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Advisory Group on Advanced Technologies in Trade and Logistics

Report on the impact of the COVID-19 outbreak on international trade and logistics and the ways advanced technologies can help overcome such disruptions*

Summary

This report provides an analysis of feedback the Advisory Group received while conducting a survey focused on the impact of the COVID-19 outbreak on international trade and logistics and how advanced technologies can help in these scenarios.

Results indicate the following areas of focus:

- Digital platforms: better implementation and utilization of digital platforms which enhance supply chain and logistics information exchange and support business continuity and innovation.
- Digital products: development and implementation of digital products and use cases which are interoperable across borders to facilitate new needs arising due to COVID-19.
- Interoperability: strong engagement of the cross-border interoperable ecosystem in creating, reviewing and adopting standards and policy frameworks which would enable the revitalization of global social and economic processes.

Document ECE/TRADE/C/CEFACT/2020/5 is submitted by the Advisory Group on Advanced Technologies in Trade and Logistics to the twenty-sixth session of the Plenary for information.

* This document was scheduled for publication after the standard publication date owing to circumstances beyond the submitter's control.



I. Introduction

1. This report on the impact of the COVID-19 outbreak on international trade and logistics was prepared by the United Nation Centre for Trade Facilitation and Electronic Business (UN/CEFACT)¹ Advisory Group on Advanced Technologies in Trade and Logistics to address the challenges faced by the private and public sectors. The objective was to identify the main areas in which advanced technologies can contribute to economic measures when coping with the negative impact of COVID-19 on international trade and logistics.

II. Methodology

2. This report is based on the findings of a questionnaire, prepared by the Advisory Group on Advanced Technologies in Trade and Logistics, which was circulated among participants of the Advisory Group's first meeting and the UN/CEFACT Experts community. The questionnaire included the following four open-ended questions, which allowed experts to share their views on the current situation:

- What innovative approaches have you seen in relation to international trade and the current COVID-19 pandemic in your country?
- What is the impact on the logistics of imports and exports in particular?
- How can advanced technologies help overcome such disruptions? (Please provide examples, if possible).
- How do you think that UN/CEFACT standards and UNECE Recommendations can be useful in the current situation?

3. UN/CEFACT received 55 responses, which were studied to identify the main issues, trends, and suggestions regarding the impact of the COVID-19 outbreak on logistics, imports and exports. These are reflected in this report.

4. Based on the analysis, this report highlights key areas of focus to mitigate impacts in similar situations of global pandemic and the disruptions that can result from country-wide lockdowns. Papers published by other international organizations and scientific communities on the economic impact of COVID-19 have also been considered.

III. Background

A. Impact on international trade and logistics

5. Today we are facing serious disruptions in social and business processes, caused by the COVID-19 outbreak.

6. According to an assessment conducted by the World Bank on the potential Impact of COVID-19 on GDP and Trade, loss of income in affected countries could be significant, with the global GDP declining by up to 3.9%, and developing countries being hit the hardest (4% on average, but some over 6.5%)².

¹ United Nations Economic Commission for Europe, "UN/CEFACT", available at <https://www.unece.org/cefact/>

² Maryla Maliszewska, Aaditya Mattoo, and Dominique van der Mensbrugge, *The Potential Impact of COVID-19 on GDP and Trade: A Preliminary Assessment*, World Bank Group, 10 April 2020, available at:

7. Due to travel and transport restrictions, the volume of international cargo trade dropped sharply as a direct effect of the COVID-19 pandemic. According to the International Air Transport Association's (IATA) Air Cargo Market Analysis, in seasonally adjusted terms, industry-wide cargo tonne kilometres (CTKs) plunged by 9.1% in February 2020³.
8. The Container Throughput Index of the Leibniz Institute for Economic Research (RWI) and the Institute for Shipping Economics and Logistics (ISL) dropped sharply by 10.9% in February 2020⁴.
9. According to the World Trade Organization (WTO), world merchandise trade is set to plummet by between 13% and 32% in 2020 and nearly all regions will suffer double-digit declines in trade volumes in 2020⁵.
10. The international trade and logistics sector has been one of the most affected sectors in the global economy by COVID-19. International trade seriously declined and was refocused on urgent medical equipment and other goods classed as essential. This has meant a narrowed selection of exported and imported products, which has in turn raised the potential risk for saturation of logistic chains. Border closures and time delays in international sourcing have been additional factors in the disruption of global supply chains and have resulted in reduced efficiency. Port congestion has resulted from the sheer build-up of volume at ports, lack of handling and storage capacity, hinterland connectivity and issues with import clearance. Some solutions have been attempted via increased intermodality but congestion issues persist due to delays caused by container capacity imbalance (containers need to be fully loaded before being shipped resulting in port timing issues). The reliability of transport services has been challenged by a decrease in reliable demand. Experienced and qualified manpower is difficult to come by to service spikes and industry needs (e.g. truck and train drivers⁶). In addition, the inherent negative aspects of some means of transportation (e.g. the high costs of air transportation and the slow processing of sea-cargo transportation) have been exacerbated by the pandemic and the pressure it has put on international trade.
11. Effective planning, forecasting, risk management, systems interoperability and communication between stakeholders is more important than ever. Despite the expansion of advanced technologies recently, COVID-19 has shown that these technologies are far from being exploited to their full potential when it comes to the efficient facilitation of social and business processes.

<http://documents.worldbank.org/curated/en/295991586526445673/The-Potential-Impact-of-COVID-19-on-GDP-and-Trade-A-Preliminary-Assessment>

³ IATA, "Air Cargo Market Analysis. Air cargo growth slumps in February as COVID-19 takes hold", February 2020, available at: <https://www.iata.org/en/iata-repository/publications/economic-reports/air-cargo-monthly-analysis--feb-2020/>

⁴ ISL, "RWI/ISL Container Throughput Index: sharp drop in February", 24 March 2020, available at: <https://www.isl.org/en/containerindex/february-2020>

⁵ WTO, "Trade set to plunge as COVID-19 pandemic upends global economy", 8 April 2020, available at: https://www.wto.org/english/news_e/pres20_e/pr855_e.htm

⁶ Forbes Media LLC, "COVID-10 And Truck Driver Shortage May Threaten Food Supply Chain", 18 March 2020, available at: <https://www.forbes.com/sites/jennysplitter/2020/03/18/covid-19-and-truck-driver-shortage-may-threaten-food-supply-chain/#22ac48c6523e>

B. Three main challenges

Three Main Challenges

Limited trade flows	Border lockdowns and travel restrictions are blocking shipping and transportation, causing severe disruptions in supply chains.
Limited staff capacities and higher demands for staff protection	The need for physical human interaction (e.g. inspections) or physical document exchange (e.g. certificates) are causing bottlenecks in international logistics.
Limited information exchange	Sourcing delays and lack of storage capacity, different timing of imposed restrictions between trading countries, and the existence of protective measures are causing the import and export of some goods to be subject to new rules.

IV. Innovative approaches in the face of COVID-19

12. As a reaction to the “new normal”, innovative approaches were adopted to enable quick responses and to deal with short term gaps. This was done through the redefinition of supply chains and through organizational innovations involving the rapid replacement of physical operations by digital services, business operation automation and remote collaboration. Switching from dependency on global value chains to local ones and engaging capacities available at the local level put processes, industries and human resources that originally had different purposes to alternative and efficient use.

13. Many local industries have shifted their production to medical equipment and materials and new technologies such as 3D printing (components and parts of masks⁷ and respirators) have been exploited to facilitate local and national needs and to own the production of essential equipment. Local food supply chains have been strengthened and refocused on local food producers⁸ and municipalities, supported by dynamic platforms for continuation of supply. Track and trace technologies (particularly mobile) and biometric applications are being adopted in innovative ways to improve the effectiveness of government front-line responses to COVID-19⁹.

14. Organizational innovation in land transport has enabled faster transit flow of goods and products and raised the efficiency of cross-border supply—for example, by forming escorted convoys of trucks when passing national borders and increasing use of rail capacity. Passenger aircraft have been converted to cargo¹⁰ airlines to facilitate the transport of medical equipment and other essential goods in certain territories and countries.

15. Social distancing has created the need to transform communication tools and to redefine social contacts, shifting to digital devices and advanced technologies such as AI-

⁷ CERN, “Initiatives from the CERN community in global fight against COVID19”, 8 April 2020, available at: <https://home.cern/news/news/cern/initiatives-cern-community-global-fight-against-covid-19>

⁸ FAO, “Local food systems and COVID-19: A look into China’s responses”, 8 April 2020, available at: <http://www.fao.org/in-action/food-for-cities-programme/news/detail/en/c/1270350/>

⁹ OECD, “Tracking and Tracing COVID: Protecting privacy and data while using apps and biometrics”, 23 April 2020, available at: <http://www.oecd.org/coronavirus/policy-responses/tracking-and-tracing-covid-protecting-privacy-and-data-while-using-apps-and-biometrics-8f394636/>

¹⁰ World Economic Forum, “Coronavirus and aviation: Why is air cargo grounded when the world needs it most?”, 30 April 2020, available at: <https://www.weforum.org/agenda/2020/04/coronavirus-aviation-why-is-air-cargo-grounded-when-the-world-needs-it-most/>

powered geolocation and remote monitoring¹¹. Today, more than ever before, society is becoming aware of the importance of technology and the need for advanced development of tools and services to enable the functioning of the global economy and society.

V. Advanced technologies to assist in overcoming disruptions

A. Global digital platforms for trade

16. The development and functioning of global digital platforms as enablers and facilitators of social and economic interactions is a prevailing form of operation and communication in today's new reality. Digital platforms and networks are becoming even more important as they enhance trust, transparency, traceability, and security of the flow of data, materials, goods and services. Convergent technologies enable efficient, real-time functioning of these platforms through the visibility and accessibility of data. Development of new platforms and the better exploitation of existing platforms address the increased need for safe and continuous flow of goods, services and information while protecting all participants in the value chain. A variety of digital platforms and data are needed to facilitate certain parts or entire processes throughout the value chain—from global supply chain platforms, to trade documentation platforms, geographical information system platforms, to a single global system for information exchange and a global manufacturer database for identification of manufacturers, etc.

17. Blockchain is one of the most recognized Distributed Ledger Technologies (DLT) for supporting the functioning of platforms. As a technology with a high social value proposition, it substantially contributes to the safe and secure transaction of services and processes, as transparency enhances trust and cryptography protects users, their identities and ensures data integrity. In combination with other technologies, it extends its value proposition through its ability to support interoperability. It provides true and transparent information, immutably recorded and stored from various sources at different entry points (supported by the Internet of things). Combined with data feeding oracles, quick response codes (QR codes), near-field communication, entity tags (ETags) or other means of data encryption, and structured with AI and analytical algorithms, it increases the value obtained, collected and transferred from different sources.

18. International trade can benefit from the development and adoption of trade-supporting blockchain-based platforms, as it increases trust in commercial transactions and enables all stakeholders in the supply chain to identify risks. It enables them to create on-time supply chain security plans, to track goods and materials at every point and trace container capacity. It effectively supports transport orders and custom clearance systems based on cross-border interoperability, using common standards and digital identification services for remote document or file exchange (such as eDelivery¹²), thereby enabling transparent international trade.

B. Digital products and services development

19. Additionally, blockchain technology and its driving principles¹³ can enable the creation and development of digital products to support not only cross-border and

¹¹ OECD, "AI-powered COVID-19 watch", 25 June 2020, available at: <https://www.oecd.ai/covid>

¹² European Commission, "eDelivery", 25 June 2020, available at <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/eDelivery>

¹³ UNECE, "White Paper on Blockchain in Trade Facilitation", 2019, available at: <https://www.unece.org/fileadmin/DAM/cefact/GuidanceMaterials/WhitePaperBlockchain.pdf>

international flows of goods and services, but also flows of people. As the new reality puts the health of human beings at the core of all social and economic processes, a permissioned and private blockchain can have an even more important role in the creation of digital health solutions. Common, interoperable sets of digital tools can support the certification of immunity or the health status of travellers and provide trusted medical information. They can enable the development of smartphone applications to allow a person to present a verifiable digital health certificate. Based on the principle of self-determination, the individual owner of the data is in charge of the transfer of their personal data (including his/her health condition) to trusted users, enabling them to check and verify the authenticity of the data. This can contribute to the safety and security of travellers, during and post COVID-19, while increasing protection of all actors and processes in the global value chain.

20. One example of a new digital product is the Covid19 Pass project on the HashNET platform¹⁴, whose goal is to create the C-19 Pass digital certificate (to be issued by health authorities such as national health organizations and licensed public and private testing centres) that shows the holder has tested negative for the virus and allows the holder to commute and visit designated COVID-19 negative certified venues (C19CNV), where all employees and suppliers have tested negative. Certificates are uploaded to HashNET DLT and are retrieved by the holder's smartphone app as a reference QR code that can be scanned at C19CNV venues. This solution leverages the use of dashboards, reports and big data analysis of detailed or anonymized user data. The data is collected from any venue that provides C19CNV accommodation to visitors like hospitals, airports, government buildings, banks, restaurants, shopping malls, etc.

21. Another activity which focused on issuing health certificates is the COVID-19 Credentials Initiative (CCI)¹⁵, which aims to support projects developing and deploying verifiable credential solutions to help stop the spread of COVID-19 in a controlled, measurable, and privacy-preserving way. Using industry standards, like the Verifiable Credentials¹⁶ by World Wide Web Consortium (W3C), CCI works on architecture guidance, tools, and documentation that all participants could use to solve COVID-19 credential use-cases, such as a digital certificate that lets individuals prove (and request proof from others) that they've recovered after testing negative, or have received a vaccination, once one is available. By proving some level of immunity, individuals will be able to begin participating in everyday life again.

22. In delivery services, companies have been experimenting and implementing, to some extent, non-contact delivery methods—mostly to improve efficiency through automation and business process optimization. Now, "...sensing an opportunity amid concerns over the coronavirus, on-demand delivery companies have begun pressing ahead with eliminating human contact altogether".¹⁷ "New regulations have curbed the level of permissible human contact. Drivers now pick up and deposit orders from special terminals outside commercial premises and housing blocks."¹⁸

23. Another experimental innovation is the use of remotely controlled or autonomous drones "to deliver medications, masks and hand sanitizer to its elderly in remote areas. A heavy-duty four-propeller drone, complete with landing gear, is loaded with a bag of supplies in the city centre then blasts off across the parched, hilly landscape to reach areas that are as

¹⁴ Tolar.io, "HashNET Distributed Ledger Technology (DLT)", 2020, available at: <https://tolar.io/hashnet>

¹⁵ CCI, "The COVID-19 Credentials Initiative website, 2020, available at <https://www.covidcreds.com>

¹⁶ W3C, "Verifiable Credentials Data Model 1.0", 19 November 2019, available at: <https://www.w3.org/TR/vc-data-model/>

¹⁷ The Financial Times Ltd, "US delivery companies offer contact-free service to ease coronavirus fears", 20 March 2020, available at: <https://www.ft.com/content/1ffc0be8-5f7c-11ea-b0ab-339c2307bcd4>

¹⁸ TIME USA LLC, "These Delivery Drivers Are Risking Their Health to Keep China Running During the Coronavirus Epidemic", 16 March 2020, available at: <https://time.com/5803803/china-delivery-driver-ecommerce-covid19/>

much as a two-hour walk from the nearest pharmacy.”¹⁹ “Drones can provide just-in-time supply of key medical items, regardless of location. Since some health systems cannot afford to keep cold-chain products such as platelets or blood on site, drones can ensure these supplies are available on demand.”²⁰

C. Standards and interoperability

24. Using common standards is essential to cross-border interoperability of infrastructure and services, and this will be of central importance in the revitalization of global social and economic processes.

25. Along with standardized data transactions, existing standards, tools, and concepts can be used to create a blockchain-based environment in which trustworthy, common identification and communication interchange is facilitated including the implementation of interoperable digital identity frameworks, UN/CEFACT Standards and UNECE Recommendations provide a global basis for interoperable semantic data exchange including UNECE Recommendation 33 on Single Window²¹ and Recommendation 37 on Single Submission Portals (SSPs)²² together with 200+ UN/CEFACT data exchange standards of UN/EDIFACT UNSMs²³ and the UN/CEFACT Reference Data Model subset XML Schemas²⁴ which are based on UN/CEFACT Core Component Library (CCL)²⁵. These include the Electronic Sanitary and Phytosanitary Certificate (eCERT) schemas²⁶, the Electronic Consignment Note (e-CMR)²⁷ schema.

26. Support from policymakers and the evolution of regulatory frameworks are also essential for the successful implementation and interoperability of innovative advanced technologies. Harmonized solutions and adoption of common legal frameworks can be done bilaterally, regionally or globally. An example is the Model Law on Electronic Transferable Records (MLETR), adopted by United Nations Commission on International Trade Law (UNCITRAL). It gives legal recognition to the use of electronically transferable records that are functionally equivalent to transferable documents and instruments such as bills of lading, bills of exchange, cheques, promissory notes and warehouse receipts. These commercial documents, issued on paper, allow the person who holds them to claim payment of a sum of money or delivery of certain goods. One main legal challenge has been to electronically reproduce the functions associated with possession of these documents in tangible form. The MLETR has solved this issue by establishing a legal equivalence between control of an

¹⁹ World Economic Forum, “This Chilean community is using drones to deliver medicine to the elderly”, 22 April 2020, available at: <https://www.weforum.org/agenda/2020/04/drone-chile-covid19/>

²⁰ World Economic Forum, “How drones could change the future of healthcare delivery”, 8 May 2020, available at: <https://www.weforum.org/agenda/2020/05/medical-drone-delivery-india-africa-modernize-last-mile/>

²¹ UNECE, “Recommendation N°33: Recommendation and Guidelines on establishing a Single Window”, 2005, available at https://www.unece.org/fileadmin/DAM/cefact/recommendations/rec33/rec33_trd352e.pdf

²² UNECE, “Recommendation N° 37: Single Submission Portal”, 14 January 2019, available at: https://www.unece.org/fileadmin/DAM/cefact/cf_plenary/2019_plenary/ECE_TRADE_C_CEFACT_2019_06E.pdf

²³ UNECE, “Part 4. UN/EDIFACT Rules - Chapter 2. UNSMs”, available at

<https://www.unece.org/tradewelcome/un-centre-for-trade-facilitation-and-e-business-unecefact/outputs/standards/unedifact/tradeedifactrules/part-4-edifact-rules-for-electronic-data-interchange-for-administration-commerce-and-transport/part-4-unedifact-rules-chapter-2-unsms.html>

²⁴ UNECE, “Streamlined presentation of UN/CEFACT standards”, available at

<https://www.unece.org/uncefact/mainstandards.html>

²⁵ United Nations Core Component library (UN/CCL), 2020, available at:

https://www.unece.org/cefact/codesfortrade/uncccl/cccl_index.html

²⁶ UN/CEFACT, “Electronic and Phytosanitary Certificate (eCERT), 1 September 2010, available at:

https://www.unece.org/fileadmin/DAM/cefact/brs/BRS_ExportCertificate_eCert_v5.1.0.pdf

²⁷ UNECE, “Business requirements specification (BRS) e-CMR”, 2018, available at:

http://www.unece.org/fileadmin/DAM/cefact/Standards/eCMR/01_BRS_eCMR_v1.pdf

electronic transferable record and possession of a transferable document or instrument.²⁸ The UN/CEFACT MLETR project is developing a white paper which provide the link between the semantic basis for the interoperability of such documents and the title transfer solutions²⁹

VI. Conclusions

27. During the COVID-19 outbreak, international supply chains are being affected by border closures, travel restrictions, sourcing delays, lack of storage capacity, lack of qualified manpower and disruptions in information exchange.

28. There are increased needs in the areas of communication, systems interoperability, effective planning, forecasting and risk management.

29. Innovative approaches to addressing these issues have involved dematerialization, process automation, document and asset digitization, remote collaboration, and orientation toward local supply chains and markets.

30. Technologies such as blockchains, IoT, remote control and drones, process automation, 3D printing, artificial intelligence, geolocation services, remote monitoring, and data analytics have been used.

31. These technologies have been leveraged to facilitate international trade and transform existing products into new use cases by utilizing global digital platforms, digital products, legally recognized digital credentials and new (non-contact) delivery methods.

32. These solutions have been supported by standards (such as UN/CEFACT Standards and UNECE Recommendations), infrastructure and service interoperability, inclusion of policymaking stakeholders and regulatory framework review.

33. In order to build disruption-resilient supply chains, international trade and logistics can greatly benefit from the dematerialization of business processes, documents and assets; the use of common digital platforms; and multilateral agreements on common standards and regulatory frameworks for legal recognition of those documents and datasets.

34. The following are some possible actions United Nations Member States can take to strengthen supply chains and prepare them for potential disruption:

35. Short-term actions:

- Prepare communication materials that clearly explain policy changes and restrictions implemented by the Member State's government and ways supply chain entities are affected.
- Identify essential supply channels including alternate source supply; identify essential goods and allow and prioritize the efficient acquisition, storage and distribution of these goods.
- Identify manufacturers that can provide essential supplies and equipment and manufactures that can reorient their business to start producing these essentials.
- Align government IT systems to support new requirements based on updated policies and reinforce system stability to prepare them for increased online activity.

²⁸ UNCITRAL, "UNCITRAL Model Law on Electronic Transferable Records", available at: https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/mletr_ebook_e.pdf

²⁹ UNECE, "Transfer of MLETR-Compliant Titles", available at <https://uncefact.unece.org/display/uncefactpublic/Transfer+of+MLETR-compliant+titles>

- Promote digital platforms, products and services to support business and community solutions to better face supply chain disruptions.
36. Long-term actions for the foreseen future:
- Prepare strategy for adoption of Industry 4.0 and its key components, such as improved communication frameworks, support of IoT ecosystems, advanced process automation, issue analysis and diagnosis automation, monitoring and intelligent support of the workforce.
 - Strengthen interoperable infrastructure needed for digital business, support development of value-added digital products and services, analyse and improve connectivity and digital coverage in all regions.
 - Analyse impact of the COVID-19 outbreak on local economy and implement findings into a nationwide risk management plan.
 - Analyse and review legal frameworks to allow and support digital economy processes using developed and widely accepted standards.
 - Participate in global multilateral planning and agreements to synchronize potential actions on an international scale.
37. The Advisory Group recommends focusing on the following advanced technologies and their aspects:

Three main solution recommendations

<i>Issue</i>	<i>Solution Recommendation</i>
Limited trade flows	Digital platforms: We call for better implementation and utilization of digital platforms to enhance supply chain and logistics information exchange and to support business continuity and innovation.
Limited staff capacities and higher demands for staff protection	Digital products: We call for the development and implementation of digital products and use cases for interoperable cross-border trade to address new needs arising from COVID-19.
Limited information exchange	Standards and interoperability: We call for strong multilateral engagement in a cross-border interoperable ecosystem in creating, reviewing, and adopting standards (such as UN/CEFACT Data exchange Standards) and policy frameworks which would enable revitalization of international trade and logistic processes.

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