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Magdalena Stok-Wódkowska
Faculty of Law and Administration, University of Warsaw, Poland

Elżbieta Czarny
Institute of International Economics, SGH Warsaw School of Economics, Poland

Traditional Categorisation of Trade and the Digital Economy: Toward Order or Chaos?*

Tradycyjna klasyfikacja handlu a gospodarka cyfrowa – w stronę porządku czy chaosu?

Abstract

Electronic commerce has disrupted traditional international trade categories, making it increasingly difficult to classify traded items as services, products or factors of production. This paper examines whether classic economic classifications can effectively capture the nature of e-commerce. The authors question the World Trade Organisation's division between goods and services in frameworks such as the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS), and regional trade agreements (RTAs), arguing that the concept of a "commodity" fails to fully represent digital trade. The analysis shows that e-commerce often combines multiple categories within single transactions. Consequently, traditional legal, economic and trade policy concepts are insufficient to address the complexities of digital trade. Without a precise definition of e-commerce, practical issues arise, including challenges in identifying trade barriers and implementing effective regulations. The paper outlines the limitations of the current regulatory framework, reviews the WTO's trade classification system, and analyses the notion of "commodity" as an overly narrow term for e-commerce. Finally, the authors explore the characteristics of digital trade and recommend the introduction of new classification categories for electronically traded objects to help address these shortcomings.

Keywords:
services, digital economy, international trade agreements, e-commerce, goods

JEL classification codes:
F10, F13, O33, P45

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Streszczenie

Handel elektroniczny kwestionuje tradycyjne kategorie handlu międzynarodowego, utrudniając klasyfikację transakcji jako usług, produktów czy czynników produkcji. W artykule zbadano, czy klasyczne klasyfikacje ekonomiczne skutecznie oddają istotę e-handlu. Autorki podważają podział towarów i usług stosowany w ramach WTO (m.in. GATT, GATS, RTAs) i twierdzą, że „towar" nie odpowiada w pełni handlowi cyfrowemu. E-handel często łączy różne kategorie w jednej transakcji, przez co tradycyjne pojęcia prawne, ekonomiczne i handlowe są niewystarczające. Brak precyzyjnej definicji e-handlu prowadzi do problemów praktycznych, takich

Słowa kluczowe:
usługi, gospodarka cyfrowa, międzynarodowe umowy handlowe, handel elektroniczny, towary

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jak określenie rodzajów barier handlowych i wprowadzanie regulacji. W pracy przedstawiono niedoskonałości obecnych ram regulacyjnych, przeanalizowano klasyfikację handlu WTO oraz omówiono ograniczenia dotyczące pojęcia „towar" w kontekście e-handlu. Autorki badają specyfikę handlu cyfrowego, sugerując potrzebę nowej klasyfikację dla obiektów handlu elektronicznego.

Introduction

Data and digitisation have become integral to production processes, goods, household and government consumption, capital formation, cross-border flows, and finance [**IMF, 2018**]. Cross-border electronic commerce (e-commerce or digital trade) is a fundamental aspect of the digital economy, defined as trade between countries where the product itself is digital, and/or where aspects of the transaction – such as advertising, ordering, delivery, payment, or servicing – are conducted at least partially through the internet or similar digital technology [**Deardorff, 2017**, 38]. The importance of e-commerce is underscored by the fact that in 2020, consumers spent USD 1 million online every minute [**Ali, 2020**]. Despite its growing significance, the regulation of international electronic commerce remains limited and fragmented, primarily managed through regional trade agreements without globally agreed standards.

In this paper, we analyse existing classifications from the perspectives of international economic law (regulatory perspective) and international microeconomics. We question the adequacy of these classifications for analysing cross-border e-commerce and the broader digital economy. We highlight differences in how the same terms are understood by scholars in economics and law. We argue that rethinking e-traded objects is essential not only for scientific – especially interdisciplinary – discussion, but also for formulating effective economic policies, including regulation and taxation, and for improving the accuracy of e-commerce statistics.

The paper is structured as follows. We begin with two introductory sections: the first focuses on the economic definitions of goods and services, while the second explains the legal terminology and the origins of the definitions of these terms. We present inconsistences within both approaches, as well as interdisciplinary differences between definitions. The final three sections examine digital transformation and the challenges it poses to definitions used by economists and legal scholars – and, consequently, the difficulties involved in developing coherent regulatory frameworks. We also attempt to conceptualise new categories.

Goods and services – perspective of international microeconomics

According to linguistic logic, "goods" refer to things that are desirable. More precisely, they are defined as items that satisfy human needs. In this context, goods can be both material and immaterial (tangible and intangible), which means that the general term "goods" also includes services. This is the broad interpretation of the term "goods." However, in economic literature, especially in the literature on international trade, terminological logic does not dominate. This is partly a result of economic practice and partly due to tradition. It might also stem from theorists' tendency to create new terms without anchoring them in previously established terminology. Such inconsistency can also result from the different objectives of researchers specialising in various fields of economics and using diverse research methods.

The theory of international economics initially centred exclusively on international trade in physical products (e.g., in **Ricardo**'s work [**1815**] clothing and wine). There was no need to specify types of goods because, for a long time, services were considered non-tradable. By definition, services could not be traded internationally since they typically required the simultaneous presence of both consumer and producer in one location. If the two parties were in different countries, it usually meant that one travelled to the other (or vice versa), which was treated as the movement of people rather than as international trade [**Deardorff, 2017**: 35]. As a result, services were largely ignored by international trade theorists until recently.

This changed when it became evident that some services were essential components of international trade in goods – notably, transportation services [**Deardorff, 2017**: 36]. Moreover, with advancing technology and evolving demands, other services also became tradable. Increasingly, services could be provided across borders via remote means. Simultaneously, economists recognised four methods of service provision, including the movement of both producers and consumers, as part of international trade. The first method is to provide services cross-border using various types of means of distance communication. The second way is the so-called passive use of cross-border services, when the recipient uses the service in a country other than the country of origin. The third method, consisting of a commercial presence in another country, is often combined with the need to set up an enterprise in the country where the service is provided; thus, in practice, it means an investment. The fourth way of providing services consists of the physical presence of persons in the host country. It is primarily a temporary stay. The modes (2)–(4) include movements of the service provider or recipient.

The inclusion of trade in services in the Uruguay Round of international trade negotiations and the adoption of the General Agreement on Trade in Services (GATS) formalised the division between goods and services. In the literature, goods and services began to be seen as separate subjects of production and consumption. This classification, however, does not acknowledge the fact that services are "goods" just as much as material products are, and that their provision enhances consumer satisfaction. Nevertheless, because this narrow (material) meaning of the term "goods" is widely adopted in practice and is often used in the literature, we cannot ignore it and will apply it throughout the remainder of this part of the paper.

International trade theorists usually do not define the terms "goods" and "services" at all, assuming them to be self-evident or already defined elsewhere (e.g., in economics textbooks). As globalisation progresses, microeconomics textbooks increasingly contain chapters on open economies, trade, factor mobility, and protection, but even there, definitions are rare. Moreover, many economists are imprecise in the use of these terms.

The result is a degree of terminological chaos, which we illustrate with examples stemming from numerous textbooks in microeconomics and international economics, as well as selected publications on international trade and e-commerce. We additionally recall classifications of trade subjects in various databases. Rather than conducting a complete literature review, we document how economists handle this issue.

Browning and Zupan [2020] do not define "goods" and "services" in the glossary or index [**Browning, Zupan, 2020**: G1-G7 and I-1-I14]. However, they use these terms in the text (e.g., when discussing production possibilities under scarce resources, they provide the example of "research and teaching that your university can produce" [**Zupan, Browning, 2020**: 9]). These authors refer the term "good" to air transportation [**Zupan, Browning, 2020**: 34-36]. They [**Zupan, Browning, 2020**: 44] describe economic goods (as opposed to economic "bads") as commodities for which more is preferable to less. Later, in discussing composite goods, they maintain that goods are all consumed items [**Zupan, Browning, 2020**: 58-59]. They also refer to public goods as "goods that benefit all consumers, such as national defence" [**Zupan, Browning, 2020**: 509]. They consistently apply the broad interpretation of the term "goods."

Reinert [2021] discusses goods and services and defines both terms, although not in the glossary [**Reinert, 2021**: 534-543], but in a footnote [**Reinert, 2021**: 3]: "It is sometimes said that the word 'goods' refers to things you can drop on your toe. Therefore, 'services' refers to things you cannot drop on your toe. More formally, goods are tangible and storable, whereas services are intangible and non-storable." Reinert's interpretation aligns closely with the narrow meaning of the term "goods."

Investopedia does not define "goods" directly, but it refers to goods as subjects of international trade, alongside services. Investopedia also defines factors of production as the inputs needed to create a good or service. This approach is similar to the narrow understanding of the term "goods." **Mankiw and Taylor [2006**: 23] follow a similar convention, discussing markets for goods and services without defining both terms (similar to **Bowles and Halliday [2022**: 283n, 993]).

Frank, Bernanke et al. [2022: 33] discuss "providing goods and services," but later switch to "products to produce or buy." Throughout the textbook, the term "goods and services" reappears (e.g., 34, 265, 270).

However, in the index [**2022**, I-6 to I-11], the authors do not define goods, products or services. Instead, they list terms such as inferior goods, product clustering, and service industries. **Gwartney et al.** [**2021**: 4] refer to "goods," giving examples such as food, education, national defence, and entertainment. Further along, they discuss the value of a good or service [**Gwartney et al., 2021**: 11]. In both publications, we have a mix of broad and narrow interpretations of "goods," supplemented by the terms "products" and "services."

Petersen [**2021**: 5, 18] defines goods as items that satisfy human needs, are scarce, and are offered for sale in accordance with linguistic logic. **Petersen** [**2021**: 18] also divides goods into material (tangible) goods and services (intangible or immaterial). Additionally, he refers to digital goods [**Petersen, 2021**: 19] and gives examples including software, content, and communication tools such as email and the internet. **Piga** [**2022**] takes a similar approach, sometimes discussing goods and services without defining them explicitly (e.g., **Piga,** [**2022**: 11, 16, 18, 23, 96-99]), yet using the term "good" broadly to describe anything consumed or needed (e.g., **Piga** [**2022**: 26–28, 43, 55, 64]) with examples such as tennis lessons and books in the context of consumer preferences.

Perloff [**2016**] discusses "goods and services" without defining them, but also uses "goods" to refer broadly to all produced items, including services [**Perloff, 2016**: 29]. Perloff also uses the term "commodity" without a definition ("commodity market," [**Perloff, 2016**: 33]) and aligns "good" with linguistic logic: "The output can be a service, such as an automobile tune-up by a mechanic, or a physical product, such as a computer chip or a potato chip" [**Perloff, 2016**: 175]. In this instance, we see both broad and narrow definitions supplemented by the terms "output" and "commodity".

This terminological chaos makes it difficult, or even impossible, to be precise in discussions on the subject among economists. The situation becomes even more complicated when the participating parties represent other fields of science. We present this problem based on the terminology used by representatives of international economic law.

Goods and services – perspective of international economic law

Traditionally, in international economic law, trade in goods and trade in services are clearly separated. This is best illustrated by the way the WTO regulatory framework has been designed, with its core division into the General Agreement on Tariffs and Trade (GATT), related to goods, and the General Agreement on Trade in Services (GATS), related exclusively to trade in services. This division has been replicated in all of the Regional Trade Agreements (RTAs), where we have some chapters on goods and another on services (usually also including some aspects of investments). In order to assess the influence and practicability of this division in economic practice and in the digital economy, we need to present their legal definitions.

For centuries, international trade was limited to trade in goods. Consequently, there was no need to define the subject of exchange, as trade regulations were designed to apply to everything on which duties could be levied, and such items were usually tangible. Determining the scope of those tariffs belonged entirely to states [**Tonodomnej, 2023**: 214], rather than to any international institutions.

The only exception was the European Union (or rather the then European Economic Community – EEC), which recognised the possibility of international trade in both goods and services, and regulated the free movement of goods separately from the free movement of services. Hence, quite early on, there was a need to determine what constituted "goods." The European Court of Justice clarified this as any product having a value expressed in money and being capable of forming the subject of a commercial transaction (ECJ judgment in Case 7/68 Commission v. Italy, ECLI:EU:C:1968:51). This definition is very broad because it primarily reflects the need for deep integration within the EEC, based on general provisions prohibiting the imposition of duties and charges having equivalent effect as well as quantitative restrictions (and measures having equivalent effect). This broad definition could potentially also cover services, as they may be traded, have monetary value, and form the subject of commercial transactions. The main distinction was that services were, from an

early stage, perceived as immaterial.[1] However, similar definitions were not developed on the basis of other systems or trade agreements.

Given the scope of WTO law as the most universal regime governing international trade in goods, it is possible to define the material scope of the standards for the treatment of goods. The basic regulation in this area is GATT, which includes the abolition of quantitative restrictions and the reduction of customs duties. While non-tariff restrictions – always defined very broadly – may concern equal aspects of trade, customs duties are levied exclusively on goods. Thus, the scope of the regulation of goods will include any product on which it is possible to impose a duty.

In the case of both GATT and most RTAs, the material scope of the regulation of goods is even determined by a detailed definition of the goods covered by customs concessions. The reference point in these cases is the classification of the World Customs Organisation based on the International Convention on the Harmonised Commodity Description and Coding System. The Harmonised System of Classification of Goods[2] defines the types of goods in a very casuistic way, determining the scope of application of the regulations relating to goods.

Services, as an area of regulation, are usually defined indirectly. Although the term 'provision of services,' adopted in EU law but also used in non-legal language, more accurately reflects the nature of this type of economic relationship, the expression 'trade in services' adopted in international economic law emphasises above all the link with commercial law. International economic law does not, in principle, define the concept of 'service' itself. Admittedly, such a definition has been formulated in European Union law, particularly through the case law of the Court of Justice of the EU, where services are understood as an intangible supply, usually provided for remuneration, for a limited period of time. However, it can be inferred from the definition of 'trade in services' in the GATS that the scope of the concept of 'services' in EU law is narrower than in international economic law, which does not separate the provision of services from establishment, which is already explicitly the case in EU law in the Treaty on the Functioning of the European Union (Articles 49, 56, and 57).[3] Usually, international legal regulations focus on the intangible aspect of the service, as an element of the definition that distinguishes services from goods, without specifying others.

In WTO law, the distinction between services and goods is not as significant as in EU law, where the free movement of goods and the freedom to provide services are regulated separately and, according to settled case law, it is necessary to determine which freedom is central to a given factual situation. At the same time, WTO law recognises that services may be part of a commercial transaction. This is well illustrated by disputes such as EC – Bananas III and Canada – Autos, in which the claims concerned not only alleged infringements of GATT but also of GATS.

The scope of trade in services is most often defined not by the concept of a service itself, but rather more broadly through various ways of providing services, due to the fact that the General Agreement on Trade in Services (GATS) is based on such a definition. Article I of the agreement provides that trade in services shall be deemed to be "the supply of a service: (a) from the territory of one Member to the territory of any other Member; (b) in the territory of one Member to the recipient of the service of any other Member; (c) by a service supplier of one Member through a commercial presence in the territory of any other Member; (d) by a service supplier of one Member through the presence of natural persons of a Member in the territory of any other Member." This corresponds to the four modes of providing services.

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1 See for example Judgment of the Court [of EEC] of 30 April 1974, case 155/73 Giuseppe Sacchi, ECLI:EU:C:1974:40, with the exception of electricity, which was confirmed by European Court of Justice in 1964 in its famous Costa v ENEL judgment (Case 6/64, judgment of 15 July 1964, ECLI:EU:C:1964:66).

2 The Harmonised Commodity Description and Coding System, generally referred to as the "Harmonised System" or simply "HS," is a multi-purpose international product nomenclature developed by the World Customs Organisation (WCO). Each commodity group is identified by a six-digit code. This system is used by over 200 countries and economies; see more at: http://www.wcoomd.org/en/topics/nomenclature/overview.aspx.

3 Freedom of establishment is closely linked to the EU's freedom to provide services, but from the point of view of international economic law the notion forms a part of investment law. When freedom of establishment in included into an RTA concluded by the EU, it is always a part of a chapter related to services. It is not covered in this article as it is not influenced by changes in the digital economy in the same way as cross-border service provision.

Although at the time GATS and many Economic Integration Agreements (EIAs) covering liberalisation of trade in services within the framework of RTAs were negotiated, there were not many means of communication enabling cross-border trade in services. This is obviously changing rapidly and has become of fundamental economic importance. Therefore, there is a growing importance of "mode (a)" of providing services, as it is nowadays done digitally. At the same time, it may also be the most challenging mode from a regulatory point of view, as it concerns offering services without legal presence and limits control exercised in the host country of the receiver of a service. It is also the most challenging from the point of view of the incorporation of digital trade into the existing regulatory framework.

As GATS and some EIAs were formulated decades ago, they cannot counteract trade barriers that have appeared recently. They are not even applicable in the case of many new electronically provided services and therefore cannot be invoked to prevent barriers such as restricting or even banning selected suppliers. Also, disputes in the WTO concern only subjects covered in WTO regulations, which omit many forms of e-commerce. Free services provided not for money but for other services (information about the recipient, so-called digital footprint) are beyond such regulations.

Even though the WTO's classification is closely related to international economics and was created to test economic theories empirically, the definitions and distinctions between goods and services differ in the theory of international economics and in international economic law. This leads not only to problems in academic debates but also to more significant misunderstandings and inconsistencies in the formulation of new regulations and policy strategies. All of these issues have become more acute with digitisation, which has added new layers of confusion to the existing ones.

Defining goods and services in the digital economy

The digital economy, defined as an economy in which data play a central role rather than the production of goods and services [**UNCTAD, 2021**], is a relatively new concept in both international law and international economics. It becomes even more challenging to conceptualise when traditionally used definitions are taken into account.

When considering the nature of electronic commerce transactions, one might argue that they fit even less clearly into the aforementioned categories. Electronic (digital) trade involves the electronic delivery or ordering of goods or services [**OECD, 2020**: 51]. This broad definition adds to the difficulty in measuring cross-border electronic commerce and presents challenges in identifying barriers to such broadly defined trade. Consequently, it encompasses a wide array of transaction types but does not easily align with existing definitions or classifications. We therefore argue that the traditional division into goods and services is insufficient for accurately describing the nature of cross-border e-commerce. The commonly used term "commodities" is even less appropriate: in international economic law, it does not cover all goods, not even all material goods, but typically refers only to basic items, such as raw materials. Economists would further note that it excludes all intangible items traded digitally.

From a regulatory perspective, the defining features of goods are their tangibility and exclusivity of ownership. Only one person can own a good. Digital products (files, databases, information) lack such exclusivity [**Fleuter, 2016**: 165]. As GATT defines goods as tangible items, intangibles are classified as services and regulated under GATS and "trade in services" chapters in RTAs (see, for example, US Gambling panel and Appellate Body Reports). However, digital transactions complicate this distinction. A transaction might be qualified as digital, according to the OECD definition, if the good is tangible but the transaction was conducted digitally (which would classify it as trade in goods), or if the entire transaction was digital (typically classified as trade in services). At times, such digital items may even be transformed into tangible goods thanks, e.g., to new forms of recording and storage.

In some international agreements, another term – digital product – has been introduced, as in the US-Japan Digital Trade Agreement. This agreement defines digital products as any items that can be "transmitted electronically" – Article 1(g), implying intangibility and, therefore, classification under services. However, the term "products" is often used to refer exclusively to tangible goods.

In practice, electronically deliverable goods and services encompass a broad category that primarily includes services, such as information society services, frequently associated with data flow monetisation, or services that **Ciurak and Ptashina [2018]** categorise as "real to real" but provided in various modes – business-to-business and business-to-consumer (using digital intermediaries such as Amazon or for services such as travel cloud, or shared services for transnational corporations that are provided remotely), household-to-household (previously known as the sharing economy, now increasingly professionalised), and even household-to-business (including remote work, which has significant implications for the labour market). This diversity makes it difficult to fit such transactions into established categories.

Beyond the lack of a logical distinction between goods and services, we now face blurred boundaries in the regulatory categories for international trade. This distinction has become a significant regulatory challenge for electronic commerce. The lack of a clear division and classification into goods or services affects regulatory frameworks, as trade in goods is typically more liberalised than trade in services, which follows a positive-list approach [**Burri, 2016**].

Blurring boundaries between goods and services are evident even in definitions related to e-commerce. These definitions often conflict with GATT and GATS regulations. It is increasingly clear that " [i] n the digital economy, much of the value in manufactured goods is captured by the smart services embedded within them" – servicification of manufacturing [**Neeraj, 2019**: 121-122]. Technological advances such as 3D printing and the Internet of Things are further erasing the traditional line between what is physical and what is immaterial [**Chander, 2019**]. Therefore, the traditional regulatory framework that separates the liberalisation of trade in goods and services struggles to adapt to the digital reality. The inadequacy of a suitable legal framework to address these issues is becoming increasingly significant in international economic law (see, e.g., **Gao [2018**: 299]; **Willemyns [2020]**) as well as in international trade theory and practice.

While studies of some digital transactions can be classified within the goods and services distinction in the WTO framework [**Willemyns, 2021**], this categorisation is not consistently applied in regional trade agreements. Using WTO regulations to facilitate the digital economy remains challenging. Digital trade is defined as "all economic activity reliant on, or significantly enhanced by, the use of digital inputs, including digital technologies, digital infrastructure, digital services, and data. It refers to all producers and consumers, including government, that utilize these digital inputs in their economic activities" [**OECD, 2020**: 35][4]. Moreover, data regulations – covering data flow and protection – are central to the digital economy [**Sen, 2018**: 323].

However, a large sector of digital trade – services provided for free online (such as games, maps, databases, programs, e-films, and e-books) – is overlooked in traditional definitions. These services are non-rival and non-excludable, yet they cannot be classified as public goods, as their use requires a counter-duty from the user in the form of personal data.[5] This non-monetary exchange creates a hidden price paid by users for their online activity.[6] Free services are difficult to capture in international trade statistics, which typically rely

[4] Goods as a subject of digital trade are not mentioned here. The cited OECD source refers to inputs, technologies, infrastructure, services and data.

[5] Personal data is any information relating to an identified or identifiable individual [**Kende, 2021**: 85]. The owner of this data is the person concerned, but it may be also be held or controlled by his or her transaction partner, such as the recipient of services or goods. Everyone active online leaves a specific digital footprint on the internet. This footprint contains information about a person's habits, preferences and expenditures. It is valuable for producers because it increases sales efficiency by enabling the precise targeting of information to a specific individual. Information derived from the digital footprint is available free of charge to network operators, even though it is undoubtedly valuable. Payment with personal data may lead to market failure known as information asymmetry: one party to the transaction (e.g. a producer or digital platform) possesses better knowledge about the transaction than the other party (consumer or user). Moreover, users are unable to assess the level of security applied to the processing of their personal data, which may result in insufficient protection. At the same time, it is impossible to withhold certain information if one wishes to benefit from digital services.

[6] An additional price for these goods is paid indirectly, for example through expenditure on digital equipment or internet access.

on monetary values. In transactions where data or other digital content is exchanged for personal information, there is no visible financial trace. The exchange is registered only as a data flow in big-data[7] repositories, which also complicates the taxation of such transactions. Moreover, if no payment is involved, these transactions may fall outside the scope of international trade statistics altogether. It is also often unclear whether they should be classified as domestic or cross-border transactions.

Another category omitted by the "goods and services" classification is digital capital, defined as the creation, processing, and evaluation of data (databases). Digital capital represents a new form of innovation, production factor or digital service (information) that is traded in e-commerce. It is infinite in content, processing and dissemination possibilities [**Varian, 2009**]. The combinations and connections of digital components are limitless. Its elements can be produced, used, processed, transformed, analysed, and traded. Digital capital is non-rival; one database can be accessed by multiple users without quality loss. The possession of digital capital is elusive in statistics. Without a monetary price, it is recorded as zero on balance sheets,[8] despite its contribution to competitive advantage and economic gains, thereby distorting information about a company's economic standing, the characteristics of the market, and the GDP of countries with developed digital sectors.

Digitally traded goods and services not only defy traditional divisions and definitions but also introduce unique transaction types inherent to the digital economy. For example, complex transactions often involve multiple legal entities across jurisdictions (such as banks and customs in different countries) and diverse logistics networks [**Hoque, Brashow, 2021**: 6]. Such complexity can lead to trust and legal uncertainties.

These complex transactions often arise because sellers compete not only on product quality and price but also on the range and quality of services accompanying purchases. For instance, a single transaction might include services such as payment, return and refund, and delivery tracking. Complex transactions also introduce issues of simultaneous monopolisation across multiple markets for specific multi-sectoral digital firms.

E-commerce is transforming the nature of trade by altering how transactions are initiated and conducted. Increasingly, we see trade that is purely electronic in form – where traditional goods are ordered digitally, without altering their physical nature. These goods typically fall under the scope of the GATT or the goods chapters of RTAs, which aim to establish free trade areas. Although such transactions are covered by core GATT principles of non-discrimination, including Most-Favoured Nation and National Treatment, they face new types of barriers specific to digital ordering and delivery – barriers that are not addressed by GATT or existing international frameworks for goods trade (see **Sun, Lee, Roh** [**2023**: 77]). As noted by the **OECD** [**2019**], while electronic trade changes the mode of transaction rather than its substance, when such trade is regulated under frameworks applicable to services, it may no longer fall within the scope of goods-related trade rules.

Practical problems with blurring categories

The rise of cross-border business-to-consumer or even consumer-to-consumer transactions results in the shipment of small-value packages internationally. Such individual-driven trans-border e-commerce introduces new challenges for law enforcement (customs, goods security, payment security, and compliance with market access requirements) from both an economic and regulatory point of view. International economic law has been created for companies rather than individuals. This form of trade also affects statistics and distorts the perception of international cooperation, e.g., if a single transaction value is lower than the minimum value registered in the statistics but their aggregated value is significant.

In e-commerce, distinctions among goods, services and factors of production become less significant, and their interconnections deepen. For instance, songs or e-films downloaded from the internet lose their essential characteristics as services. At the same time, e-books are classified as services from a tax-law perspective

7 Big data (giga data) are varied, complex and disordered. The ability to process, structure and use such datasets becomes increasingly important as they grow less transparent and less reliable.

8 For example, a financial audit of Facebook in 2011 assessed the value of its databases at zero [Mayer-Schönberger, Cukier, 2013].

[**Tanodomdej, 2023**: 215]. Simultaneously, they continue to fulfil the same consumer needs[9] as traditional books and can be treated as interchangeable (substitutes, at least imperfect ones). As a result, it would be reasonable to treat them in the same manner as printed books from a regulatory perspective. However, differences in the application of non-discriminatory treatment under GATT and GATS make such equal treatment impossible within the existing system.

Digitisation further intertwines production, sale and consumption processes for products, services and factors of production. This is particularly evident in the so-called Internet of Things, where it is often impossible to purchase a good without complementary services. From a dispute-settlement perspective, the issue appears to have been addressed [**WTO, 1997**], with the conclusion that the assessment should focus on whether a specific measure breaches GATT or GATS, rather than on the nature of the economic transaction itself (see also **Chander** [**2019**: 20]).

The production and consumption of services can now be separated. This has been made possible by technological advances and the invention of portable media and storage devices. Although a live concert remains intangible, its recorded version resembles a product rather than a traditional service, which requires the simultaneous presence of the consumer and the producer. From the consumer's perspective, goods and services may therefore function as imperfect substitutes, which suggests that they should be treated similarly rather than regulated separately under two distinct systems.

Consequently, the line between consumer and producer is becoming increasingly blurred, giving rise to a new category: the prosumer. Traditionally, consumers acted as producers only in selected sectors, such as agriculture or real estate. Today, however, consumers contribute to transportation, food, accommodation and cultural industries [**Albert, 2020**: 16]. They also generate digital footprints and provide digital capital by creating content for electronic platforms – such as videos for YouTube. In addition, they now perform certain roles previously handled by intermediaries, such as travel agencies. Moreover, participants in e-commerce are increasingly interconnected. **Heerschap et al.** [**2018**] note that platform relationships were initially classified as B2B, B2C or C2C. Now, C2C activities increasingly resemble B2C transactions, particularly in areas such as transportation services, booking accommodation abroad or food delivery. At the same time, platforms – becoming ever more international and deeply involved in cross-border trade in both goods and services – remain only partially covered by international regulations.

Categorisation of trade in the digital economy: is stocktaking possible?

The above-mentioned problems demonstrate the need for a more comprehensive, transdisciplinary categorisation of traded objects. The digital economy further exacerbates these challenges. As boundaries between categories become increasingly blurred, it may seem easier to accept the absence of clear divisions and to adopt the broad definition of goods used by economists, as described in Section 1. At the same time, such an approach is difficult to reconcile with the existing regulatory framework, which struggles to address the specific nature of digital objects and digital trade.

However, when attempting to create classifications that align with existing categories, it is essential to bear in mind the differences between definitions used in international economics and those applied in international economic law. From a regulatory perspective, the best approach is to rely on the WTO's distinction between trade in goods and trade in services, as this framework successfully underpins the majority of international agreements and established databases. Many economists also adopt this classification in their work. Using the WTO approach, at least some activities carried out in the modern digital economy can be accommodated within existing structures. Most of them – at least at first glance – can be attributed to one of the

[9] Meeting consumers' needs is an essential part of the concept of "likeness," which is central to applying non-discrimination rules in both GATT and GATS. It determines whether imported and domestic products (or services) are comparable enough to require equal treatment.

two categories recognised in international economic law. More complex transactions may also be analysed within this framework, even if certain components qualify as trade in goods and others as trade in services.

Nevertheless, a significant group of transactions remains problematic. These transactions cannot easily be classified as international trade in goods or services, as they do not require monetary payment – traditionally regarded as an essential element of trade. We therefore propose introducing a third category: data-based digital transactions concluded without monetary payment (see Table 1).

Table 1. Objects in e-commerce

Proposed name	Digital goods	Digital services	Data-based digital transactions
Description	Tangible goods that can be bought online	Intangible goods and services that can be bought online and delivered online	Access to platforms and services paid by data
Examples	Purchase of things through e-commerce platforms (such as Amazon or Temu)	Purchase of traditional services online and delivered in person (transportation platforms such as Uber, accommodation platforms like Booking) Buying traditional ICT services (software, web hosting) Buying and delivering traditional services online (consulting, bookkeeping) Buying advanced digital services (such as cloud computing, advanced AI)	Free mobile app and software Access to email Access to AI Social media
Impact on international trade	Easy-to-levy tariffs	No tariffs but presence of other regulations	Scarce or no regulation/ no tariffs

Source: Authors' own elaboration.

Our attempt to define these categories is not definitive. Rather, it illustrates the aforementioned difficulties and limitations of the current system – and perhaps even the broader lack of clear definitions within the digital economy. When considering the actual content of the three categories mentioned above, they may not be mutually exclusive. The same digital product may be classified as a good (if tangible), as a service, or even as a data-based transaction. Moreover, this evolution appears to be continuous.

Access to music provides a useful example. One can purchase a traditional CD album. It has a physical, tangible form and would clearly qualify as a good. One can also purchase a digital file containing a song or an album online. Depending on whether the user has permanent access to the file, such a purchase may resemble the acquisition of a good or of a service. If access is provided through a subscription model, it would clearly fall within the category of a service. Music can also be accessed via platforms such as Spotify or YouTube, where the user "pays" by granting access to personal data. That data is then collected and monetised through the sale of databases to third parties for targeted advertising.

Conclusions

Digitisation transforms the characteristics and volume of sales. It also necessitates changes in the classification of traded objects. The emergence of digital services and digital capital has rendered previous classifications of international trade subjects obsolete. To the terminological chaos prevailing among economists, and between economists and lawyers or economic policy makers, digitisation adds further definitional challenges. The traditional division into goods and services fails to capture many e-transactions.

One important type of overlooked e-transaction is those without any visible financial flows. For example, GATS assumes that services are primarily provided for remuneration and for a specified period. This assumption does not hold for free e-services, which often have a zero monetary price and may be available indefinitely. Another type includes transactions that encompass both products and services (e.g., smartphones with preloaded apps). In practice, the distinction between tangible and intangible goods is dimin-

ishing, as these items are frequently combined within a single transaction or bundled together. Digitisation may not have revolutionised the production of material goods, but it has significantly transformed it (e.g., through the use of AI or Digital Twins in production processes). It has certainly reshaped the provision of services, especially digital ones. Significant changes have also occurred in trade, where free e-services cross borders without any control.

The role of public authorities in the economy is evolving due to digitisation. It increases the responsibility of international institutions for ensuring fair and secure trade. First, digitisation enables public surveillance, with new digital services altering the way citizens interact with authorities (e.g., digital vaccination passports). Second, many activities are now beyond the reach of traditional authorities. To address these challenges and protect society from cybercrime, new regulations are being implemented. However, these regulations often lag behind the solutions needed to keep pace with current technological advances. The rapid evolution of technology necessitates open control systems, as closed lists of cases quickly become outdated. Moreover, there are slim chances of having new regulations at the level of such international institutions as the WTO. Hence the only way forward, besides the national or regional solutions, seems to be through unification of standards and doctrine.

While few new barriers appear in trade in goods, barriers in trade in services continue to increase. These barriers are often invisible – much like digital services themselves – yet they can affect the functionality of tangible goods. For example, barriers on app that restric functionality of apps may limit the use of electronic devices even if trade in hardware such as computers or smartphones remains formally unrestricted. Furthermore, although GATS liberalised trade in services, it cannot prevent the introduction of barriers that were unforeseen at the time of its adoption (e.g., service bans or restrictions on digital content).

The lack of a precise definition of the subject of e-commerce creates not only theoretical controversies but also practical problems, such as identifying trade barriers or implementing effective regulation. Without clarity on what constitutes e-commerce, it becomes difficult to determine where barriers arise. This ambiguity hampers efforts to remove obstacles and facilitate international trade. It also allows the validity of regulatory measures to be easily challenged, exposing potential gaps in existing frameworks. This issue is particularly problematic given the continuous emergence of new digital goods and innovative methods of delivery. The blurring of distinctions between goods and services increases the risk that barriers may affect both categories simultaneously. Such barriers can be more effectively addressed through regional trade agreements, which are often more progressive and easier to conclude than universal agreements within the WTO framework.

Our categorisation clearly isolates the segment of e-commerce – or, more broadly, the digital economy – that currently escapes regulation and remains least known. It may help concentrate the efforts of researchers and regulators on developing appropriate governance mechanisms, similar to those applied to other areas of trade.

Another issue related to the ambiguous subject of e-commerce is the difficulty in measuring its value, which in turn affects the measurement of economic activity at both national and company levels. This can lead to distorted statistical data and inaccurate information regarding company valuations. Such distortions may result in the undervaluation of economic activity, particularly in developed countries with expanding digital sectors. This is especially relevant for digital services provided free of charge in monetary terms. The situation can lead to tax avoidance and reduce public revenues.

Finally, the size, scale and content of digitally traded objects vary enormously. For example, many packages are small and have negligible declared value, allowing them to avoid border controls and move freely across jurisdictions – even when they may pose safety risks or be socially undesirable.

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