

Article history:

Received 26 March, 2024
Accepted 10 October, 2024
Published 10 December, 2024

(*) CORRESPONDING AUTHOR

Address: FFLCH-USP, Avenida Lineu Prestes, 338, CEP 05508-000, São Paulo (SP), Brasil. Tel (+ 5511) 3091-3769
E-mail: igorvenceslau@usp.br

Abstract

Trade has always been a traditional topic of study in geography, present in different approaches. In this work, commerce is interpreted from the perspective of technique, approaching the technical phenomenon geographically, that is, through the geographical milieu and its manifestations. This article aims to propose an interpretation of trade through geography from the category of geographical milieu. Based on Milton Santos' proposal for the periodization of geographical space, we relate the natural milieu and exchanges, the technical milieu and traditional commerce, reaching the current period with the emergence of the technical-scientific-informational milieu and its corresponding form of commerce, the e-commerce.

Keywords: Geographical Space; Technical-Scientific-Informational Milieu; e-Commerce.

Resumo / Resumen

COMÉRCIO E MEIO GEOGRÁFICO

O comércio sempre foi um tema tradicional de estudos na ciência geográfica, presente em diferentes abordagens. Neste trabalho, interpreta-se o comércio a partir da técnica, abordando o fenômeno técnico geografizado, isto é, através do meio geográfico e suas manifestações. Este artigo tem o objetivo de propor uma interpretação do comércio pela geografia a partir da categoria meio geográfico. Trata-se de uma contribuição inédita para a abordagem do tema do comércio na ciência geográfica, subsidiando investigações futuras e em andamento. Baseado na proposta de periodização do espaço geográfico de Milton Santos, relaciona-se o meio natural e as trocas, o meio técnico e o comércio tradicional, chegando ao período atual com a emergência do meio técnico-científico-informacional e sua forma corresponde de comércio, o e-commerce.

Palavras-chave: Espaço Geográfico; Meio Técnico-Científico-Informacional; Comércio Eletrônico.

COMERCIO Y MEDIO GEOGRÁFICO

El comercio siempre ha sido un tema tradicional de estudio en las ciencias geográficas, presente en diferentes enfoques. En este trabajo se interpreta el comercio desde la perspectiva de la técnica, acercándose al fenómeno técnico geografizado, es decir, a través del medio geográfico y sus manifestaciones. Este artículo tiene como objetivo proponer una interpretación del comercio a través de la geografía desde la categoría de medio geográfico. A partir de la propuesta de periodización del espacio geográfico de Milton Santos, relacionamos el medio natural y los intercambios, el medio técnico y el comercio tradicional, llegando al período actual con el surgimiento del medio técnico-científico-informativo y su correspondiente forma de comercio, el e-commerce.

Palabras-clave: Espacio Geográfico; Medio Técnico-Científico-Informacional; Comercio Electrónico.

INTRODUCTION

From the Latin *commercium*, the word "commerce" has its etymology derived from *co*, meaning "together," and *merx* or *merces*, meaning "goods," which can be interpreted as the gathering of goods. From *merx*, words like *mercatus* (the market) and *Mercurius* (Mercury), the god of commerce and communication in Roman mythology, were derived (DELPo, 2024).

Commerce has historically been associated with the voluntary exchange of products, involving the buying and selling of goods either directly or indirectly mediated by symbolic elements of value, such as money. Its antiquity and permanence in human civilizations make it difficult to pinpoint its origin and to precisely encompass all its forms of execution.

The study of commerce has always held a privileged chapter in various social sciences. Alongside war, commerce has occupied a prominent position in the organization of indigenous societies studied by Lévi-Strauss's (1942) anthropology. In history, according to Mumford (1998), commerce and circulation are at the origin of the city itself, stemming from the creation of agricultural surpluses and a division of labor. Fernand Braudel (1983) also relates the centrality of commerce and transport in the establishment of a capitalist civilization in the Mediterranean of the 16th century. Modernity itself is inaugurated with the establishment of a merchant capitalism.

In political science, commerce was already present in discussions about power in Machiavelli (2007 [1532]) and Hobbes (1998 [1651]). In sociology, Durkheim (1997) questioned the morality of commerce, and Weber (1995 [1921]) proposed a typology between commerce in the presence or absence of goods.

Certainly, Economics is the science that has most dedicated itself to the study of commerce. Since Smith (1996 [1776]), it has been associated with the wealth of nations, and in Ricardo (1982 [1817]), it was based on comparative advantages. In his critique of political economy, Marx (2008 [1859]) assigns commerce, or exchange, an intermediary function— a momentum— in a broader process of production.

How has geographical science approached commerce?

In geography, commerce has always been a traditional subject of study. For Ratzel (1844-1904), the formation of the State follows the path previously established by trade routes. He understood these phenomena together, in such a way that communication and commerce precede politics, which in turn follows inseparably along the same path, in a literal sense. He stated that "if the State has entered its period of growth, then it shares with commerce an interest in the connections between routes," and also that "every trade route prepares the way for political influences" (Fernandes; Moraes, 1990, p. 182). This establishes an inseparable foundation between the economic and political dimensions in the geographical study of commerce.

Paul Vidal de La Blache (1845-1918) introduced an organization of geographical work with the production of large compendiums or manuals, and he also influenced the subsequent development of regional monographs by his disciples, which followed chapters describing physical and natural aspects, population occupation, and their ways of life (food, housing, etc.) until reaching political organization and economic activities. In his *Principles of Human Geography* (La Blache, 1954), among the large human agglomerations, only the European one received a brief specific chapter on the effects of trade relations, which he linked to industry and transport, symbols of progress. However, it was definitively La Blache's disciples¹ who dedicated more attention to commerce in their studies.

During the same period, in England, George Chisholm contemplated a direct relationship between Geography and commerce. One of his seminal considerations was that "undoubtedly the basis of commerce is the mutual advantage derived from the exchange of goods produced in different places. Geographic relations are therefore necessarily implicated in commerce" (Chisholm, 1907, p. 304)

Two decades later, the German geographer Walter Christaller formulated his central places theory, based on a model of attraction exerted by cities on consumers from a given area. The number and type of commercial facilities available would define the function and centrality of a locality (Christaller, 1966 [1933]).

In his compendium of *Economic Geography*, the French geographer Pierre George dedicated a significant portion to commerce and circulation, which, according to him, gained importance and differed markedly during the industrial period (George, 1978), which he referred to as the contemporary

era. Long-distance trade had assumed primacy and actively participated in both production, through the trade of raw materials, and in the global market for manufactured products.

In this work, we will interpret commerce through the lens of technique. In doing so, we will approach the technical phenomenon in a geographical context, that is, through the geographical milieu and its manifestations. Based on a periodization of geographical space proposed by Milton Santos (2012 [1996]), which corresponds to geographical milieu and historical period, we will address the predominant forms of commerce in each period, including the present.

The aim of this article is to propose an interpretation of commerce by Geography, based on the category of geographical milieu. Its development was guided by the thesis that commercial activity only effectively takes place through the conditions provided by the milieu, which give it existence. As a thematic focus, commerce will be analyzed primarily in its retail version, that is, directly linked to consumption.

The results presented in this text were achieved through doctoral research, which investigated the diffusion of e-commerce in Brazilian territory, utilizing an extensive literature review, the creation of databases, and fieldwork.

The method employed in this research considers geographical space as the existence of the (social) being (Santos, 2012 [1996], p. 119). In this sense, geographical milieus would be particular and historically dated manifestations of this existence. In this approach, techniques gain relevance because “between the technical phenomenon and geographical space there would be a biunivocal relationship, as both directly correspond to each other” (Silveira, 2019, p. 12)

The notion of milieu is present in various sciences, from Biology to Sociology. This is a relevant category in the epistemology of Geography, which found its greatest exponent in the French school. In La Blache (1954), man and milieu form an inseparable pair, where the milieu provides both supportive conditions and obstacles to the realization of human life, itself a geographical factor. In this way, both mutually shape each other.

The geographical milieu is a historical product of the relationship between society and nature, resulting from the “substitution of a natural milieu, given to a particular society, by an increasingly artificial milieu, that is, successively instrumentalized by that same society” (Santos, 2012 [1996], p. 233). Thus, the milieu is constituted simultaneously of natural and artificial objects.

The geographical milieu should not be confused with geographical space. In the sense given by the theory developed by Milton Santos, geographical space is the universal category of geography, considered an inseparable set of objects and actions, therefore unified, while milieus are multiple and derived from space, constituted of space. There would thus be one single space and many geographical milieus (Santos, 2012 [1996]), which would be particularities of the universality of space.

As proposed by Milton Santos (2012 [1996]), milieus can also be understood through a periodization of space. There are three geographical milieus: the natural, the technical, and the technical-scientific-informational. These milieus are successive, meaning they were historically produced and can be dated, from the oldest to the most recent, as the advancement of technique allows for the renewal of materiality. They also occur simultaneously, with no disappearance of older milieus, but coexisting in the territory, as the waves of modernization are always selective.

In all historical periods, commerce will occur according to the contents of the geographical milieu. According to Arroyo (2019, p. 176), “all economic movement includes production, distribution, exchange or commerce, and consumption, each of these moments occurring spatially and simultaneously conditioned by space.” The scale, the agents involved, the speed of flows, among other attributes, will be defined by the technical and political conditions of the milieu, that is, the arrangement of objects and their use. Thus, specific forms of commercialization correspond to successive geographical milieus, currently in complementary and contradictory coexistence. For each geographical milieu, therefore, there is its technique, its form of commerce, and its specific agents. By starting from the technique and the current geographical milieu, we will find contemporary commerce with its hegemonic and hegemonized agents.

With this work, we aim to present a more general explanation of commerce, without delving into the specificities of places and regions. Also, the emergence of a new geographical milieu does not

eliminate past milieus nor does it occur simultaneously everywhere. The historical milestones used in the text should be read as the emergence of new techniques, as possibilities of the world, but their realization in places escapes the objects outlined here. The following text is divided into three parts, in addition to this introduction and the final considerations. In the first part, we relate commercial exchanges to the natural milieu. In the second, we will address the technical milieu and traditional commerce. The last part will cover the technical-scientific-informational milieu and electronic commerce or e-commerce.

THE NATURAL MILIEU AND EXCHANGES

Since the existence of *Homo sapiens*, there has simultaneously been geographical space and a milieu constitutive of its relationships, its surroundings. The natural milieu was that of a period when nature provided humans with the conditions for action, dictating rhythms according to a natural order. Although it was already possible to speak of technique, “this generalized natural milieu was used by humans without significant transformations” (Santos, 2012 [1996], p. 235). The material basis of societies and groups was, in itself, natural, utilized practically without much mediation. There was a certain symbiosis between humans and nature, constituting the natural milieu, an organic world.

This natural milieu was primarily composed of what Hegel (2001 [1837]) described as “first nature,” a set of things existing outside of humans, a notion that later influenced Marx and other thinkers. With a slow and restricted process of modifications, there was not yet a properly artificialized milieu, to which a landscape marked by natural objects could be associated.

In the natural milieu, the objects created functioned as prostheses of the human body, as extensions of bodily functions. The axe for hands, the plow for arms, and the wheel for legs expanded the capacity for action and transformation of elements of nature, which gave rise to new objects. However, these innovations were restricted, in a period when “the local society was, at the same time, the creator of the techniques used, commanding the social times and the limits of their use” (Santos, 2012 [1996], p. 236). Thus, there were as many distinct families of techniques as there were societies inhabiting the Earth's ecumene.

Exchanges are inherent to human groupings in the natural milieu. If in Weberian terms we cannot yet properly speak of commerce for this period, various forms of barter, exchanges, and trades accompanied the development of civilizations. No civilization developed in isolation without exchanging food products, utensils, and art objects. The Phoenicians, the Mesopotamians, the Chinese, and later the Arabs are peoples whose expansion was strongly tied to commercial activities.

Commerce was for a long time related to the development of agriculture. The production of surpluses in the fields and their subsequent appropriation in exchanges enabled the development of cities and a more complex division of labor, as well as the exchange of seeds from native plants from specific regions of the planet, diversifying production itself.

The elements of the natural milieu were, and still are in some regions, fundamental to commercial activity. Rivers constituted the first circulation routes, and prosperity was long associated with their fertile valleys. Simple roads, dirt paths, were also relevant routes, as well as the knowledge of seas and straits for exchanges with distant peoples. The natural milieu also presented obstacles that hindered exchanges, such as mountain ranges, arid deserts, and harsh climatic conditions that limited the material contact of peoples in time and space. Truly, for millennia, commercial activity was governed by the seasonality of the seasons, the flow of rivers, the absence of inclement weather and storms, the duration of daylight – all conditions of the natural milieu. Difficulties and strategies for food storage also played a role in this endeavor. Transport was the most dynamic element for commerce. Under the times and rhythms of nature's circulation, first the boat and soon “the donkey, the horse, the camel, the wheeled vehicle, and finally the paved road expanded the realms of transportation and gave the city command over men and resources in distant areas” (Mumford, 1998, p. 84). Regarding Europe, La Blache (1954, p. 124-125) pointed out that the natural correspondence that unites the parts of the continent should not be forgotten, “given the progressive narrowing in the shape of a peninsula, the relative tightness, the ease of passages that mitigate the obstacles of the mountain ranges or massifs that wrinkle it, and the natural routes that its rivers open.”

The emergence of more abstract forms of exchange, first with the use of other goods as equivalents, as the Maya civilization did with cacao seeds, or even after the invention of coins and money, turned exchanges into symbolic relations. However, the restricted circulation of money and the diversity of its manufacturing – the most varied metals and other non-metallic elements – do not yet allow for dissociating commerce from the natural milieu.

Since ancient times, cities have been the locus of commerce. This activity has been characterized by co-presence, that is, by the face-to-face encounter between merchants and buyers, which assumed diverse forms in time and space. From the nomadic merchants who traversed vast territories, among whom the Persians deserve mention, to merchants fixed in establishments, all forms presupposed the encounter. Goods and information about them – price, origin, variety – arrived at the same time.

For centuries, fairs were the predominant spatial form for exchanges, whether in itinerant variants or those occupying a fixed location in cities, as still occurs today in the Arab medinas of the Maghreb, Turkish bazaars, and in Brazil's open-air markets in virtually all cities. Besides fairs, the market squares in city centers were, for a long time, "the decisive motors of economic life," where, in the words of Braudel (1983, vol. 1, p. 425), they definitively "break the hostility of space, launching the great circulations that, at the speed allowed by the time, triumph at any cost over distances." In various cases, such as in Venice, Hamburg, or Marseille, the port, the market place, and the fair overlapped to coincide with the center of the city, the center of commerce, and the center of economic life.

In the natural milieu, the scale of commerce was initially local, organizing exchanges of agricultural surpluses between the countryside and the city. Over time, the development of transportation expanded exchanges to the regional scale, particularly in the more prominent urban centers. The development of frequent large overland routes, such as the Silk Road between Asia and Europe, and later large maritime trade routes, especially along the transatlantic and Indo-Atlantic axes, enabled regular long-distance commerce, still under the dominion of the natural milieu. For this, advancements in navigation techniques, knowledge of the seas, wind directions, and improvements in cartography were fundamental.

THE TECHNICAL MILIEU AND TRADITIONAL COMMERCE

Especially after the Industrial Revolution in the 18th century, a mechanized space began to emerge. The distinction between different places and regions is no longer based solely on the attributes of the natural milieu but increasingly on the "extent and density of the replacement, in them, of natural and cultural objects by technical objects" (Santos, 2012[1996], p. 236). Where a technical milieu was established, social time increasingly overlaid and contrasted with the times and rhythms dictated by nature.

In Hegel (2001[1837]), a "second nature" refers to human nature, constituted now by elements internal to humans, such as morality and law. In Marxist tradition, the second nature is a product of human labor on the first, producing a new artificial reality, which includes both an external dimension (materiality) and an internal one (ideology). This is the meaning of the technical milieu, an artificial second nature from which society develops.

No longer just artificial extensions of the human body, in the technical milieu, objects and instruments are produced as "extensions of the territory, true prostheses" (Santos, 2012[1996], p. 237). Large energy plants, railway networks, enormous port structures, among other inventions of the period, function as territorial prostheses that authorize actions of magnitude and scale greater than those previously possible, accelerating the transformation of the first nature and profoundly modifying existing economic activities. From significant contributions from Galileo (1564-1642) and Newton (1642-1727), mechanics—the set of techniques and knowledge about the movement of matter—finally materialized an ancient desire of human invention: the machine, allowing a transition from manual production methods to mechanized ones. Force and energy could emancipate themselves from the local conditions offered by the natural milieu through the use of coal and iron sources, leading to the creation of machine tools, the steam engine, the textile machine, among others.

The First Industrial Revolution, in the mid-18th century, was a landmark for the advent of a technical milieu, a process that began in the first industrialization countries, namely England, France, and Belgium, and spread to the rest of the world with a considerable time lag. It was precisely the establishment of a technical milieu that provided the territories of industrialized countries with the conditions for a first space of genuinely capitalist accumulation.

In the second half of the 19th century and especially in the early 20th century, alongside Einstein's (1879-1955) discoveries in quantum mechanics and the photoelectric effect, the advent of new families of techniques named "chemical" for the manipulation of matter compounds and production of inputs, and "electric" for energy manipulation, gave rise to a new generation of machines known as the Second Industrial Revolution. Oil replaced coal as the main energy source, and steel became the basis for metal alloys and cables. Germany and the United States (US) emerged as the dominant powers in this second phase, joining the previous industrial powers.

Numerous inventions transformed the geographical milieu worldwide. Networks of railways, highways, large bridges, gigantic ports, and later airports connected the world at the speed of machines. Maritime canals such as Suez and Panama opened previously unimaginable passages, considerably shortening the distances of intercontinental travel. Gigantic electricity generation plants—hydroelectric, thermal power stations, and nuclear plants—and their transmission lines altered the dependency on day and night, extending the hours of human activity and synchronizing, by the clock, production and consumption. Communication was also radically transformed by the introduction of the telephone and telegraphic cables, literally tying the entire planet into a network. Control of the electromagnetic spectrum and the establishment of radio and television antennas in the territories completed the elements that differentiated the new milieu from the previous one.

For all these technical systems, "the reason for commerce, not the reason of nature, presides over their installation" (Santos, 2012[1996], p. 237), indicating that the economic factors, which are also geographical, are more important in explaining their implementation than those of natural limitations. Under the technical milieu, techniques emulate natural conditions, artificially recreating them: daylight through electric lamps; temperature through heaters and refrigerators; landscapes through photography and television images. For Harvey (2011, p. 219), capitalism has produced an acceleration of the pace of life such that "sometimes the world seems to shrink around us," referring to what he called the compression of time-space.

The most established forms of commerce, which continue to this day, date back to this period. According to George (1978), until the development of the industrial economy, exchanges were limited to regional and local barter, with long-distance trade being favored for precious and low-tonnage products. For the author, by the twentieth century, we were already "distanced from this commerce by a revolution inseparable from the industrial one, understood in the context of its economic and technical aspects" (George, 1978, p. 268).

The so-called "traditional commerce"² is a more complex way of connecting different places through exchange, where the place of production does not coincide with that of commercialization. In the technical milieu, production became industrialized and scaled for an international market, linking central countries to their respective economic peripheries, often composed of colonies or former colonies. The very renewal of the materiality of the geographical milieu with the introduction of superobjects—railways, telegraphic cables, airports—was driven by capital and companies from England, France, Belgium, and Germany.

In terms of retail commerce, under the technical milieu, the consolidation of the "establishment" as the predominant or legal form of commerce is observed, ensuring its stability in space and permanence over time, despite the mobility and ephemerality of markets, even though they continue to exist. Retail commerce gains a specific address in cities and a distinct brand, replacing the personified figures and professionals of artisans, bakers, tailors, and others. It is primarily due to the permanence and predictability of electricity supply, the provision of goods by industry, regular transportation lines, and communication methods between suppliers, intermediaries (mainly banks), and consumers that commerce, as traditionally known, was able to develop.

The store or boutique is a type of commercial establishment widely disseminated during this period, although its origins date back to the medieval era. It is primarily established on the streets of city

centers³, where there is a higher movement of people. With the massification of industrial consumption already observed in large cities by the mid-19th century, grand magasins emerged—stores that had departments for various products and local stock to serve a larger audience. In Brazil, the first department store was Mappin in 1913, created as a branch of the English Mapping & Webb at Ouvidor St. in Rio de Janeiro, and soon relocated with a headquarters in São Paulo. By 1940, the new facilities at Ramos de Azevedo Square had fifty departments and five hundred employees, covering a total area of over 5,000 m². It declared bankruptcy in 2000 and reemerged in 2019 exclusively as an online store.

With the New York stock market crash and the economic crisis of the 1930s, a new establishment for large-scale food sales at more competitive prices spread in the U.S.—the supermarket, characterized by self-service retailing. Its roots trace back to the brief experience of the Astor Market in New York, which operated for only two years. In Brazil⁴, the first experiences emerged in the 1950s, in the context of the diffusion of the post-war American way of life, such as the "Sirva-se" supermarket owned by the Simonsen family.

Also in the U.S., the massive use of individual automobiles, combined with the Fordist city model marked by suburbanization (Soja, 2000), stimulated the spread of shopping centers starting in the 1920s. These are private establishments that gather a myriad of other establishments of various types and sizes, including stores, department stores, and supermarkets, as well as restaurants and leisure facilities like cinemas. There are controversies over what should be considered a shopping center and what constitutes galleries, which are older. In Brazil⁵, the first true initiatives date back to Conjunto Nacional in 1958 and Shopping Iguatemi in 1966, both in São Paulo. A corollary of the individual road transportation paradigm, drive-through commerce emerged in the U.S. during the same period, with restaurants serving meals through car windows.

In the technical milieu, the scale of retail commerce was transformed, connecting upstream producers of industrialized goods from various locations, sometimes beyond national borders, with downstream consumers from increasingly broader regions, whose movements became more frequent and complex. However, commercial activity still required in-person interaction within this technical milieu: the acquisition of goods and products continued to necessitate a physical encounter between sellers and consumers, leading to well-known spatial implications.

One of the spatial implications of the technical milieu on commerce is the urbanization pattern of the modern city, characterized by fixed functional zones (Corrêa, 1989; Mumford, 1998). In this model, which prevailed globally for several centuries and still predominates to some extent, neighborhoods are easily identifiable in the landscape: residential zones, industrial areas, administrative sectors, and commercial districts. Although many neighborhoods are designated for specific functions, the city center is no longer the only commercial area. It has expanded along railway and roadway axes and planned commercial centers, guided by real estate capital.

For commerce and service activities, the most important contribution during this period came from the German geographer Walter Christaller (1893–1969), who formulated his central place theory in his 1933 book *Die zentralen Orte in Süddeutschland*⁶. This theory is based on centrality as a spatial ordering principle. Christaller proposed that every region has a center in a city, a central place, and when several centers exist, they are arranged in a hierarchy relative to one another.

In this theory, localities have central functions that act as a force attracting consumers from their surroundings, which depends on the individual cost of movement. From this, a "maximum spatial range" can be defined, representing the consumers' radius of attraction, and a "minimum spatial range," referring to the minimum area required for an activity to be profitable. The centrality of a place and the hierarchy of centers within a region result from the differentiated supply of goods and services. Since each center does not offer the same types of goods and services, superior goods tend to concentrate in certain localities rather than others, thus defining their centrality over a broader area.

However, this process of modernization is inherently contradictory, not occurring universally. The same expansion of the technical milieu that produces wealth also generates poverty and occurs selectively across the territory, forcing large segments of the populations in peripheral countries to create their own alternative circuits. In these underdeveloped countries, such as Brazil, commerce operates within two distinct circuits of the urban economy⁷, differentiated by the level of organization, capital, and technology employed. One circuit is the upper circuit, consisting of large firms and formal

activities, while the lower circuit relies on labor as its differentiating factor and employs the vast majority of the population (Santos, 2004[1979]). This lower circuit leads to a direct consequence of poverty: a "fragmentation of commercial activities" (Santos, 2004[1979], p. 214), with local residents tending to walk to and consume from nearby micro-retail businesses, which source goods in small quantities and are grounded in credit, whether informal credit or its more recently popularized forms through installment plans, cards, and other mechanisms. Milton Santos's theory of the two circuits of the urban economy allows for an understanding of the precarious and subordinate inclusion of a significant portion of the population and territory of poor countries within a modern economy, rather than viewing them as excluded from an inexorable process of linear progress.

THE TECHNICAL-SCIENTIFIC-INFORMATIONAL MILIEU AND ELECTRONIC COMMERCE

In the period that begins after World War II, a profound qualitative change alters the content of the geographical milieu. The technical-scientific-informational milieu emerges as one where "science and technology, along with information, are at the very foundation of production, utilization, and the functioning of space and tend to constitute its substrate" (Santos, 2012[1996], p. 238). The new establishes itself without eliminating the old but subordinating the natural milieu and the technical milieu to the new logic of accumulation, which is intensive in information. The technical-scientific-informational milieu can be understood, in this context, as the "geographical appearance of globalization" (Santos, 2012[1996], p. 239) and will spread to peripheral countries, including Brazil, only from the 1970s, albeit with delays. As the production of a new milieu utilizes the material bases of the previous one to transform it, we witness the creation of a certain type of artificialized nature, that is, one that develops from the already artificial second nature, which is itself naturalized and incorporated into the first. This is how mechanical objects no longer appear as artificial or invasive in the face of new objects endowed with informational attributes.

The new geographical milieu can now be understood, in addition to the previous extensions of the body and territory, as a cognitive prosthesis, that is, an extension of the human mind, something substantially different from past milieus. Its informational quality expands human knowledge and action and connects elements of nature, machinery, and humans through permanent flows of information.

The techno-scientific-informational milieu consists of a technosphere and a psychosphere. The technosphere, which is the sphere of objects in systemic functioning, is "the result of the increasing artificialization of the milieu" (Santos, 2008[1994], p. 30), spreading across the territory in a selective and punctual manner. It is, in fact, an expression of globalization and the contemporary wave of successive modernizations. In turn, the psychosphere is the sphere of action, which can be better translated as a set of "ideas, beliefs, passions, and the place of meaning production" that, also constituting this milieu, "provides rules for rationality or stimulates the imaginary" (Santos, 2012[1996], p. 256). The psychosphere is where the techno-scientific-informational milieu is most present because, unlike the technosphere, it is "the domain of the entire country" (Santos, 2008[1994], p. 30). This is because even before the establishment of a new technical base in places, the respective beliefs, discourses, and consensuses are already in place. The psychosphere "supports, accompanies, and sometimes precedes the expansion of the techno-scientific milieu," as elucidated by Ana Clara Torres Ribeiro (2013, p. 268).

In both the First and Second Industrial Revolutions, techniques produced analog objects, such as radios and telephones, through the control of physical magnitudes and wave frequencies. It was akin to producing inanimate objects. With the advent of the Third Industrial Revolution or Digital Revolution, which began between the 1950s and 1970s, objects started to produce, process, store, and transmit information, and they became equipped with memory and an artificial processor, allowing them to be programmed to perform specific tasks. Digital electronics, robotics, and mechatronics are techniques from this period that introduce a new type of animated object into the milieu.

The Digital Revolution shifts the axis of innovation and accumulation from the European continent, with the central countries being the USA, particularly its west coast, and Asian countries, notably Japan and those referred to as the Asian Tigers in the 1990s. Today, there is talk of a Fourth

Industrial Revolution (Schwab, 2016) or even the maturation of the Third, marked by advancements in artificial intelligence, a process currently being led by China, which is at the forefront and in direct competition with the declining power of the USA (Lee, 2018).

Thus, in agreement with Malecki and Moriset (2008), we can regard the digital paradigm as one that encompasses technological, economic, social, and political aspects, recognizing that all these dimensions are encompassed by geographical space. The technosphere, as a dimension of the technical-scientific-informational milieu, incorporates the content of digital technology, endowing it with a geographical manifestation. The other constituent dimension of this process is the psychosphere, which is capable of attributing meaning to contemporary technology.

As an additional layer to the pre-existing materiality, elements of the technical-scientific-informational milieu include information highways, which complement highways and railways in the territory; submarine and terrestrial fiber optic cables for Internet connection; mobile connection antennas; servers; data centers; individual connection devices (gadgets); and many others. These elements have become increasingly important for various economic activities, including wholesale and retail commerce. In this new geographical milieu, "exchange values are produced increasingly" (Santos, 2012[1996], p. 241), significantly increasing the need for circulation and exchanges, including commercial activities necessary for the realization of commodities and the appropriation of surplus value, which has become global.

Supported by a digital material base, electronic commerce or e-commerce is the updated version of commerce in the technical-scientific-informational milieu. For the first time in human history, the exchange of goods can occur at a distance, that is, in telepresence, without the need for a meeting between sellers and consumers. The relationship between these agents is mediated by information and communication technologies (ICTs), which presupposes, therefore, a multitude of other intermediaries. E-commerce complicates the categorization made by Weber (1995[1921]) of commerce in the absence/presence of goods, as it is both absent and does not necessarily refer to a speculative future market. Its retail version eliminates the need for consumers to travel to commercial neighborhoods or central locations in their region, challenging explanatory models that dealt with population flows, such as those by Christaller (1966[1933]), and adding layers of complexity to the entire production process. Instead, it is the goods that now exhibit constant mobility, updating the strategic character of geographical space for the digital economy.

However, the emergence of e-commerce has not led to the disappearance of previous forms of face-to-face commerce; rather, solidarities can be identified between these forms of commercialization, cooperating in multiple hybrid channels that oscillate between in-person and remote. Previous commercial forms do not disappear but metamorphose and coexist complementarily and conflictually with e-commerce, as seen in establishments and even markets that incorporate elements of digital technology. Hypermarkets emerge, blending supermarkets and department stores, alongside the brand-new mega malls, which are giant shopping centers capable of incorporating even residential ventures. Nevertheless, electronic commerce remains the typical form of commercialization in the technical-scientific-informational milieu.

Under the digital paradigm, modern urbanization becomes reconfigured as the well-defined boundaries of industrial, commercial, and residential zones begin to dissolve. Former industrial zones are repurposed with the arrival of distribution centers that expand along transportation axes, encroaching on areas that were previously residential or rural. Commerce surpasses commercial thoroughfares, gradually transforming residential neighborhoods into commercial zones filled with vehicles and delivery personnel. It is at this point that "the store enters the consumer's home" (Ortigoza; Ramos, 2003), which becomes definitively a place of consumption.

It was only at the turn of the century, with commercial Internet and the integration of various information, logistics, and financial services into a single operational interface, that e-commerce could be launched. Arroyo (2021, p. 151) explains that "at the end of the 20th century, the processes of digitalization and financialization of the territory feed back into each other at new levels of complexity and sophistication."

In the 1990s, two distinct e-commerce models emerged in the U.S.: the virtual store, initiated by the launch of Amazon, and the marketplace, a platform for third-party sales that began with eBay. The

2000s, already in the new century, were characterized by the expansion of e-commerce following some initial experiences in the previous decade. With widespread fears that virtual stores would drive traditional commerce to bankruptcy, retail companies operating physical stores, some nearly a century old, entered the digital market. This process of digitalization transformed physical stores into virtual stores while maintaining the already established brands.

After a decade of consolidation among e-commerce companies in Brazil and the formation of large groups, the predominant trend in the last decade has been the transformation of those that were born as physical stores, or even those that initially operated as virtual stores on marketplace platforms. In these cases, they began to operate with a multichannel strategy, acting as conventional retailers holding the goods while opening their online addresses to third-party sellers. It became a race to attract the largest number of sellers to the platforms of already established brands that had significant web traffic.

In Geography, e-commerce has been analyzed in many works using new concepts, with expressions like "digital milieu" or "cyberspace" (Lévy, 1999). Regarding the digital technical phenomenon, such as the emergence of the Internet and the advent of e-commerce, we affirm that the concept of the technical-scientific-informational milieu is sufficient to provide a geographical approach that engages with the elements of the discipline's epistemology, allowing for an exploration of continuities and discontinuities with other milieus and historical periods.

CONCLUSION

In this work, we presented an interpretation of commerce from the perspective of the geographical milieu, allowing for an understanding of this economic activity in its geographical and historical dimensions simultaneously. In this sense, the emergence of new activities in the digital economy, such as electronic commerce, needs to be understood based on the constitutive elements of the current milieu, rather than as a product of the innovative will of economic agents or solely of capital investments taken in the abstract.

The contribution presented here relates the geographical milieus proposed by Milton Santos to the emergence of specific and predominant forms of commerce, namely: the natural milieu and exchanges, the technical milieu and traditional commerce, the technical-scientific-informational milieu and electronic commerce (e-commerce). This represents a novel contribution to the interpretation of commerce from the perspective of technical phenomena and their spatial manifestations, allowing for a geographical explanation of commercial activities beyond those already developed by Economics, History, Sociology, and other human sciences.

As with any theoretical proposition, there is a limitation of scope here. The interpretation presented allows for addressing the broad movement in the predominant periods of each geographical medium and their corresponding forms of commerce. In each particularity (region, territory) and singularity (place), this phenomenon manifests itself distinctly, thus requiring concrete studies with empirical dimensions. Furthermore, the exercise carried out here does not negate the validity of various other ways to interpret commerce geographically, according to other theories and categories, such as those adopted from different methodological perspectives in the works of Berry (1967), Corrêa (2000), and Freire (1999; 2010).

The introduction of notions and concepts foreign to the epistemological framework of geography, such as terms like "cyberspace" and "digital milieu", employed in the urgency to explain issues of the 21st century, poses a risk of theoretical and methodological confusion. Recent discussions surrounding artificial intelligence, Industry 4.0, and related topics also suggest the urgency of properly addressing the subject of commerce as an activity in constant transformation. Now that the current challenges demand an effective contribution from the discipline, geographers are called to the fruitful exercise of mobilizing their categories, or even reinventing them.

NOTES

1 - Among them were Albert Demangeon, Emmanuel de Martonne, Jean Brunhes, and Camille Vallaux.

2 - By "traditional commerce" we are referring to physical stores where transactions occur in person, distinguishing it from distance commerce, which will be addressed in the following section. We are not referring to open-air markets or local or neighborhood commerce, as discussed in other research on commercial activity.

3 - To understand the geographical diversity of traditional commerce today, see Pacheco and Carreras (2009).

4 - Regarding the spatial implications of the expansion of supermarkets in Brazil, see Pintaudi (1988) and, more recently, Miyazaki et al. (2022) and David (2022).

5 - For a geographic study of shopping centers in Brazil, see Pintaudi and Frúgoli Jr. (1992).

6 - "The Central Places in Southern Germany", untranslated into Portuguese, was first published in German as *Die zentralen Orte in Süddeutschland*. The English version was released in 1966.

7 - To explore some of the works that employ this theory, see Dantas, Arroyo, and Cataia (2017).

REFERENCES

ARROYO, Mónica. Geografia e comércio internacional: breve revisão bibliográfica. *Boletim Campineiro de Geografia*, v. 9, n. 2, p. 165-179, 2019. DOI.

ARROYO, Mónica. Digitalização e financeirização do território: uma imbricação que se renova no capitalismo do século XXI. In: RENA, Natacha; BRANDÃO, Marcela; MEDEIROS, Daniel; SÁ, Isabel (org.). *Urbanismo biopolítico*. Belo Horizonte: Agência de Iniciativas Cidadãs, 2021. p. 143-156.

BERRY, Brian. *Geography of market centres and retail distribution*. Prentice-Hall, 1967.

BRAUDEL, Fernand. *O Mediterrâneo e o mundo mediterrâneo na época de Felipe II*. 2 vol. São Paulo: Martins Fontes, 1983.

CHISHOLM, George. *Geography and commerce*. *The geographical journal*, v. 30, n. 3, p. 303-318, 1907.

CHRISTALLER, Walter. *Central places in Southern Germany*. New Jersey: Prentice-Hall, 1966[1933].

CORRÊA, Roberto Lobato. *O espaço urbano*. São Paulo: Editora Ática, 1989.

CORRÊA, Roberto Lobato. *Comércio e Espaço: Uma Retrospectiva e Algumas Questões*. *Textos LAGET, Série Pesquisa e Ensino* no 2, 2000.

DANTAS, Aldo; ARROYO, Mónica; CATAIA, Márcio (org.). *Dos circuitos da economia urbana aos circuitos espaciais de produção: um diálogo com a teoria de Milton Santos*. Natal: Sebo Vermelho, 2017.

DAVID, Virna Carvalho. *La ciencia en los alimentos y los circuitos de la economía urbana en Brasil*. Tese (Doctorado en Geografía) – Facultad de Filosofía y Letras, Universidad de Buenos Aires, Buenos Aires, 2022.

DELPO – Dicionário Etimológico da Língua Portuguesa. São Paulo: Universidade de São Paulo, 2024. Disponível em: <https://delpo.prp.usp.br>. Acesso em: 20 jun. 2024.

DURKHEIM, Émile. *Leçons de sociologie. Physique des moeurs et du droit*. Paris: Quadrige/PUF, 1997.

FERNANDES, Florestan (coord.); MORAES, Antonio Carlos Robert (org.). *RATZEL: Geografia*. São Paulo: Ática, 1990. Coleção grandes cientistas sociais.

FREIRE, Ana Lucy Oliveira. O comércio tradicional e as transformações na cidade. Tese (Doutorado em Geografia Humana) – Faculdade de Filosofia, Letras e Ciências Humanas, Universidade de São Paulo, São Paulo, 1999.

FREIRE, Ana Lucy Oliveira. O desenvolvimento do comércio e a produção do espaço urbano. *GeoTextos*, v. 6, n. 2, p. 11-32, 2010.

GEORGE, Pierre. Geografia econômica. 2. ed. Rio de Janeiro: DIFEL, 1978.

HARVEY, David. Condição pós-moderna: uma pesquisa sobre as origens da mudança cultural. Trad. Adail Ubirajara Sobral e Maria Stela Gonçalves. 21 ed. São Paulo: Loyola, 2011.

HEGEL, Georg Wilhelm Friedrich. The philosophy of history. Kitchener: Batoche Books, 2001[1837].

HOBBS, Thomas. Leviatã: ou matéria, forma e poder de um estado eclesiástico e civil. 4. ed. São Paulo: Nova Cultural, 1988[1651].

LA BLACHE, Paul Vidal de. Princípios de Geografia Humana. Lisboa: Ed. Cosmos, 1954.

LEE, Kai-Fu. AI superpowers: China, Silicon Valley, and the new world order. Boston; New York: Houghton Mifflin Harcourt, 2018.

LÉVI-STRAUSS, Claude. Guerra e comércio entre os índios da América do Sul. *Revista do Arquivo Municipal de São Paulo*, v. LXXXVII, p. 131-146, 1942.

LÉVY, Pierre. A inteligência coletiva. Por uma antropologia do ciberespaço. 2 ed. São Paulo: edições Loyola, 1999.

MALECKI, Edward; MORISET, Bruno. The digital economy: business organization, production process, and regional developments. London; New York: Routledge, 2008.

MAQUIAVEL, Nicolau. O Príncipe. Comentários de Napoleão Bonaparte e Rainha Cristina da Suécia. São Paulo: Jardim dos Livros, 2007[1532].

MARX, Karl. Contribuição à crítica da economia política. 2. ed. São Paulo: Expressão Popular, 2008[1859].

MIYAZAKI, Vitor; GOMES, Vinicius; SPOSITO, Maria Encarnação Beltrão; SOUSA, Guilherme (org.). As lógicas econômicas e espaciais do ramo supermercadista. Rio de Janeiro: Consequência Editora, 2022.

MUMFORD, Lewis. A cidade na história: suas origens, transformações e perspectivas. 4. ed. São Paulo: Martins Fontes, 1998.

ORTIGOZA, Silvia; RAMOS, Christiane. A geografia do comércio eletrônico (e-commerce) no Brasil: o exemplo do varejo. *Geografia (Rio Claro)*, vol. 28, n. 1, p. 63-81, 2003.

PACHECO, Silvana; CARRERAS, Carles (org.). Cidade e comércio: a rua comercial na perspectiva internacional. Rio de Janeiro: Armazém das Letras, 2009.

PINTAUDI, Silvana. Mudanças nas formas do comércio varejista e a implantação dos supermercados na grande São Paulo. *Boletim Paulista de Geografia*, n. 66, p. 23-38, 1988.

PINTAUDI, Silvana; FRÚGOLI JR., Heitor. Shopping-centers – espaço, cultura e modernidade nas cidades brasileiras. São Paulo: Editora da Unesp, 1992.

RIBEIRO, Ana Clara Torres. Por uma sociologia do presente: ação, técnica e espaço – Vol. 3. Rio de Janeiro: Letra Capital, 2013.

RICARDO, David. Princípios de economia política e tributação. São Paulo: Victor Civita, 1982[1817].

SANTOS, Milton. O espaço dividido: os dois circuitos da economia urbana dos países subdesenvolvidos. 2. ed. São Paulo: Edusp, 2004[1979].

SANTOS, Milton. Técnica, espaço, tempo: globalização e meio técnico-científico-informacional. 5. Ed. São Paulo: Edusp, 2008[1994].

SANTOS, Milton. A natureza do espaço: técnica e tempo, razão e emoção. 4. ed. São Paulo: Edusp, 2012[1996].

SCHWAB, Klaus. A quarta revolução industrial. São Paulo: Edipro, 2016.

SILVEIRA, María Laura. Espacio geográfico y fenómeno técnico: cuestiones de método. Punto Sur, vol. 1, p. 6-20, 2019. DOI.

SMITH, Adam. A riqueza das nações. Investigando sobre sua natureza e suas causas. Vol. 1. São Paulo: Editora Nova Cultural, 1996[1776].

SOJA, Edward. Postmetropolis: critical studies of cities and regions. Oxford: Blackwell Publishing, 2000.

WEBER, Max. Economia e sociedade: fundamentos da sociologia compreensiva. 4. ed. Brasília: Editora da Universidade de Brasília 2015[1921].

Author's Affiliation

Venceslau, I. - Professor at the University of São Paulo, São Paulo (SP), Brazil

Authors' Contribution

Venceslau, I. - The author contributed to the elaboration, realization and manipulation of data and writing.

Editors in Charge

Alexandra Maria Oliveira
Alexandre Queiroz Pereira