

PERFORMANCE OF THE SERVICE SECTOR IN WORLD ECONOMIES: THE INFLUENCE OF ECONOMIC AND SOCIODEMOGRAPHIC FACTORS

*DESEMPENHO DO SETOR DE SERVIÇOS NAS ECONOMIAS MUNDIAIS: A INFLUÊNCIA DE
FATORES ECONÔMICOS E SOCIODEMOGRÁFICOS*

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Resumo

Nas últimas décadas observa-se um movimento de ascensão do setor terciário na produção de riquezas nacionais. A fim de evidenciar as razões deste crescimento, este estudo teve como objetivo identificar os fatores relacionados ao desempenho do setor de serviços nas economias mundiais. Metodologicamente, trata-se de uma pesquisa quantitativa, operacionalizada por meio de estatística inferencial com testes de correlação, abrangendo dados de 128 países. A variável dependente consiste no desempenho do setor de serviços, mensurado pela participação dos serviços no Produto Interno Bruto (PIB) nacional. As variáveis independentes compreendem fatores econômicos e sociodemográficos com potencial de justificar o desenvolvimento e crescimento do setor terciário. Os resultados indicam que a inovação, o acesso à Internet, o nível de desenvolvimento humano, o grau de liberdade econômica, a taxa de urbanização, a renda per capita e o percentual de população idosa estão positivamente relacionados à participação do setor de serviços na economia dos países.

Palavras-chaves: Serviços; Desempenho; Variáveis econômicas; Variáveis sociodemográficas; Correlação.

Abstract

The last few decades have seen the ascension of the tertiary sector in the production of national wealth. In order to find the reasons for this growth, this study sought to identify the factors related to service sector performance in world economies. Methodologically, it is a quantitative study, operationalized through inferential statistics with correlation tests, encompassing data from 128 countries. The dependent variable is the service sector performance, measured as its participation in the national Gross Domestic Product (GDP). The independent variables comprise economic and sociodemographic factors that might justify the development and growth of the tertiary sector. The results reveal that innovation, internet access, human development level, economic freedom degree, urbanization rate, per capita income, and percentage of elderly population positively affect to service sector participation in the economy of countries.

Keywords: *Services; Performance; Economic variables; Sociodemographic variables; Correlation.*

<http://periodicos.unifacef.com.br/index.php/rea>

INTRODUCTION

We have seen a sharp development of the service sector in the world's economy over the last few decades. Commerce, transportation, communication, hospitality, financial operations, tourism, healthcare, education, publicity, sports, and culture, for instance, are expanding activities that provide high economic returns for developed and developing nations (OLUSOJI; ODELEYE, 2018; OCHEL; WEGNER, 2019; ORHAN; KIRIKKALELI; AYHAN, 2019; ISHOLA; OLUSOJI, 2020; AKDAS; PRASAD, 2022; AIGHEYISI, 2023).

Data from the World Bank reveal that, in 2020, the service sector generated 55.6 trillion dollars in the world's economy, compared to 21.5 trillion in 2000 (THE WORLD BANK, 2022a). Other indicators that show the service sector contribution concern job generation and participation in the Gross Domestic Product (GDP) (GIANESI; CORRÊA, 2018). Regarding the population employed, estimates indicate that 50.6% act in the service sector globally (THE WORLD BANK, 2022b). Concerning wealth generation, in 2019, services comprised around 65% of the global GDP (THE WORLD BANK, 2022c).

These numbers differ between developed and developing countries. According to data from the United Nations Conference on Trade and Development (UNCTAD, 2021), developed economies present a service sector participation in the GDP of around 75%, whereas it stays around 56% in developing economies. The same occurs when observing numbers related to the employed population. In the United States, Canada, Australia, and the United Kingdom, for instance, 8 out of 10 employees work in the service sector, well above the global average of 50.6% (THE WORLD BANK, 2022b).

Thus, we can see that the tertiary sector has been contributing increasingly more to the production of national wealth, simultaneously being one of the key sectors for job

generation (UWITONZE; HESHMATI, 2016; URBAN, 2018; KUMAR, 2019; ORHAN; KIRIKKALELI; AYHAN, 2019; WIRTZ; HEMZO; LOVELOCK, 2020). Olusoji and Odeleye (2018) reinforce this understanding, putting forth the service sector as a sine qua non condition for a country to grow and develop economically, requiring more attention to its investments.

Given its significance, we need to understand the factors that may influence the growth and performance of the tertiary sector by employing statistical correlation coefficients (URBAN, 2018). A few studies have sought to establish relations to fulfill this purpose. Saito and Takashima (2016) used data from Japan to demonstrate that urbanization rate and population density are predictors of the participation of the secondary and tertiary sectors in the economy. Olusoji and Odeleye (2018) confirmed, using quarterly data from 1981 to 2015 in Nigeria, that the service sector is positively related to GDP growth. Similarly, Abdukhalilova (2022) revealed that increasing the service volume by one unit generates a global GDP of 2.35 units. Moreover, they found a positive relationship between service volume and the number of internet users. Orhan Kirikkaleli and Ayhan (2019) sought to demonstrate the causality relation between the Service Sector Index in the Turkish stock market and economic growth. The results revealed a unidirectional causal relationship between the variables.

There is also evidence that urbanization, technology, higher quality of life and income, and sociodemographic changes, like the increased participation of women in the job market and population aging, are associated with the development of the service sector (CORRÊA; CAON, 2006; FITZSIMMONS; FITZSIMMONS 2014; GIANESI; CORRÊA, 2018). However, we lack studies that prove those relationships. Other limitations concern the emphasis on the individual analysis of countries, largely focusing on developed economies (UWITONZE; HESHMATI, 2016).

In order to elucidate this question, this paper intends to identify the factors related to the performance of the service sector in world economies. Thus, we take the performance of the service sector in the economy of countries as the dependent variable, measured through service participation in the GDP. We assess nine independent variables: innovation, internet access, development, economic freedom, female workforce, urbanization, population density, income, and population aging.

With this study, we hope to better understand the possible relationships between service sector performance and economic and sociodemographic variables. In this sense, we aim to predict the development of nations and foment reflections on the outline of public policies that stimulate economic growth based on the tertiary sector.

The following section presents the theoretical framework of the study, describing the service sector from a historical and conceptual perspective, followed by the relationship between the sector's development with economic and sociodemographic factors presented as the research hypotheses. The subsequent section outlines the methodology employed, followed by the main results and discussions that lead to the study's conclusions.

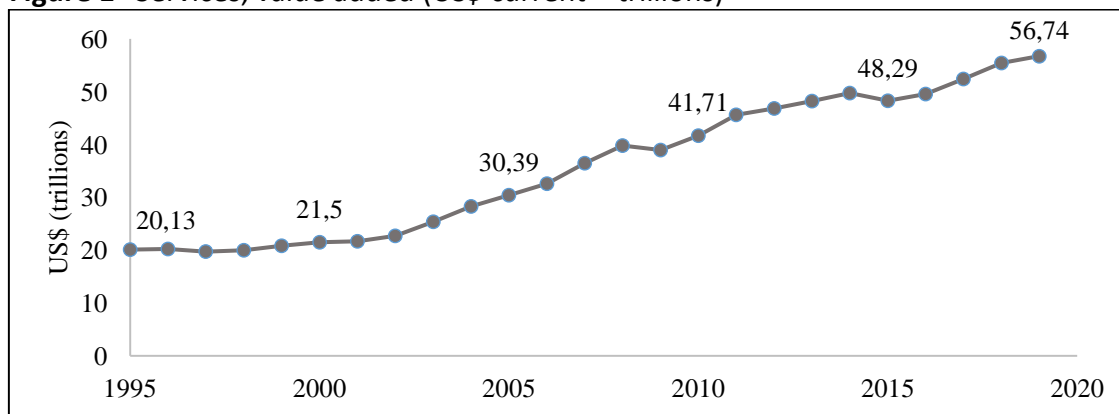
THE SERVICE SECTOR: HISTORY AND CONCEPTS

The service sector is responsible for a large part of the production of goods and services (GDP) in any country (AIGHEYISI, 2023). Conceptually, services are the non-physical production of products, meeting different consumer needs and creating value (ORHAN; KIRIKKALELI; AYHAN, 2019). In their definition, a few attributes are essential and differentiate services from produced goods. Among them, we have intangibility, because services cannot be touched or seen before purchase; inseparability, seeing that they cannot be separated from their suppliers; variability, because their quality varies and depends on who provides them; and perishability, seeing that services cannot be stored and their consumption is simultaneous (FITZSIMMONS; FITZSIMMONS, 2014; HEIDRICH; RÉTHI, 2012; KOTLER; ARMSTRONG, 2015; AKDAS; PRASAD, 2022). These attributes must be minimized through actions that provide tangible signs, recognize and meet particular customer needs, offer standardization, and optimize production capacity to improve the perception of service quality by the customers.

Among the activities or segments of the service sector, we have transportation, commerce, storage, healthcare, education, communication, food, hospitality, insurance, tourism, real estate, leisure, financial institutions, information technology, culture, stock market, sports, and publicity (OLUSOJI; ODELEYE, 2018; KUMAR, 2019; ORHAN; KIRIKKALELI; AYHAN, 2019; SOBIRJONOVNA, 2022; AIGHEYISI, 2023). Technological evolution has created new services, like online services and smartphones applications (ABDUKHALILOVA, 2022).

The last few years have seen an accelerated growth of the service sector in the global economy (Figure 1). However, this development relates to an evolution of economic development over history that encompasses the three sectors of the economy.

Figure 1 - Services, value added (US\$ current – trillions)



Source: The World Bank (2022a).

According to Corrêa and Caon (2006), services, albeit with a diminished role as an economic activity, have existed since Classical Greece, seen especially in the education of young men. The Early Middle Ages featured the spice transportation, which contributed significantly to the economic ascension of countries like Portugal and the Netherlands.

However, until the mid-18th century, agriculture dominated economic activity. The Industrial Revolution, starting in the 1860s in England and expanding to other countries over the following decades, initiates the industrialization age, substituting the traditional agricultural economy. The service sector began to gain space, effectively, in the mid-20th century, with the United States and other developed countries transitioning to a service-based economy (CHENG, 2013). Tourism, for example, arose as an economic activity after World War II due to urbanization, new means of communication and transportation, and the increased buying power and welfare of individuals (GIANESI; CORRÊA, 2018). Since then, industrialized countries have increasingly focused on offering and consuming services (OLUSOJI; ODELEYE, 2018; OCHEL; WEGNER, 2019).

Fitzsimmons and Fitzsimoons (2014) see this process as composed of three stages: 1. Pre-industrial society, based on manual labor in activities like agriculture, mining, and fishing, in which climate conditions are determinant; 2. Industrial society, with emphasis on producing goods and using machines and technology to “do more with less”; and 3. Post-industrial society, directed at the quality of life obtained from services like healthcare, education, and leisure.

This evolution from agricultural to industrial and then to a service-based economy is a natural and unavoidable process in the development of countries (CHENG, 2013). Over the last few years, the tertiary sector has been quickly surpassing the other two economic sectors (OLUSOJI; ODELEYE, 2018; WIRTZ; HEMZO; LOVELOCK, 2020), corresponding to 64.8% of the global GDP in 2020 (THE WORLD BANK, 2022c). Besides companies having services as their core activity, the goods-services complements have characterized the economy of modern society (URBAN, 2018). According to Sobirjonovna (2022), the characteristics of the current development of the service sector are the connections between technology and material production, as well as the intensification of services in all spheres of society, denoting its importance for the economy and for improving quality of life.

Thus, the service sector is expanding and gaining significance for developed and developing economies, as previously stated (ORHAN; KIRIKKALELI; AYHAN, 2019; AKDAS; PRASAD, 2022). It directly affects a country’s economic and social growth, entailing the generation of wealth, jobs, and investments (KUMAR, 2019; ISHOLA; OLUSOJI, 2020). The following section explores a few factors that might have contributed to the development of the service sector.

THE DEVELOPMENT OF THE SERVICE SECTOR AND ECONOMIC AND SOCIODEMOGRAPHIC FACTORS

Several factors relate to the growth of the service sector over time in the global economy (UWITONZE; HESHMATI, 2016). The role of innovation in the development of services has been widely discussed. Kumar (2019) demonstrates that the growth of the sector has become more significant over the last few years, especially due to technological advances that have allowed new ways to provide services. Uwitonze and Heshmati (2016) also attribute this result to technological innovation. According to Cheng (2013),

the development of the service sector tends to diversify and improve in quality due to innovation. Urban (2018) stresses that the accelerated pace of innovation enabled the creation of new services related to information and communication technology, besides services linked to quality of life. Technology and innovation may have contributed to the ascension of the service sector in yet another manner, by making manufacturing more intensive and automatized, generating fewer jobs in industry and therefore reinforcing job creation in the tertiary sector (SANTACREU; ZHU, 2018). A country's innovation performance can be measured through the Global Innovation Index, composed of 81 indicators distributed into five input pillars, namely institutions, human capital and research, infrastructure, market sophistication, and business sophistication, and two output pillars, namely knowledge and technology products and creative products (WORLD INTELLECTUAL PROPERTY ORGANIZATION [WIPO], 2021). Based on these considerations, we assume that countries with higher innovation levels tend to present more service participation in the economy, leading to our first hypothesis:

H1: Innovation positively affects the performance of the service sector in the economy of countries.

Jointly with innovation and technological advances, the internet is one of the factors that expands the possibilities of service provision, besides changing traditional characteristics like the need for in-person interaction with the customer in the process (GIANESI; CORRÊA, 2018). According to Wirtz, Hemzo and Lovelock (2020), the internet has allowed the creation of entirely new services that gather different sources of information and add value to the customer. Examples include application services that meet the demands of transportation, healthcare, education, and physical activity, among others. This same issue is reported by Aigheyisi (2023) who points to the increase in services from internet technology, due to the greater ease of not moving labor. Matzner et al. (2018), more broadly, comment on how the digital transformation changes the management of services and expands possibilities through the Internet of Things, artificial intelligence, and robotics. More practically, Abdukhalilova (2022) identifies that using information technology may contribute to the increase in competitiveness in the service sector. Moreover, a higher number of internet users may result in an increased volume of offered services, especially in digital marketing, virtual markets, and online shops. Thus, we estimate that:

H2: Internet access positively affects the performance of the service sector in the economy of countries.

The development level of countries is often linked to more participation of the service sector in the economy. As countries develop, services tend to contribute more to wealth generation (WIRTZ; HEMZO; LOVELOCK, 2020). According to Fitzsimmons and Fitzsimmons (2014), eliminating diseases and increasing life expectancy requires healthcare services, and high education levels provide the skills required to live in a post-industrial, service-based society. The Human Development Index (HDI) is a parameter to assess the development level considering three dimensions: 1. Health, evaluated through life expectancy at birth; 2. Education, considering the mean years of schooling; and 3. Standard of living, measured by the gross national income per capita (UNITED

NATIONS DEVELOPMENT PROGRAMME [UNDP], 2022). Searching a relationship between the service sector and the HDI, Arshed et al. (2022) found that the growth of the service sector affects negatively the HDI in low or lower-middle income countries and positively in upper middle or high-income countries. This finding makes sense, considering that initial economic growth tends to lead to income inequality, which changes over the development process. Daud (2017), investigating the Maluku Province in Northern Indonesia, concluded that the tertiary sector has a positive and linear relationship with the HDI. Thus, we assume that places with higher Human Development Indices feature more participation of the service sector in the economy.

H3: Human development positively affects the performance of the service sector in the economy of countries.

Another factor that might influence the participation of the service sector in the economy is the degree of economic freedom in a country. Giansesi and Corrêa (2018) state that deregulating the economy, privatizations, and non-intervening policies by the State open new business opportunities in a more competitive environment. Gohmann, Hobbs and McCrickard (2008) observe that the degree of economic freedom affects the level and type of economic activity in US states, with a positive relationship with the number of companies and jobs in a few service segments, like business and personal services. Angulo-Guerrero, Pérez-Moreno and Abad-Guerrero (2017) also identify a relationship between economic freedom and business, with the Index of Economic Freedom positively related to fomenting entrepreneurship, especially by opportunity. It is worth highlighting that economic freedom can be measured through the Index of Economic Freedom, which encompasses 12 liberties, including right to property, financial freedom, business freedom, government integrity, and investment freedom (HERITAGE FOUNDATION, 2022). Thus, we assume that a high degree of economic freedom in the country tends to lead to more participation in the service sector in the economy.

H4: Economic freedom positively affects the performance of the service sector in the economy of countries.

Sociodemographic changes may impact the behavior of economic sectors, such as growth in the female workforce, urbanization, population density, income, and population aging. Considering women's participation in the job market, Verick (2018) points out that the growth of the female workforce directly reflects on the increase in family income and, consequently, the consumption of goods and demand for services. Rendall (2018) states that, from the moment women ingress the workforce, home consumption shifts to the market, increasing the demand for transportation, childcare, and restaurant services. Petrongolo and Ronchi (2020) comment that the growth in female job rates, especially after World War II, accompanies the growth of the service sector. Thus, we propose that:

H5: Women's participation in the job market positively affects the performance of the service sector in the economy of countries.

Urbanization is another demographic factor that tends to contribute to the growth of the service sector (UWITONZE; HESMATI, 2016; OLUSOJI; ODELEYE, 2018). Saito and Takashima (2016) identified a positive effect of urbanization on the tertiary sector participation in the economy. Das and Paul (2021) observed a tendency in highly urbanized countries in Southern, Eastern, and Southeastern Asia to present more contributions from service-based jobs. Statistical analysis confirmed a significant relationship between service-based jobs and urbanization growth. Mendez, Atienza and Modrego (2023) also denoted that urbanization increases the productivity of services in developed countries. Moreover, Corrêa and Caon (2006) and Gianesi and Corrêa (2018) point out that having more people living in cities raises the demand for public safety and transportation services, besides promoting new services like applications that follow traffic in real-time, for instance. Given those considerations, we propose the following hypothesis:

H6: Urbanization positively affects the performance of the service sector in the economy of countries.

Like urbanization, Saito and Takashima (2016) state that population density may predict the sectors' participation in the economy. However, few studies present the influence of this variable on the service sector. Mutunga (2020), more broadly, observed that the growth of population density affects economic growth positively and significantly. Nguyen and Nguyen (2018) found the same results. Thus, understanding the effect of population density on economic growth, we suggest that it may affect the performance of the service sector in the economy as the following hypothesis:

H7: Population density positively affects the performance of the service sector in the economy of countries.

Income is another variable widely discussed in its relationship to services. The increase in consumption expenses linked to income growth might have a positive relationship with the development of the service sector (UWITONZE; HESHMATI, 2016). According to Urban (2018), Ernst Engel, a Prussian statistician in the 19th century, observed that when family income is higher, expenses with food and durable goods diminish and expenses with services grow. Similarly, Chai (2018) associates the growth of services with increasing family incomes, which tend to diversify expenses beyond basic needs. We infer, therefore, that the higher the income observed in countries, the greater the participation of the service sector in the economy.

H8: Income positively affects the performance of the service sector in the economy of countries.

Finally, demographic changes concerning the age composition of the population may affect the demand for services. Population aging, with the increase in elderly people in a region, might favor the demand for a variety of services. Guimarães and Tiryaki (2020) comment that population aging changes consumption habits, which become more conservative. According to the authors, healthcare, elderly care, and leisure services gain prominence and expand the participation of the service sector in the economy.

Fitzsimmons and Fitzsimmons (2014) identified that, in the United States, population aging influences the needs for services greatly, especially in finances and healthcare. In the empirical study by Cravino, Levchenko and Rojas (2019) this relationship is also confirmed. The authors state that, considering home data from the United States, service-related expenses increase with population aging, which consequently generates growth in the service sector as the population ages. Given these considerations, we present the following hypothesis:

H9: The percentage of the elderly population positively affects the performance of the service sector in the economy of countries.

The discussions promoted reveal, thus, possible influences of economic and sociodemographic variables in the participation of the service sector in the economy. The following section presents the research methodology that will subsidize the confirmation or disproof of the hypotheses.

METHODOLOGY

This paper presents a quantitative study, seeing that it measures the relationship between variables using statistical instruments (ZANELLA, 2013). In this type of study, the researcher starts from clearly defined hypotheses and variables and seeks to explain the causes and connections between phenomena by quantifying the investigation results (VIEIRA, 2010).

Concerning the goals, this study is descriptive and explanatory. A descriptive study aims to describe a phenomenon, sometimes establishing relationships between variables. An explanatory study explains the reasons behind phenomena, deepening reality by controlling variables and identifying the influence of independent variables on the dependent one (PRODANOV; FREITAS, 2013).

The technical procedures comprise a document search using secondary data. According to Zanella (2013), a document search employs quantitative or qualitative data found, for instance, in companies, official publications, or the results of published studies. This study employed international institutions and official organizations as information sources, like The World Bank, Heritage Foundation, World Intellectual Property Organization (WIPO), and United Nations Development Programme (UNDP), all of which present data that characterize countries in terms of economic and sociodemographic factors.

The study population comprises 128 countries selected considering data availability for the variables analyzed (Chart 1). We hope to identify the factors related to the performance of the service sector in the economy, which is therefore the dependent variable. The relevance of service activities in an economy can be measured through the workforce in the sector or wealth generation (URBAN, 2018). This study considers the participation of the service sector in the GDP of each nation, using the most recent data disclosed by the World Bank (THE WORLD BANK, 2022a).

Chart 1 – Countries included in the study

Albania	Cameroon	Greece	Lebanon	Oman	Sweden
Algeria	Canada	Guatemala	Lithuania	Pakistan	Tajikistan
Angola	Chile	Guinea	Luxembourg	Panama	Tanzania
Argentina	China	Honduras	Madagascar	Paraguay	Thailand
Armenia	Colombia	Hungary	Malawi	Peru	Togo
Australia	Costa Rica	Iceland	Malaysia	Philippines	Trinidad and Tobago
Austria	Cote d'Ivoire	India	Mali	Poland	Tunisia
Azerbaijan	Croatia	Indonesia	Mauritius	Portugal	Turkey
Bahrain	Cyprus	Iran	Mexico	Qatar	Uganda
Bangladesh	Czech Republic	Ireland	Moldova	Romania	Ukraine
Belarus	Denmark	Israel	Mongolia	Russia	Arab Emirates
Belgium	Dominican Rep.	Italy	Montenegro	Rwanda	Uni. Kingdom
Benin	Equator	Jamaica	Morocco	Saudi Arabia	United States
Bolivia	Egypt	Japan	Mozambique	Senegal	Uruguay
Bosnia	El Salvador	Jordan	Namibia	Serbia	Uzbekistan
Botswana	Estonia	Kazakhstan	Nepal	Singapore	Vietnam
Brazil	Ethiopia	Kenya	Netherlands	Slovakia	Zambia
Brunei	Finland	Rep. of Korea	New Zealand	Slovenia	Zimbabwe
Bulgaria	France	Kuwait	Niger	South Africa	
Burkina Faso	Georgia	Kyrgyzstan	Nigeria	Spain	
Cabo Verde	Germany	Laos	Macedonia	Sri Lanka	
Cambodia	Ghana	Latvia	Norway	Switzerland	

Source: the authors.

We assess nine independent variables: 1. Innovation, measured by the Global Innovation Index); 2. Internet access, considering the percentage of individuals that have access to the internet in the total population; 3. Development, provided by the Human Development Index (HDI); 4. Economic freedom, measured by the Index of Economic Freedom; 5. Female workforce, considering the participation of women in the job market compared to the female population older than 15; 6. Urbanization, given by the percentage of urban population compared to the total; 7. Population density, which consists of the number of people per square kilometer; 8. Income, calculated by the national liquid income adjusted per capita; and 9. Population aging, measured as the proportion of the population older than 65. Chart 2 displays the variables.

After gathering the information from the corresponding websites, we compiled the data on a Microsoft Excel spreadsheet and then employed the software Statistica 7.0 to conduct the descriptive and inferential analysis. Descriptive statistics characterized the study variables in terms of mean, median, minimum, maximum, and standard deviation. The data were also submitted to the Shapiro-Wilk normality test, which indicated non-normal distribution (< 0.05).

Chart 2 – Research variables

VARIABLES		CALCULATION METHOD	REFERENCE
VD. Performance of the service sector		% of participation of the service sector in the GDP	(THE WORLD BANK, 2022c)
H1	VI-1. Innovation	Global Innovation Index	(WIPO, 2021)
H2	VI-2. Internet access	% of individuals that use the internet compared to the total population	(THE WORLD BANK, 2022d)
H3	VI-3. Development	Human Development Index	UNDP (2022)
H4	VI-4. Economic freedom	Index of Economic Freedom	(HERITAGE FOUNDATION, 2022).
H5	VI-5. Female workforce	% of female participation in the job market compared to the total female population older than 15	(THE WORLD BANK, 2022e)
H6	VI-6. Urbanization	% of urban population compared to the total population	(THE WORLD BANK, 2022f)
H7	VI-7. Population density	Number of people per square kilometer	(THE WORLD BANK, 2022g)
H8	VI-8. Income	National liquid income adjusted per capita (current US\$)	(THE WORLD BANK, 2022h)
H9	VI-9. Population aging	% of the population older than 65 compared to the total population	(THE WORLD BANK, 2022i)

Legend: VD = dependent variable; VI = Independent variable; H = Hypothesis.

Source: the authors.

Given the non-normality of the data, we conducted Spearman's Correlation test to check the relationship between the dependent variable and the independent ones. We interpreted the results according to the values determined by the Department of Political Science of the Quinnipiac University, which considers: 1.0 – perfect correlation; 0.7 to 0.9 – very strong correlation; 0.4 to 0.6 – strong correlation; 0.3 – moderate correlation; 0.2 – weak correlation; 0.1 – insignificant correlation; and 0.0 – nonexistent correlation, for positive and negative values (AKOGLU, 2018). The values $p < 0.05$ were considered significant (FERREIRA; PATINO, 2015).

RESULTS AND DISCUSSIONS

This section presents the results of the descriptive and inferential analysis, as well as the discussion of our findings with the literature. Table 1 characterizes the research variables in terms of position measurements (mean, median, minimum, and maximum) and standard deviation.

The dependent variable presents a median of 56.64%, which indicates that a large part of the countries is still under this value, at an incipient stage of tertiary sector development. The lowest percentage of participation of the service sector in the economy corresponds to Mali (34.42%), while the highest was seen in Lebanon (87.16%).

Table 1 – Descriptive statistics

Variables	Mean	Median	Minimum	Maximum	Standard deviation
VD. Performance of the service sector	56.37	56.64	34.42	87.16	10.21
VI-1. Innovation	34.32	31.75	15.00	65.50	12.32
VI-2. Internet access	67.89	75.50	10.00	100.00	25.49
VI-3. Development	0.759	0.779	0.394	0.957	0.142
VI-4. Economic freedom	62.68	62.95	33.10	84.40	9.84
VI-5. Female workforce	51.88	53.50	13.00	83.00	14.59
VI-6. Urbanization	63.45	67.00	17.00	100.00	21.15
VI-7. Population density	214.00	88.00	2.00	8019.00	737.40
VI-8. Income	13815.07	5862.00	363.00	65600.00	16368.36
VI-9. Population aging	10.59	9.00	1.00	28.00	6.86

Source: the authors.

Regarding innovation (VI-1), we observe a median score of 31.75. Among the countries assessed, Switzerland ranks first with 65.50, and Angola ranks last with 15.

The internet access variable (VI-2) reveals inequality among the countries. The median of 75.50% indicates that half of the nations do not provide internet access to at least 25% of the population, with this growing value considered the lowest development level. In Malawi and Niger, for instance, only 10% of the population have access to the internet, while the United Arab Emirates, Qatar, and Bahrain provide it to 100% of the population.

Concerning the Human Development Index (VI-3), we observe a median of 0.779, which shows that at least half of the countries have high or very high development levels (UNDP, 2022). Norway presents the highest development level (0.957), followed by Ireland and Switzerland (0.955). On the other hand, Niger has the worst development index (0.394).

In terms of economic freedom (VI-4), Singapore ranks first in the world with the best result (84.4), followed by Switzerland (84.2). The country with the lowest economic freedom is Zimbabwe, scoring 33.10, considering the average of the 12 liberties assessed by the index.

Regarding female workforce (VI-5), the median of 53.50 indicates that in at least half of the countries assessed, over 50% of the female population older than 15 acts in the job market. The country with the most participation of women in the job market is Rwanda with 83%, while Jordan presents the lowest participation (13%).

Concerning urbanization (VI-6), we observe that Kuwait and Singapore are the most urban (100%). The lowest urbanization levels are found in Malawi, Niger, and Rwanda, with only 17% of the population living in cities. Similarly, in terms of population density (VI-7), we see that Singapore has the highest value, with 8,019 per Km². The countries with the lowest population density are Mongolia (2 inhabitants/km²), followed by Namibia and Australia (3 inhabitants/km²).

The income variable (VI-8) reveals that half of the countries assessed present a yearly income per capita under US\$ 5,862.00. Malawi presents the lowest income per capita (US\$ 363.00), while Switzerland has the highest value (US\$ 65,600.00).

Finally, the aging variable (VI-9), measured as the percentage of people older than 65 compared to the total population, indicates that Japan features the highest proportion of elderly population (28%). The United Arab Emirates rank last with only 1%, followed by Angola, Burkina Faso, Qatar, Uganda, and Zambia with 2%.

To reveal whether these data relate to a higher participation of the service sector in the economy, Table 2 presents the results of the correlation test.

Table 2 – Correlation test results

VD. Development of the service sector	VI-1. Innovation	VI-2. Internet access	VI-3. Development
	r = 0.695 p = 0.000*	r = 0.606 p = 0.000*	r = 0.716 p = 0.000*
	VI-4. Economic freedom	VI-5. Female workforce	VI-6. Urbanization
	r = 0.618 p = 0.000*	r = -0.160 p = 0.071	r = 0.638 p = 0.000*
	VI-7. Population density	VI-8. Income	VI-9. Population aging
	r = 0.168 p = 0.058	r = 0.762 p = 0.000*	r = 0.648 p = 0.000*

* p<0.05. Spearman's correlation test.

Source: the authors.

The results reveal a statistically significant difference in the relationship between the dependent variable and the independent variables innovation and internet access. We find a strong positive correlation for both variables, confirming that technological development is related to service sector growth (CORRÊA; CAON, 2006; UWITONZE; HESHMATI; 2016; GIANESI; CORRÊA, 2018; KUMAR, 2019; WIRTZ; HEMZO; LOVELOCK, 2020; AIGHEYISI, 2023). This finding corroborates the study by Abdukhalilova (2022), which confirmed a positive relationship between the volume of services and the number of internet users. This fact is justified by the possible creation of new services through technology and the internet, like online and app-based services (URBAN, 2018). Moreover, the automation of the industrial sector reinforces the demand for job generation in the tertiary sector (SANTACREU; ZHU, 2018).

Human development is another variable with a statistically significant influence on the performance of the service sector in the countries examined. We found a very strong positive correlation between the variables. Thus, we estimate that as countries develop, the contribution of services to the economy grows, corroborating Gianesi and Corrêa (2018), Daud (2017), and partially Arshed et al. (2022), who found this positive relationship in middle and high income.

The level of economic freedom is another factor that affects the participation of the tertiary sector in a nation (GOHMANN; HOBBS; MCCRICKARD, 2008; ANGULO-GUERRERO; PÉREZ-MORENO; ABAD-GUERRERO, 2017). We confirmed this relationship, finding a strong positive relationship between the variables. Thus, we understand that non-intervening policies by the State might promote a more competitive environment favorable to developing services (GIANESI; CORRÊA, 2018).

The hypotheses related to the independent variables urbanization and income also presented statistically significant results and were confirmed. Considering urbanization, we found a strong positive relationship with the dependent variable. These findings corroborate the perspective of Fitzsimmons and Fitzsimmons (2014), Uwitonze and Heshmati (2016), and Olusoji and Odeleye (2018), besides Saito and Takashima (2016) and Das and Paul (2021), who identified urbanization as a predictor of the participation of the tertiary sector in the economy. In turn, income presents a very strong positive correlation with the performance of the service sector. We understand that increasing incomes entail higher consumption of services, leading to the development of the tertiary sector, as indicated by Uwitonze and Heshmati (2016), Fitzsimmons and Fitzsimmons (2014), Chai (2018), and Urban (2018).

Finally, we see statistically significant results in the relationship between population aging and the dependent variable, as a strong positive correlation. We understand that the elderly population tends to demand a variety of services that stimulate growth in the sector (FITZSIMMONS; FITZSIMMONS, 2014; CRAVINO; LEVCHENKO; ROJAS, 2019; GUIMARÃES; TIRYAKI, 2020).

We did not find relationships between women's participation in the job market or population density with the dependent variable. Thus, despite indications of shifting service demands, especially for domestic, childcare, and transportation services (VERICK, 2018; RENDALL, 2018; PETRONGOLO; RONCHI, 2020), the study did not confirm that increasing female participation in the workforce directly affects service sector growth. Our findings also go against the results of Saito and Takashima (2016), which presented population density as a predicting factor for the sectors' participation in the economy. Even though population density affects economic growth positively (NGUYEN; NGUYEN, 2018; MUTUNGA, 2020), we could not confirm this relationship for the service sector.

Table 3 summarizes the findings concerning the confirmation or disproof of the hypotheses.

Table 3 – Summary of the results found

Hypotheses	Expected sign	Found sign	p-value	Correlation	Result
H1	+	+	0.000	Strong	Confirmed
H2	+	+	0.000	Strong	Confirmed
H3	+	+	0.000	Very strong	Confirmed
H4	+	+	0.000	Strong	Confirmed
H5	+	-	0.071	-	Refuted
H6	+	+	0.000	Strong	Confirmed
H7	+	+	0.058	-	Refuted
H8	+	+	0.000	Very strong	Confirmed
H9	+	+	0.000	Strong	Confirmed

Source: the authors.

In summary, the service sector is linked to the economic growth of a nation (OLUSOJI; ODELEYE, 2018; ORHAN; KIRIKKALELI; AYHAN, 2019; ABDUKHALILOVA, 2022) and, therefore, its stimulus tends to provide positive impacts on wealth generation. The factors explored in this paper serve as a support for understanding this process and allow reflections about the countries' development tendencies based on economic and sociodemographic variables.

FINAL CONSIDERATIONS

This paper intended to identify the factors related to the performance of the service sector in world economies. To operationalize the study, we considered the performance of the service sector of countries as the dependent variable, measured by the percentage of service participation in the national GDP. The independent variables corresponded to economic and sociodemographic factors that potentially justify the development and growth of the tertiary sector, obtained from official statistics. The study encompassed 128 countries.

The results showed that internet access, human development level, economic freedom degree, urbanization rate, income per capita, and percentage of elderly population significantly and positively affect the participation of the service sector in the economy of countries, confirming hypotheses H1, H2, H3, H4, H6, H8, and H9. On the other hand, the participation of women in the job market (H5) and population density (H7) were refuted, as we did not find significant relationships between them and the performance of the service sector.

This study contributes by providing subsidies for understanding the ascension of the tertiary sectors in the world's economy, identifying the relationships between the performance of the service sector and the economic and sociodemographic variables. Moreover, it enables reflections on development tendencies and policy priorities, intending to stimulate economic growth based on services. The study also expanded the literature on services, which is still incipient in the academic context, and innovated by conducting an integrated analysis encompassing several world economies.

As a limitation of this investigation, we indicate the inability to include all countries in the analysis, given the data unavailability in the databases consulted. For future studies, we suggest the inclusion of other variables that might deepen and elucidate other causes for the ascension of the tertiary sector. Another suggestion is to separate countries by different development levels to understand the sector and its predictors in a more detailed and contextualized manner. Fulfilling the same research goal, we also encourage the reproduction of the study at sub-national and regional levels.

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