: <<https://aklogisticsandsupplychain.com/2020/03/02/1pl-2pl-3pl-4pl-5pl-6pl-the-advancement-of-party-logistics/>> [Accessed 17 January 2021].
- Lockl, J., Schlatt, V., Schweizer, A., Urbach, N. and Harth, N., 2020. Toward Trust in Internet of Things Ecosystems: Design Principles for Blockchain-Based IoT Applications, *IEEE Transactions on Engineering Management*, 67(4), pp.1256-1270.
- McKinsey, 2018. *Creating Value with the Cloud*. [pdf] New York: Digital McKinsey. Available at: <<https://www.mckinsey.com/~media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Creating%20value%20with%20the%20cloud%20compendium/Creating-value-with-the-cloud.ashx>> [Accessed 28 March 2021].
- Pan, S.L., Trentesaux, D., McFarlane, D., Montreuil, B., Ballot, E. and Huang, G.Q., 2021. Digital interoperability in logistics and supply chain management: state-of-the-art and research avenues towards Physical Internet. *Computers in industry*, 128, Article number: 103435.
- Perera, C., Zaslavsky, A., Christen, P., Georgakopoulos, D., 2013. Context Aware Computing for The Internet of Things: A Survey. *Communications Surveys and Tutorials, IEEE Communications Society*, 16(1), pp.414-454.
- Popa, I. and Belu, M., 2018. *Afaceri internaționale. Tehnica operațiunilor de export-import*. București: Economica.
- Popa, I., 2008. *Tehnica operațiunilor de comerț exterior*, București: Economica
- Raj, A., Maji, K. and Shetty, S.D., 2021. Ethereum for Internet of Things security. *Multimedia Tools and Applications*. [online] <https://doi.org/10.1007/s11042-021-10715-4>.
- Raj, M. and Seamans, R., 2019. Primer on artificial intelligence and robotics. *Journal of Organization Design*, 8(11), pp.1-14.
- Vacca, A., Di Sorbo, A., Visaggio, C.A. and Canfora, G., 2021. A systematic literature review of blockchain and smart contract development: Techniques, tools, and open challenges. *Journal of Systems and Software*, 174, Article number: 110891.

- Williams, R. and Gerber, J., 2015. How Bitcoin's Technology Could Make Supply Chains More Transparent. *CoinDesk*, [online] Available at: < <http://www.coindesk.com/how-bitcoins-technology-could-make-supplychains-more-transparent/> > [Accessed 22 December 2020].
- World Economic Forum, 2020. *Mapping TradeTech: Trade in the Fourth Industrial Revolution*. [pdf] Brussels: World Economic Forum. Available at: <<https://www.weforum.org/reports/mapping-tradetech-trade-in-the-fourth-industrial-revolution>> [Accessed 22 February 2021]
- World Trade Organization, 2016. *Trade Finance and SMEs – Bridging the Gaps in Provision*. [pdf] Geneva: World Trade Organization. Available at: <[https://www.wto.org/english/res\\_e/booksp\\_e/tradefinsme\\_e.pdf](https://www.wto.org/english/res_e/booksp_e/tradefinsme_e.pdf)> [Accessed 20 January 2021]
- Xue, H., 2017. The Newest UN Treaty to Facilitate Cross-Border Paperless Trade in Asia and the Pacific: An Insight Preview. *Journal of World Trade*, 51(6), pp. 959-985.
- Yu, Y., Li, Y.N., Tian, J.F. and Liu, J.W., 2018. Blockchain-based solutions to security and privacy issues in the internet of things. *Ieee Wireless Communications*, 25(6), pp.12-18.