

Mapping TradeTech: Trade in the Fourth Industrial Revolution

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Foreword

The COVID-19 pandemic has revealed the urgent need for customs and all supply chain stakeholders to digitize procedures and apply technology to achieve more efficient connectivity and collaboration.



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Global trade is experiencing a technological revolution and the area of customs clearance is no exception, given its mandate to facilitate trade, protect society and ensure effective revenue collection while making processes as smooth as possible for all actors along the supply chain. In this regard, emerging and enabling technologies based on the use of big data, telematics and cloud computing can positively impact the overall performance of customs administrations.

The topic of digital customs has been high on the customs agenda for many years. Customs administrations are already making some use of digital systems to collect and safeguard customs duties, control the flow of goods, people, conveyances and money, and protect cross-border trade from illicit trafficking. The World Customs Organization (WCO) has developed several instruments to guide its members along the path of digitization.

In the context of the COVID-19 pandemic, it has become apparent that automated clearance systems for issuing declarations, performing risk management, undertaking validation and possibly delivering approvals, coupled with the use of high-tech devices to perform non-intrusive inspections, have made a significant difference on the ground.

The current worldwide health crisis has revealed the urgent need for customs and all supply chain stakeholders to digitize procedures

and apply technology to achieve more efficient connectivity and collaboration using harmonized approaches and interoperability based on the implementation of international standards, such as the WCO Data Model.

Studies to implement some emerging technologies, such as blockchain, biometrics, artificial intelligence and the internet of things, are well under way in customs administrations, and their use could provide a much needed leap forward for customs in the fight against illicit trade and trafficking, while boosting efficiency and equity.

By virtue of their strategic location along the supply chain, customs administrations can contribute to large-scale deliberations on making greater use of technological innovations in the international trade arena for the benefit of all. In cooperation with the World Economic Forum, the WCO is pleased to contribute to a global discussion on the convergence of technology and trade.

In 2021, as reflected in the theme of International Customs Day (26 January), the customs community will unite around the theme of “Customs bolstering Recovery, Renewal and Resilience for a sustainable supply chain”. The WCO looks forward to working with the international community on how best customs agencies can strengthen collaboration, harness technology and heighten stakeholder preparedness in order to enter tomorrow’s world with confidence.

Executive summary

“ The TradeTech survey results show that “fundamental” technologies such as digital documentation, digital platforms, digital payment and cloud computing are perceived as most relevant in the shorter term, along with IoT, digital services and 5G.

TradeTech is the set of technologies and innovations that enable global trade to be more efficient, inclusive and equitable. The interplay of technology and trade has a long history, spanning from advances in transportation to the advent of the container to the emergence of coordinated production networks.

This report considers modern TradeTech in two layers: (1) a first layer in which trade data and processes are transformed from analogue to digital; and (2) a second layer in which trade process optimization and synchronization occurs between different parties, and where emerging technologies play a key role. TradeTech solutions work in bundles. While the second layer depends on data generated in the first one, it is also hard to separate artificial intelligence (AI) from robotics or the internet of things (IoT) from 5G.

Business perceptions show that many technologies have a significant impact on trade. The World Economic Forum launched a global survey to understand how firms are currently using technologies in international value chains and to assess which technologies will have the biggest impact on global trade. The results are being used to determine a landscape of technologies that have the biggest effect on trade in the short and medium term. According to this survey on TradeTech, conducted from June to September 2020, “fundamental” technologies such as digital documentation, digital platforms, digital payment and cloud computing are perceived as most relevant in the shorter term, along with IoT, digital services and 5G. Technologies expected to affect trade in the longer term are robotics, virtual reality, 3D printing and AI.

The major benefits of TradeTech are efficiency gains (often thanks to collaboration between different parties), the emergence of new digital products and services, positive environmental impacts and the inclusion of smaller players in trade. Yet the survey results also show the potential negative effects of TradeTech adoption in terms of job displacement and competition.

This report aims to shed light on the landscape of emerging trade technologies and consider the opportunities and challenges for each, with case studies used for illustration.¹ Chapter 1 offers an overview of TradeTech and highlights seven current trends. These range from geopolitical considerations to the restructuring of the logistics market as a result of the adaption of emerging

technologies to the role of TradeTech in supply chain resilience amid COVID-19.

Chapter 2 considers the application of major technology groups, describing the trade-related problems they purport to solve and implications for trade policy. Chapter 3 covers the major challenges for TradeTech adoption and suggests a way forward for solutions. Chapter 4 describes the potential that further TradeTech adoption could have for micro-, small and medium-sized enterprises (MSMEs) and developing countries, while Chapter 5 outlines key takeaways and next steps.

Some new and innovative trade agreements, initiatives such as Data Free Flow with Trust under the Osaka Track, and harmonized principles around new technologies such as the Organisation for Economic Co-operation and Development (OECD) Principles on Artificial Intelligence, among others, are working towards facilitating the wide adoption of TradeTech. At the same time, international tension regarding trade and technology – especially around 5G technology – risks expanding beyond legitimate security safeguards to techno-nationalism.

A fragmented international tech environment might be harmful for standard setting and, ultimately, affect affordability for smaller firms and developing countries. Consequently, their competitive advantage in trade could also be affected, as digitalization and emerging technologies have an enabling role not just in trade facilitation but in overall trade.

The traditional perception that economic interdependence is driven by low-wage labour arbitrage or access to resources is now challenged. Only 18% of trade in goods is driven by labour cost.² Meanwhile, value chains are becoming more and more knowledge intensive, in part thanks to embedded technology. Knowledge-intensive goods and services account for half of all cross-border flows and are growing faster than labour- or capital-intensive flows.³

The democratization of technology can help close the gaps between developed and developing countries, as well as between small and large firms, even offering “leapfrog” opportunities. The further widening of the digital divide must be prevented, also in the trade space. As any other technology application, TradeTech is here to stay. Thus, the focus needs to be on fostering public-private partnerships and international cooperation to ensure efficiency gains and advance development for all.

1

TradeTech: An Overview

TradeTech is fundamental to harnessing the innovations of the Fourth Industrial Revolution to support the public good.



1.1 What is TradeTech?

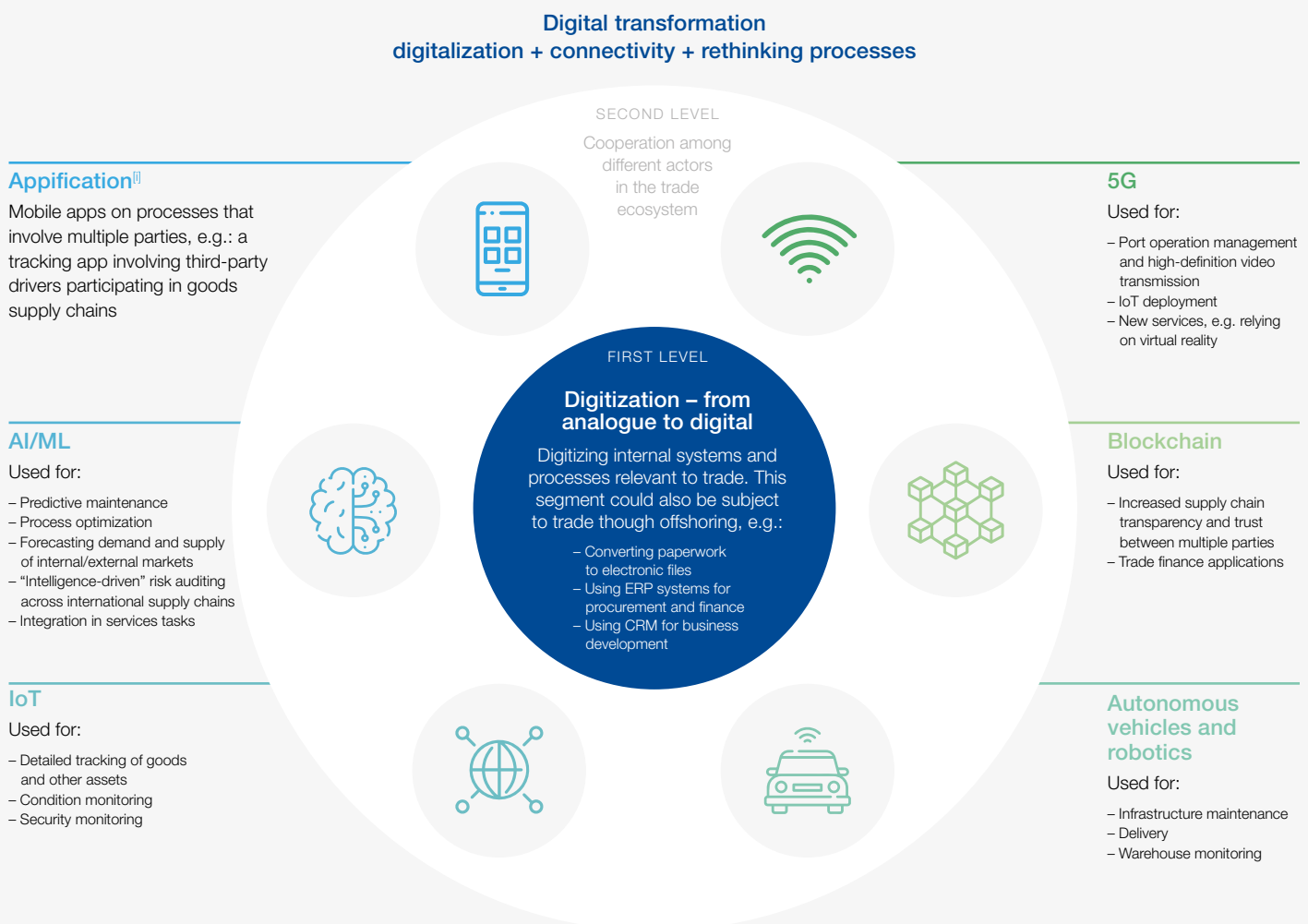
Technologies and innovations have interacted with trade for thousands of years, from advancing transportation methods to the advent of the container to the emergence of fragmented production networks. TradeTech, or the set of technologies and innovations that enable trade to be more efficient, inclusive and equitable, is fundamental to harnessing the innovations of the Fourth Industrial Revolution to support the public good.

TradeTech's importance is shown by the disruptions that technologies are causing to business models, the reconfiguration of value chains, efficiency gains, the achievement of sustainable outcomes and the inclusion of micro-, small and medium-sized enterprises (MSMEs) in trade. Yet less positive consequences also exist and need to be mitigated to ensure TradeTech works for all.

TradeTech can be understood in two layers (Figure 1): (1) a first level of transforming internal systems and processes from analogue to digital, ultimately useful to streamline trade processes; and (2) a second level in which trade process optimization and synchronization between different parties is possible thanks to new technologies and greater connectivity.

The second level involves the transformation of processes and relies on the data generated by the first to further enhance trade operations or introduce a new class of service. Emerging Fourth Industrial Revolution technologies play an enabling role at this second level, working in bundles. For example, it is hard to envision autonomous robotics operating without relying on artificial intelligence (AI), or AI services without cloud computing, or extensive internet of things (IoT) deployment without 5G networks.

FIGURE 1 TradeTech digitalization levels



Notes: ERP – enterprise resource planning;
CRM – customer relationship management

^{II} appification: for a definition, see EASA, “What is ‘Appification’?”, EASA Blog, <https://easasoftware.com/democratization/what-is-appification/#> (accessed 30 November 2020).

Source: World Economic Forum

“ The availability of data allows moving from reactive event mitigation to proactive event management, anticipating late shipments, for example.

BOX 1

Taking, for example, the proliferation of 5G, drastic changes can be expected in virtually all areas of business, and trade is no exception. Supply chains stand to gain tremendously from real-time product tracking, the automation of processes through robotics as well as wireless sensors on roadways, in railcars, at airports, in seaports, at customs, at

yards and in warehouses. The decentralization of business processes beyond the confines of one organization promises to enable transparency from end to end for the first time. Moreover, the availability of data allows moving from reactive event mitigation to proactive event management, anticipating late shipments, for example (Box 1).

The evolution of TradeTech mobile applications

Enterprise computing today is increasingly augmented by decentralized, highly distributed applications that allow access to and capture of data at any time and in any place. Increasingly capable hardware allows many business processes to be handled on mobile devices. Close to 9 million mobile applications are available across the globe, with over 200 billion downloads worldwide. Shipments and the movement of freight are among the most active trade applications. The underlying concept of a first generation of these applications was ensuring supply chain visibility: users see what is happening in logistical processes across different actors in the supply chain.

Until recently, GPS tracking systems, electronic logging devices and other hardware-based solutions provided some relief in this area through a “dot on a map”. Yet, transportation mistakes, other errors and miscommunication are still rife. In the United States, for example, 35% of shipments experience irregularities.^[1] The fact that these problems still exist is proof that the first generation of GPS-type mobile supply chain tools does not effectively address them.

A new class of supply chain visibility applications recently emerged to drastically reduce and anticipate these issues through intelligent data sharing and real-time updates based on mobile data capture and IoT sensors. Some companies, such as Truckl, have demonstrated the potential of these new applications, where transportation drivers record their arrival and departure times, capture documents through images that are instantly converted into PDFs, take photos of freight, work through checklists and obtain proof of pickup or delivery signatures. This data is shared with all parties to a supply chain transaction immediately using collaborative dashboards that do not require application programming interfaces (APIs) or electronic data interchange (EDI). The resulting cost and time savings can be substantial, but it is ultimately the gain in quality of service and customer satisfaction that often makes the case for innovative and enhanced supply chain visibility.

^[1] Communication from Chris Hanebeck, Chief Executive Officer, Truckl.io, USA

Source: Contributed by Truckl

The diffusion of TradeTech does not stop at national borders, making it relevant for global supply chains and trade networks. This is not just a private-sector-led initiative, as governments are also adopting TradeTech internationally to facilitate customs clearance and trade single window interconnections.

Yet key challenges persist, from the lack of human capital in certain sectors to the lack of interoperability of tech infrastructure/ecosystems, to resistance to share data with other actors. Collective action to increase international supply chain security and visibility can realize tremendous efficiency gains, although incentives to move in this direction might not be high for individual companies.



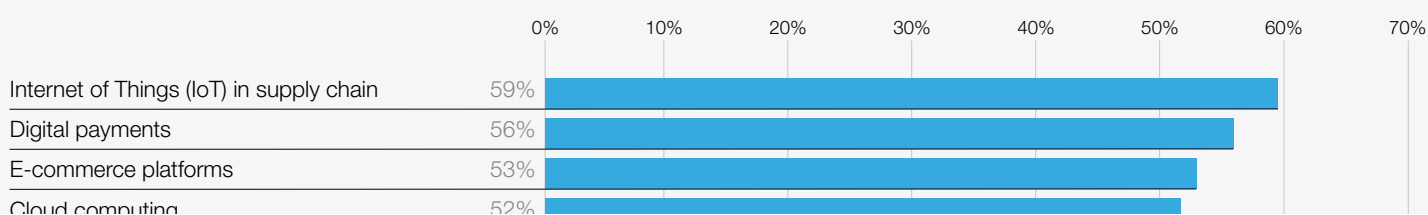
1.2 Most transformative TradeTech

The Forum's global survey aimed to understand how firms are using technologies in trade and to assess which technologies will have the most impact on global trade going forward. The survey insights are based on 340 responses from firms of different sizes across sectors and from the

world over. All respondents were from companies currently engaged in international trade operations.⁴

The survey results identify the most transformative technologies to be IoT, digital payment, e-commerce platforms and cloud computing, as presented in Figure 2.

FIGURE 2 Most transformative technologies for trade



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