

Multilateralism: 2070 projections²

A potential long-term scenario of multilateral trade in 2070 is presented. Prospective global trade trends are explored, as well as the respective inevitable transformations of the multilateral trading system. Changing cross-border trade patterns and dynamics are considered under the assumption that digital reality progressively overtakes the “physical world”. Particular focus is placed on the challenges and opportunities of the expanding technological progress. Consequently, potential implications for the WTO legal framework are examined. A set of approaches aimed at maintaining WTO’s central role in regulating multilateral trade is suggested for consideration.

Key words: *WTO, multilateral trade rules, cross-border trade, protectionism, new technologies, additive manufacturing, 3D printing, artificial intelligence, virtual reality, augmented reality, aerial transportation.*

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Introduction

Multilateral trade is ever-evolving. Being shaped by various emerging trends and factors in the global economy it is subject to continuous transformations. One of the most prominent of such factors is technology. In the past years, world altering inventions like the Internet, digital platforms, blockchain and the Internet of things have challenged the existing nature of trade flows by changing the economics and location of production, and transforming the actual content of what is being bought and sold across borders [1].

As significantly as the Internet has revolutionized the global economy and international trade in the past decades, the impact of the future technological progress will be even more extensive. The evolution and expansion of ubiquitous digita-

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lization, advanced robotics and artificial intelligence, 3D printing, as well as the spread of numerous other know-how and technological inventions into practically all spheres of life will transform the architecture of international commerce and the very concept of cross-border trade.

To access the possible implications of such changes, the remainder of this article is divided into three sections.

The first part is aimed at creating a visualization of the potential technological transformations that might take place in the coming five decades. The second part examines respective opportunities and challenges of such technological advancements and demonstrates a 2070 vision of the international trade context. The final section addresses the possible ways of accustoming the WTO's legal framework to the new economic realities and reaffirming the WTO's central role in regulating multilateral trade relations.

1. Evolving technological progress: 2070 projections

Predicting the future can be a challenging task. According to many great thinkers, including Abraham Lincoln – the best way to predict the future is to invent it.

In this manner, this article looks at four technological inventions that will have a decisive impact on shaping our future: additive manufacturing (or 3D printing), aerial transportation, artificial intelligence and brain-machine interfaces, and virtual and augmented reality technologies. Respective 2070 projections are built on the already existing achievements in each sphere and demonstrate where the future might take these technologies, given the accelerating pace of innovative progress.

One of the most prominent technological advancements that is already now revolutionizing global trade is *additive manufacturing* (or *3D printing*). 3D printing is “a process of making three-dimensional solid object of virtually any shape from a digital model” [2, p. 7]. Nowadays this technology is adapted to work with a diversified range of materials and has numerous applications. The capabilities of 3D printing are evolving rapidly and are progressively transforming numerous sectors and industries, ranging from architecture, construction, retail and healthcare to aviation, aerospace and automotive industries.

For example, robotics construction company ApisCor has just completed worlds' largest 3D-printed building in Dubai – a 9.5 meters high two-story administrative building with a floor area of 640 square meters [3]. In January this year, the world's longest 3D-printed concrete 26.3-meters-long pedestrian bridge has been completed in Shanghai [4]. Researchers from the University of Maine have recently created an 8-meter patrol boat in under 72 hours using a giant 3D printer [5].

However, currently 3D printing is largely focused on working with one single material at a time. When it comes to multi-material 3D printing – it is still at an early stage of its development. 3D printers that can simultaneously work with different material already exist. However, until recently the process of switching between such materials was rather slow. A breakthrough was made in November this year, when a new multi-material multi-nozzle 3D (MM3D) print head was introduced, which was capable of printing and quickly switching between up to 8 materials [6].

It is fair to envision that by 2070 with the advancement of multi-material 3D printing, additive manufacturing would effectively replace other production methods. It would overtake “complex manufacturing” by simultaneously carrying out production of various components that go into one product. To take car manufacturing as an example – everything from airbags to transmission gears and engines would potentially be produced by one 3D printer at the same place and time.

Another factor that would further challenge the existing international trade patterns would be the *evolution of alternative transportation methods* of both passengers and cargo. By 2070, aerial transportation will be in full operation (see Fig. 1).

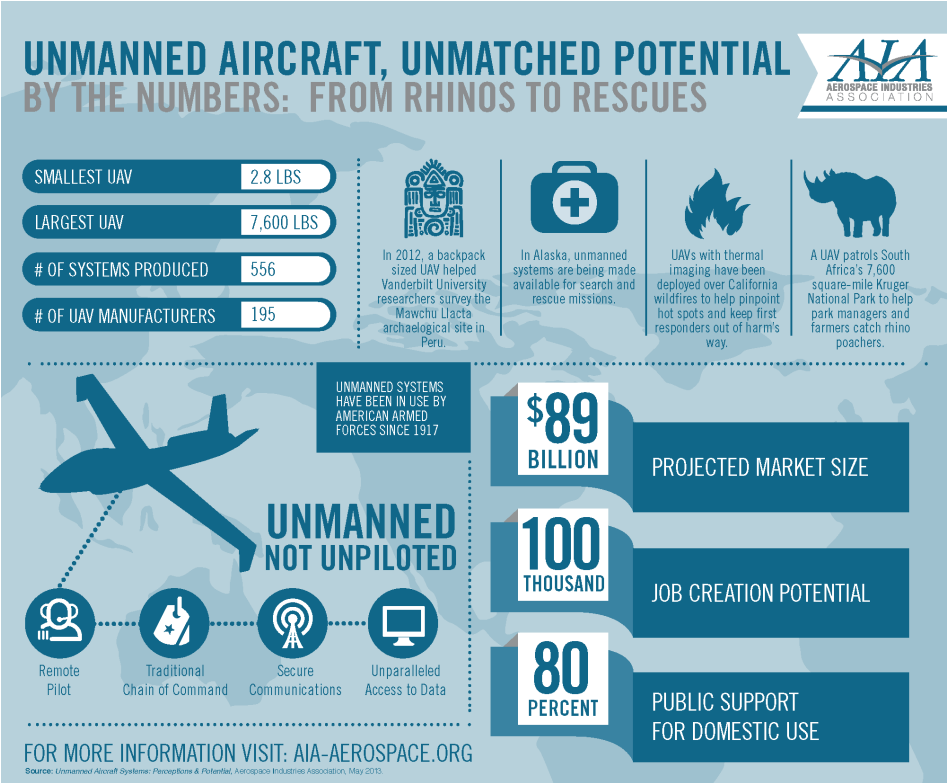


Figure 1. Unmanned aircraft.

Source: AIA-Aerospace. URL: <<https://www.aia-aerospace.org>

According to Uber, already by 2023 its' flying taxis will be fully functional [7]. In addition, autonomous aerial transportation market will be actively expanding. According to Morgan Stanley, by 2040, accelerating technological advancements have the potential to create a \$1.5 trillion market for autonomous aircrafts [8]. For example, at the 2019 Paris Air Show, Airbus presented its Project Vahana – an electric, self-piloted vertical take-off and landing passenger aircraft, or an autonomous flying taxi [9]. What concerns cargo transportation – certain goods' deliveries are already made by autonomous flying vehicles, or delivery drones. However, major limitations remain, as currently battery-powered drones can carry loads of no more than 4.5 kg [8].

Simultaneously, aerial transportation is also advancing in terms of its' speed capabilities. At the 2019 Paris Air Show mentioned above, another technological breakthrough was demonstrated – XB-1 project by Boom Supersonic. Two-seat supersonic jet XB-1, that was demonstrated at the Show, will serve as the foundation for the creation of a supersonic passenger jet Overture [10].

By 2070, supersonic travel will become an ordinary transportation method. In addition, autonomous aerial mobility will become widespread not only in passenger travel, freight and package transportations, but also in military and defense sphere. Capabilities of specialized flying vehicles will be significantly enhanced, enabling both any sized cargo deliveries and large-scale passenger transportations to be performed at supersonic speeds.

Artificial intelligence (AI) will also have a decisive effect on shaping the future of international trade. AI is “the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with humans, such as the ability to reason, discover meaning, generalize or learn from past experience” [2, p. 6]. Currently AI is mainly used for repetitive physical work, collection and processing of data in such spheres as production and manufacturing, banking and finance. Moreover, such machines perform these tasks more efficiently than humans and, often, at a lesser cost. However, with time advanced AI will progressively rival and substitute humans in other spheres as well. Already now, robots and computers are increasingly capable of accomplishing activities that include cognitive capabilities, such as making tacit judgements, driving, or even sensing emotion [11].

By 2070, useful robots will also learn to excel at problem solving and logical thinking, creativity and ability to determine and express emotions. According to the WTO DDG Alan Wolff, the world will progress towards achieving Artificial General Intelligence– equivalence in reasoning capability to the human brain, but much faster and with greater capacity [12]. Labour market will have to adapt accordingly to the growing competition posed by the advancements in AI. This will force governments to reconsider labor market strategies, develop new job creation approaches and provide re-training schemes to help the working population adapt to the new realities.

At the same time, there is a great chance that humans will learn to utilize advanced AI for expanding their own capabilities through “brain-machine interfaces” (BMI). Currently, BMIs are progressively becoming non-invasive (i.e. control of robotic devices through brain implants is giving way to noninvasive control over such appliances). A first-ever successful mind-controlled robotic arm exhibiting the ability to continuously track and follow a computer cursor was developed at the Carnegie Mellon University [13]. In the space of five decades, BMIs could progress towards enabling humans to exert ultimate control over the entire machines (of any size), instead of controlling only moderate-sized robotic devices. In this manner, AI in combination with BMIs will offer endless possibilities for enhancing human abilities, allowing machines to eventually become human surrogates (or avatars) [14].

One other factor with potentially large implications for the future of international trade is a large-scale use of *virtual reality* (VR) and *augmented reality* (AR) technologies (see Fig. 2). In addition to entertainment, these technologies are already successfully used in education, manufacturing, retail, tourism and healthcare industries. For example, VR technologies gave rise to “telehealth” – ability to deliver health care services (including doctor-patient consultations and monitoring of vital signs) outside of traditional health-care facilities [15]. According to Adobe, VR is also transforming educational sphere, and with time will offer people endless possibilities, including various field trips, highly technical training (e.g. in medical and military industries), internships, group and distance learning [16]. In addition, VR and AR technologies are also progressively shaping the field of electronic commerce and with time will be able to provide consumers with exclusive VR shopping experiences.

The ability to recreate real life experience in virtual reality can have numerous prospective applications. By 2070 VR and AR technologies have the potential to open up numerous novel possibilities for delivering services globally and revolutionize the means of communication. They could stimulate the emergence of the new types of services and the transformation of the already existing ones.

These four outlined technological developments represent but a small fraction of all the prospective innovative changes that might occur in the next 50 years. However, the consideration of these four technological breakthroughs alone can already demonstrate the extent of their cumulative impact on multilateral trade.

2. Implication for the future international trade: possible scenario

In the next five decades all the above-mentioned technological advancements – additive manufacturing, aerial transportation, AI, as well as VR and AR technologies – will come to define and dictate the terms of international trade. In accordance with the projections outlined in the previous section, by 2070, the most prominent of the international trade transformations will include the following.

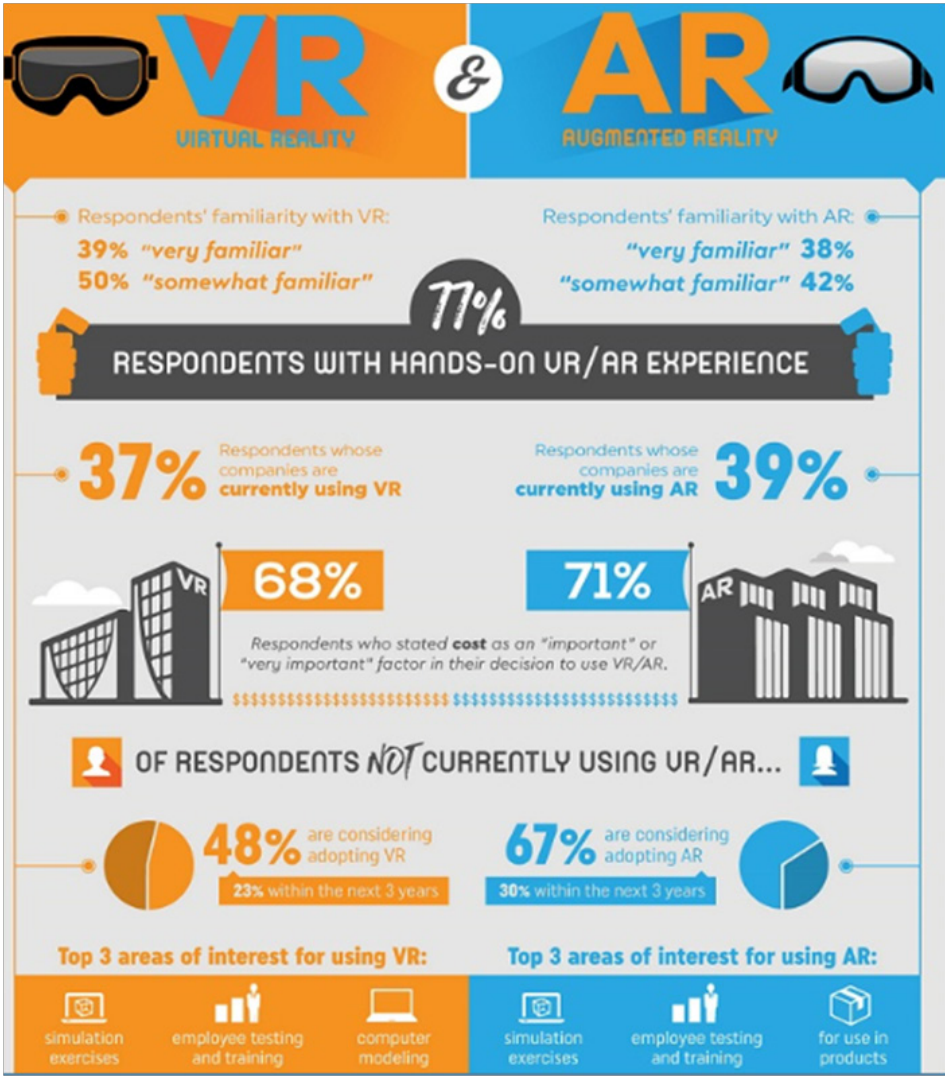


Figure 2. Virtual reality vs Augmented reality.

Source: TechRepublic. URL: <<https://www.techrepublic.com/article/infographic-vr-and-ar-are-gaining-traction-for-use-in-the-enterprise>>.

The *content and nature of cross-border trade* will be largely transformed. High-speed mass-scale 3D printing that is cost-efficient will heavily contribute towards a replacement of traditional exchange in goods and services with the transmission of design files, software and blueprints necessary to produce 3D-printed models [2]. For instance, it was estimated that by 2030 additive manufacturing coupled with advanced AI could reduce global goods trade by up to 10%, or \$4 trillion in annual trade flows [1]. In addition, 3D printing will stimulate massive reshoring trends across various industries and largely eliminate the need for international shipping, as 3D-printing will allow to produce practically any good near the prospective point of its' use [1]. As the need for imports will continue to decline,

and given that the current growth in investments in 3D printing continues, global trade may soon decrease by as much as 25%, according to certain studies [17].

Furthermore, advancements in AI, VR and AR technologies will progressively redefine the existing *ways (or modes) of supplying services*, including, primarily, cross-border supply. If currently certain services are predominantly supplied in person (e.g. various educational trainings and health-related services), these technologies will enable a remote connection of consumers with service providers, thus progressively expanding cross-border supply of financial, educational, tourism, health-related and many other services. For the service providers, the need to move to a different country to supply a service (e.g. doctors, teachers) will decline accordingly.

Protectionism as we know it today will cease to exist and will be progressively embracing new forms. With the expansion of additive manufacturing “traditional at-the-border” measures, such as tariffs, will effectively lose their relevance. New market protection approaches emerge, including various “behind-the-border” regulations that target data management and organization, use of intellectual property (IP) and operation of AI. In this respect, WTO Agreements, including, for example, certain provision of the General Agreement on Tariffs and Trade governing the use of import duties, quotas, subsidies and antidumping measures, will become increasingly outdated.

Competitiveness will come to be defined by the ability of companies to generate and manage knowledge and data, as well as their possession and control over AI. As a result, transnational companies (TNCs) and highly technological firms that exert monopoly control over data, IP and knowledge, as well as drive innovative progress will come to dominate markets and dictate the terms of access and participation in GVCs. In the absence of an appropriate multilateral legal framework on competition, new global trade rules will be largely written by TNCs and high tech giants for their own benefit with little account for the interests and capabilities of the other players in the international arena. Such abuse of market power will lead to a deterioration of global competitive environment and will largely prevent smaller firms from developing and effectively participating in global trade.

In addition, global transportation market will undergo decisive changes due to advancements in aerial transportation. Cargo deliveries would become much more efficient due to potentially lower technological barriers, fewer regulatory hurdles, decreased shipping costs, lower transportation time, as well as facilitated access to remote locations and rural areas [8]. The same is true for passenger travel – it would become much faster and more efficient. However, novel transportation methods will create new challenges for the global community, including the need to develop appropriate infrastructure for autonomous aerial transportation and a respective air traffic management system. Supersonic travel will also raise various environmental concerns that will have to be adequately addressed by the international policymakers.

These are but a few prospective changes that international trade will have to face in the coming five decades. Taken together they will reshape the nature and con-

tent of global value chains (GVCs), supply chains, foreign direct investments and distribution systems around the world. In this respect, to survive and remain at the center of regulating multilateral trade relations, the WTO of the year 2070 will have to effectively adapt to the changing nature of cross-border trade, protectionism and global competition, as well as to the novel transportation methods. New regulatory framework will have to be developed in time to negate potential problems that might arise in the absence of appropriate effective regulations, but not too early, so as not to distort the ongoing technological progress and prevent it from flourishing.

3. Implications for the WTO: possible solutions

“Institutions that fail to adapt, do not survive [12]. This Darwinian truth is as true for international organizations, as it is to for various species. Being hostage to its own institutional structure, WTO struggles to promptly react to changing global circumstances and efficiently generate respective up-to-date rules. If the existing negotiating impasse is not breached in the nearest future, by 2070, the multilateral legal framework will become entirely unfit to govern global trade relations. As a result, the WTO will lose its power in regulating multilateral trade.

To maintain WTO’s relevance and enable governments and businesses to seize opportunities offered by the evolving global trade context, the WTO’s fundamentals will have to be reconsidered and modified accordingly.

To start, the existing three fundamental pillars of the WTO (goods, services and IP) will be unable to account for the emerging novel products of “dual nature”. Such products will appear in the aftermath of continued technological and innovative progress that will progressively blur the boundaries between the existing WTO’s pillars. This novel concept will raise numerous questions for policymakers. For example, when robots start to replace humans in various spheres of activity – will such machines be treated as services (as robots would essentially be classified as natural persons) or as goods? The same concerns VR and AR products. Will they be treated as goods or as services? To answer these questions, the very philosophy of the WTO will have to be adjusted to account for this novel category of “dual natured” products.

Consequently, WTO spheres of competence will have to be expanded to account for the new spheres of regulation, and its’ existing Agreements will have to be adjusted accordingly in terms of their structure, coverage and substance. Given the projections outlines in this paper, at a minimum the future multilateral regulatory framework will have to account for the following.

First, *regulations governing the use and development new technologies*. Development in AI, VR, AR and BMI technologies could open up numerous prospects for “neurocrime” and malicious “brain-hacking”, including illicit access and manipulation of neural information and computation [18], virtual harassment risks as well as various other safety risks. Therefore, more advanced and complex data protection methods

will have to be devised at the multilateral level. In addition, respective industry standards (including safety standards) will have to be developed to ensure privacy and security of information and prevent “neuro-hacking” (see Fig. 3). Moreover, appropriate penalty measures will have to be designed to prevent unwanted conduct, including potential fraud and false activity.

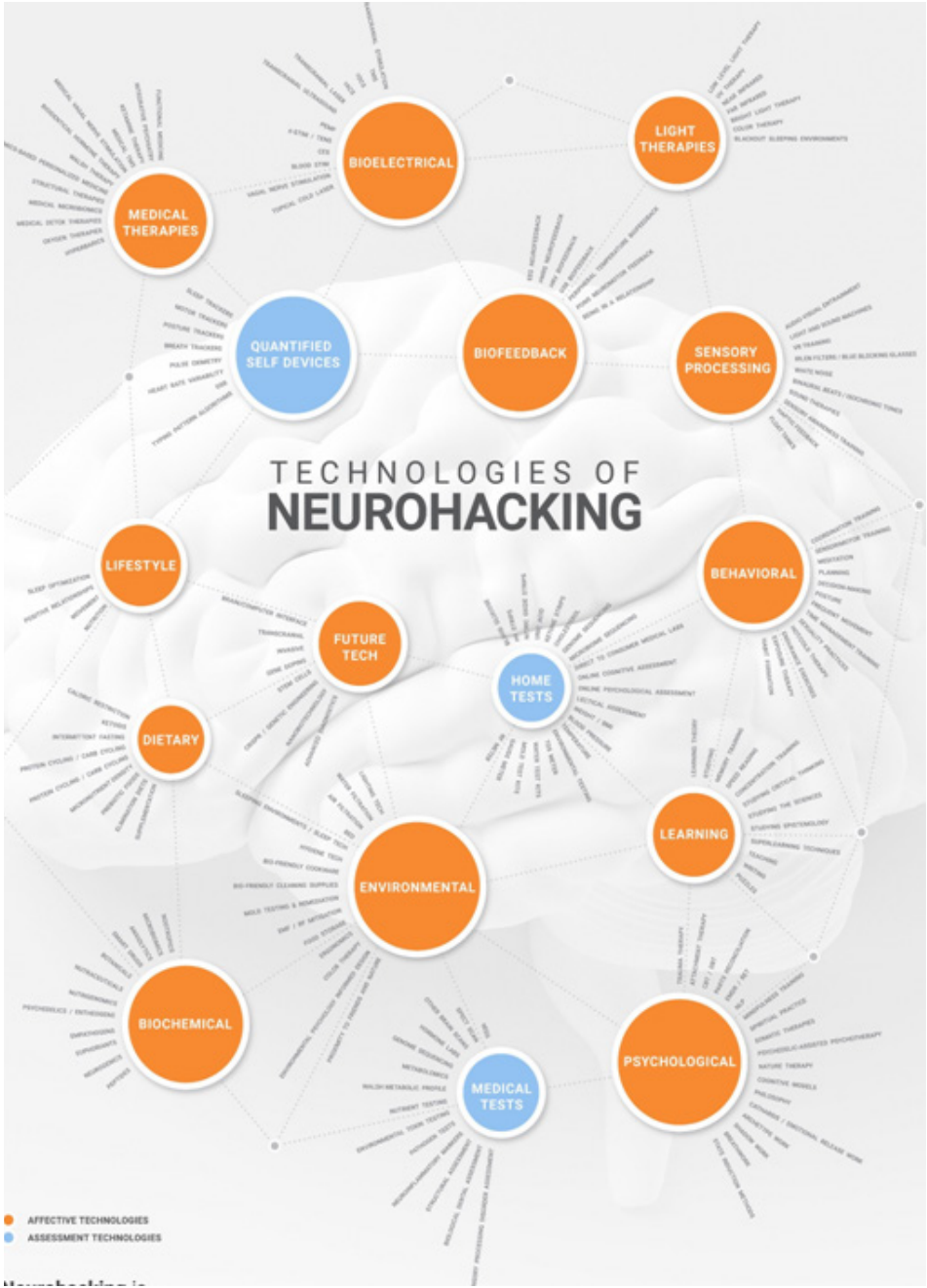


Figure 3.Technologies of neuro-hacking

Source: [19].

Second, *regulations providing for “fair” global competition conditions*. To prevent the emergence and spread of technological monopolism of large TNCs and big technological giants, appropriate mechanisms will have to be developed to enable barrier-free access to new technologies, including 3D printing, AI, VR and AR technologies.

Third, *rules governing IP rights protection* will have to account for technological and innovative developments. Also, given that IP will be increasingly produced by AI, IP protection, including patent and copyright protection, will have to be improved and adjusted accordingly.

Fourth, *air and space transportation regulations*. The advancement and spread of autonomous aerial transportation of passengers and cargo will require the development of respective safety standards, a new set of rules governing its operation and market access conditions. As the current system of international air traffic regulation is partially subject to GATT and General agreement on trade in services (GATS), amendments will have to be introduced to both agreements.

Fifth, structural changes in the nature of *services’ supply modes* will trigger the need to adapt the existing WTO legal framework in this sphere. For example, GATS regulations governing “Mode 1: cross-border trade”, as well as “Mode 4: presence of natural persons” will have to be developed in line with the ongoing technological changes.

In addition, the WTO will have to undergo certain institutional changes. For instance, *WTO’s Dispute settlement mechanism* will have to be adjusted to a progressive involvement of AI in its’ procedures and processes. However, most importantly, instead of predominantly exerting discipline on its Members, the WTO will have to start managing the evolving economic environment to remain at the center of the multilateral trading system. It will have to start effectively guiding the new flows of data, IP, knowledge and services across the globe.

Overall, the future WTO legal framework will still remain essential for ensuring full and equal participation of both economies and businesses in the multilateral trading system. Therefore, despite the many changes, risks and challenges envisioned by this article, the WTO’s core principles, including transparency, openness, inclusivity and non-discrimination will remain as relevant in 2070, as they are today.

Conclusion

In the next five decades, global economy and international trade architecture will be largely transformed under the impact of technological advancements and innovative progress. To remain at the center of effectively managing evolving multilateral trade context, the WTO of the future will have to embrace new spheres of regulation and generate appropriate up-to-date rules.

These would include, among others, regulations governing the use and development of new technologies and novel transportation methods, development of respective safety standards and regulations aimed at ensuring privacy and security of information, prevention of “neuro-hacking” and establishment of appropriate IP protection. Competition rules will also have to be devised and implemented at the multilateral level to enable barrier-free access to and use of the new technologies.

Most importantly, the very philosophy of the WTO will have to be adapted to the changing environment. The three fundamental pillars of the organization (goods, services, intellectual property) will have to accommodate for the emerging products of “dual nature”, which do not fall exclusively under any single WTO category.

Notwithstanding the accelerating pace of technological changes with their respective risks and challenges for the multilateral trade community there will always be a strong need for a level-playing field, where competition conditions are not hindered by artificial advantages. Even in 50 years from now rules-based multilateral framework, strong and fair competition conditions, stability and predictability will remain integral for ensuring continued economic growth, development and innovation. Therefore, the core WTO’s values and principles, including transparency, openness, inclusivity and non-discrimination, will remain indispensable and will have to be preserved and promoted by the international policymakers.

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Мочалова А.¹

Многостороннее регулирование торговли: Прогноз на 2070 г.²

В статье представлен возможный долгосрочный сценарий развития многостороннего регулирования торговли до 2070 г. Исследованы возможные глобальные тренды и соответствующая неизбежная трансформация многосторонней торговой системы. Рассмотрены динамика и модели трансграничной торговли с учетом растущей роли цифровой реальности, особый акцент сделан на вызовах и возможностях набирающего темпы технологического прогресса. Проанализированы возможные последствия данных процессов для правовой базы ВТО. Предложен ряд подходов, направленных на сохранение центральной роли ВТО в регулировании международной торговли.

Ключевые слова: ВТО, многостороннее регулирование торговли, трансграничная торговля, протекционизм, новые технологии, аддитивные технологии, 3D-печать, искусственный интеллект, виртуальная реальность, дополненная реальность.

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2 Статья отражает исключительно авторский взгляд и может не совпадать с позицией организации, аффилиация с которой указана выше. Статья основана на выступлении автора на сессии «Многостороннее регулирование: ожидания новых поколений» Общественного форума ВТО (Женева, октябрь 2019 г.).