Chapter 1 – Modern services dynamics: Global and the Colombian context

Authors/Collaborators

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This chapter seeks to analyze the services' sectors exports in the world and Colombia. It consists of two parts, the first studies the recent evolution and trends in services' foreign trade. The second presents a proposal to analyze which modern service sectors in Colombia can be strategic.
The service sectors in the EBOPS 2010 classification fall under the concepts of modern and traditional services. In Colombia, there are some services that, although internationally, are classified as modern or traditional services, behave differently in Colombia. For this analysis, we will group these service sectors under the label of Other services. (BanRep, 2020)

Table 1 Modern, Traditional and Other services classification

Modern	Traditional	Other
Telecommunications, computing, and information services. Other business services. Charges for IP use. Personal, cultural, and recreation services	Travel. Transport. Maintenance and repair services n.i.e.	Construction. Manufacturing services on physical inputs owned by others. Financial services. Government goods and services n.i.e. Insurance and pension services.

Conclusions and recommendations

1. Information limitations inhibit the development of assertive policies to promote trade in services in Colombia. There are large biases in the generation of information that can only be solved by constructing more complex and robust information-generating instruments. Even though the National Administrative Department of Statistics (DANE) and the Central Bank are regularly publishing information for trade in services, there are biases related to the high aggregation of sectors, the lack of consensus in sectoral definitions, problems with the business characterization of service companies, and absence in information regarding exports through mode 3 (foreign investment).

2. Colombia must sophisticate and diversify services exports in line with its National Policy for Productive Development (PDP)[1] and international trends. The integration of new technologies is key to promoting the development and sophistication of traditional and modern services, adding value and diversifying Colombian services exports.
3. Modern services have the most dynamic growth trend. Colombia has many comparative advantages in the modern services sector, which has been the most dynamic in recent years. Therefore, Colombia should promote regulatory and policy enhancements to foster modern services, especially by cross-border supply.
4. Cross-border trade in services is the most strategic mode of supply[*]. In Colombia, the cross-border trade in modern services has increased with information technologies and reduced costs, especially in the subsector of other business services.
5. It is essential to continue developing pre-identification exercises according to the PDP, which function as a sectorial tool to identify opportunities and productive bets. These exercises could be done in partnership with public and private associations adding new sources of investigation.
6. The services identified in the pre-identification exercise represent Colombia's opportunity to diversify and promote services exports[**]. Moreover, the development of modern services is also an opportunity to improve other economic sectors and new businesses, adding value to Colombian's exports. It is recommended to develop a joint action plan with the private sector and relevant stakeholders to boost these sectors' development.

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[*] The General Agreement on Trade in Services GATS (WTO, 1995) classifies services by their mode of marketing or supply as follows: Cross-border supply does not require displacement of the parties involved; Consumption abroad, who consumes the service travels abroad to receive it; Commercial presence, when service providers establish (or acquire) a subsidiary, a branch, or a representative office in the territory of another country through which they provide their services and; Presence of natural persons, which implies that the person providing the service moves to the territory of the consumer to supply it on behalf of the company. (MSITS, 2012)

** After having carried out all the steps of the proposed methodology, we can arrive at the following results for modern services classified by EBOPS 2010:

		Pre-identified
EBOPS 2010	Description	Yes/No
8	Charges for the use of intellectual property n.i.e.	No
9.1	Telecommunications services	Yes
9.2	Computer services	Yes
9.3	Information services	Yes
10.1	Research and development services	No
10.2	Professional and management consulting services	Yes
10.3	Technical, trade-related, and other business services	Yes
11.1	Audio-visual and related services	No
11.2	Other personal, cultural, and recreational services	Yes

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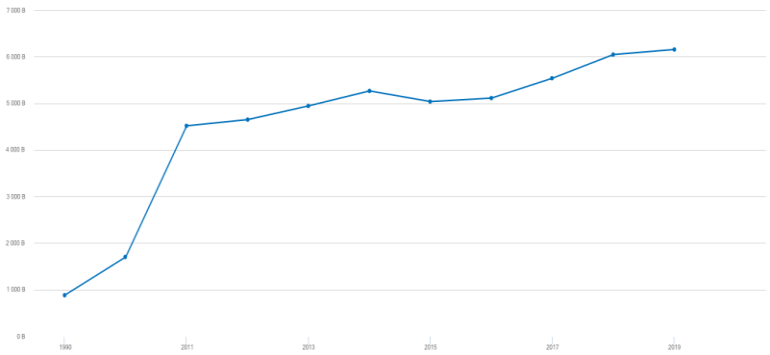
This chapter seeks to analyze the services' sectors exports in the world and Colombia. It consists of two parts, the first studies the recent evolution and trends in services foreign trade. The second presents a proposal to analyze which modern service sectors in Colombia can be strategic.

The concept of services can be attributed to the set of activities carried out by economic agents when generating or making a wide range of intangible products available to individuals, homes, or companies. (United Nations, 2008)

In addition to the significant growth in trade in services worldwide, services have higher value-added characteristics than goods, greater integration within international value chains, and resilience to supply and demand shocks, which means less volatility that allows the trade in services be more stable. (WTO, 2019)

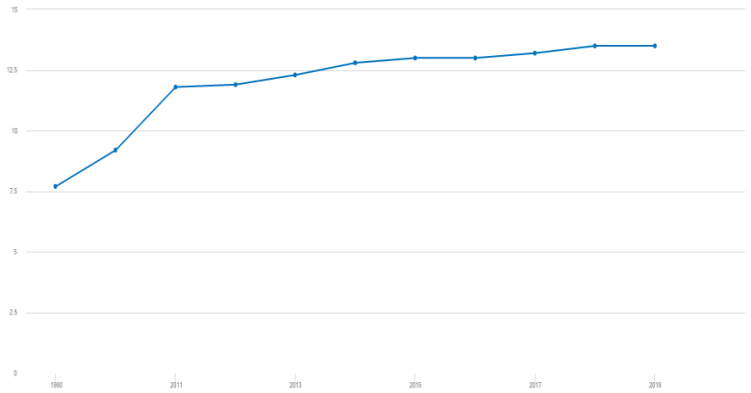
International trade in services has been increasing at a significant rate in recent years. As a percentage of world GDP, services had grown from 9.25% in 2000 to 13.48% in 2019. Likewise, world exports of services have increased from $ 1.702 trillion in 2000 to $ 6.156 trillion in 2019. (World Bank, 2020)

Figure 1 Exports Balance of payments, Millions of USD at current prices



Source: World development indicators. (World Bank, 2020)

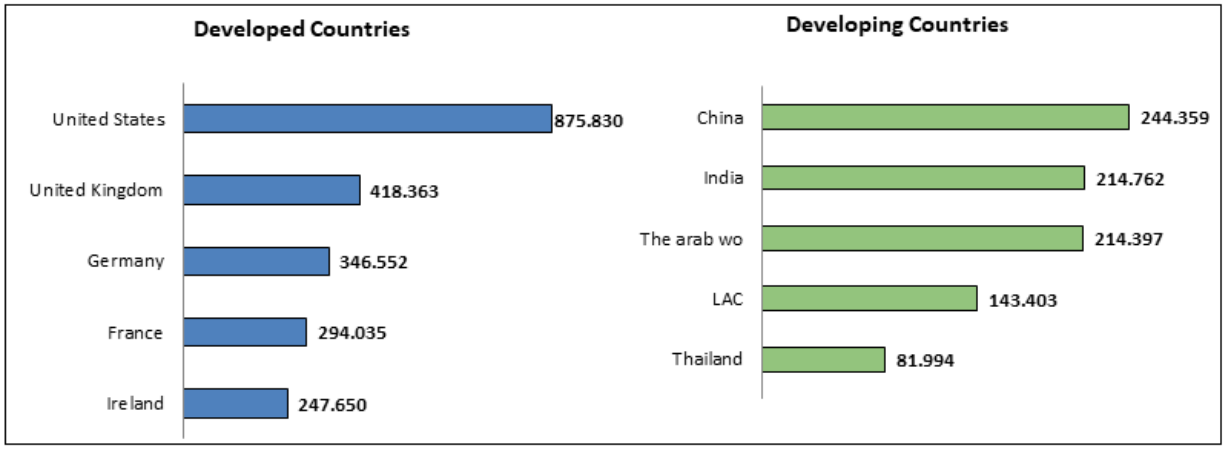
Figure 2 Percentage of world GDP from Trade in services



Source: World development indicators. (World Bank, 2020)

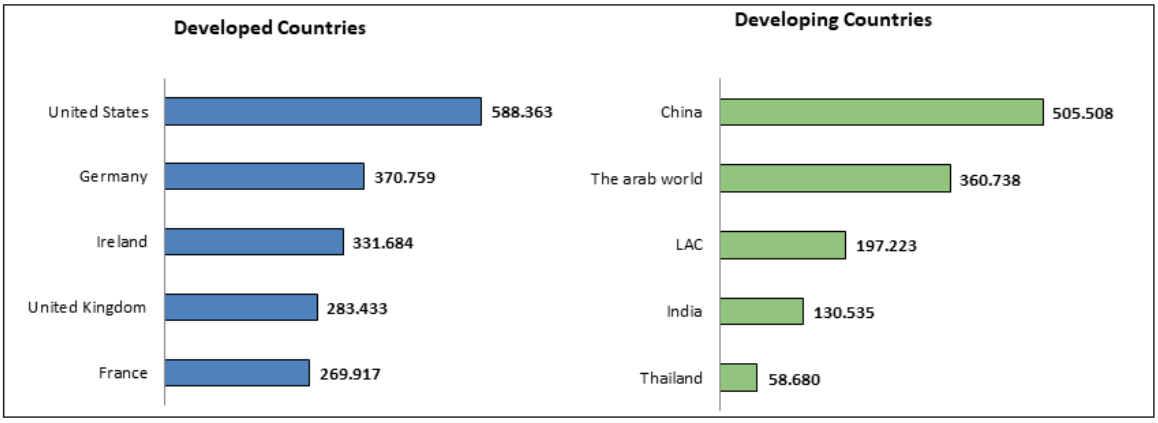
Services are often overlooked in international trade discussions even when they account for most trade in many developed countries and some developing economies. This may be because services are less tangible, and problems related to trade in services tend to be more complex. (WTO, 2020)

Figure 3, Main exporters of services in the world 2019



Source: Own elaboration. Based on (IMF, 2019)

Figure 4 Main importers of services in the world 2019



Source: Own elaboration. IMF

An example of the lack of recognition of the importance of trade in services is the little effort to solve the problems of defining and measuring these markets. The attempt to understand, couple, and measure numerous activities in a single definition broaden the spectrum as services are highly heterogeneous. (Gonzáles, M., Gómez, C. d., & Dominguez, J, 1989)

It has led to significant biases in the compilation of information on foreign trade in services by not having an instrument that results from high-quality information comparable and adaptable in all countries. The proposal that has come closest to raising the standards of services information has been the Sixth Version of the BPM6 Balance of Payments Manual, the previous version that had already introduced important improvements in trade statistics in services. (Mattos, 2001)

In general, information regarding service trade have the following challenges:

- Inconsistencies in the definition and coverage of services reduce comparability between countries.
- Service information tends to be highly aggregated.
- Lack of detail in the information on services in countries such as Non-OECD[2].
- The Balance of Payments does not generate information for Mode 3[3].

Information problems for services are not significantly different in Colombia. There are large biases in the generation of information that can only be solved by constructing more complex and robust information-generating instruments. Even though the National Administrative Department of Statistics (DANE) and the Central Bank are regularly publishing information for trade in services, there are biases related to the high aggregation of sectors, the lack of consensus in sectoral

[2] The OECD member countries offer more detailed information by correctly following the BPM6 guidelines to classify trade in services in the balance of payments. This means that non-OECD countries have greater problems related to services' statistics, including the lack of comparability and the even higher aggregation of sectoral information on services..

[3] WTO defines mode 3 or commercial presence as trade by a service provider of one Member through the commercial presence in any other Member's territory.

definitions, problems with the business characterization of service companies, and absence in information regarding mode 3(foreign investment). For a discussion on the 'Measurement of foreign trade in services: challenges, sources of information and methodology' for Colombia, see a contribution by a group of researchers from the Central Bank in Annex 1.

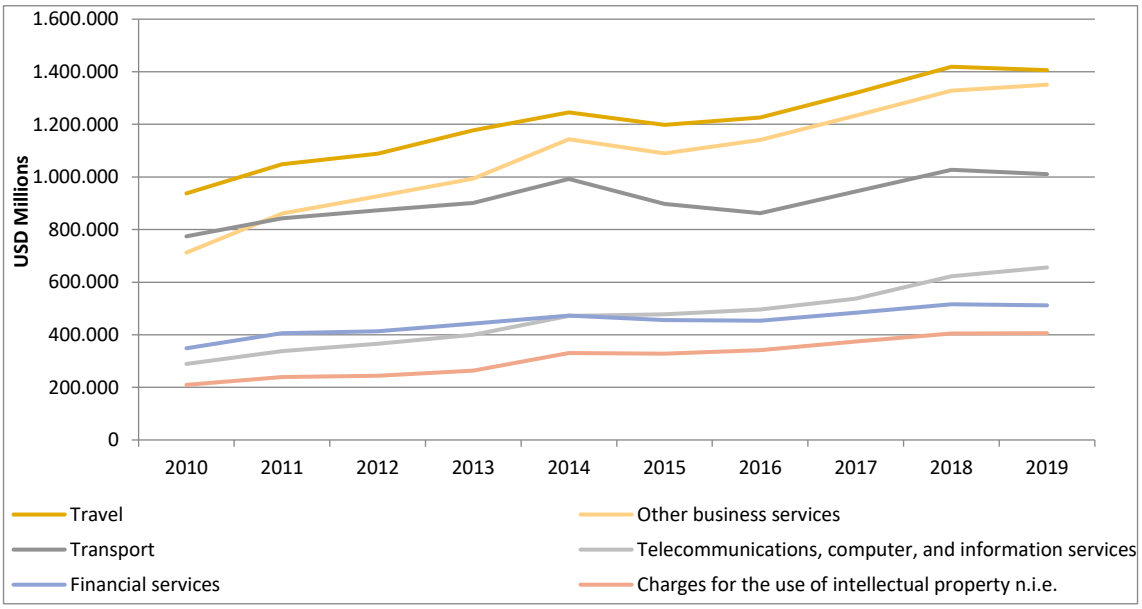
Addressing these problems represents an excellent opportunity to expand knowledge of these markets and the efficient formulation of public policies.

Recent trends in foreign trade in services

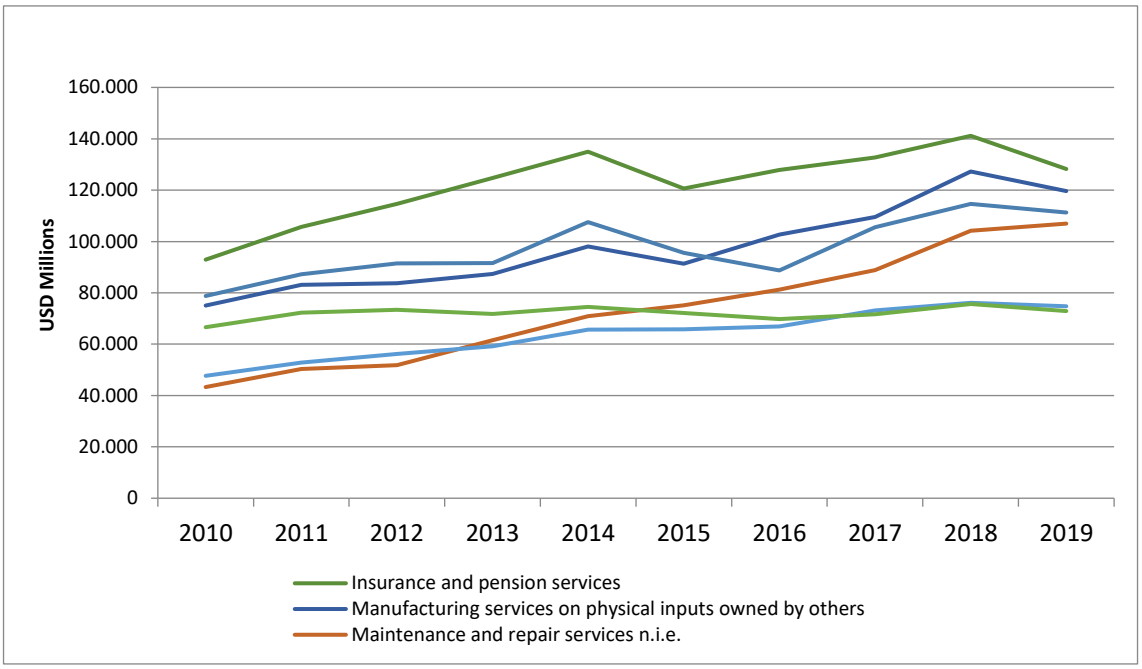
To provide an analysis of trade in services, we use the EBOPS 2010 classification, a classification with the widest disaggregation available and implemented by the BPM6. The service sectors correspond to Manufacturing services on physical inputs owned by others, Maintenance and repair services n.i.e, Transport, Travel, Construction, Insurance and pension services, Financial Services, Charges for the use of intellectual property n.i.e, Telecommunications, computer, and information services, Other business services, Personal, cultural, and recreational services, and Government goods and services n.i.e.

Some of these services have more specific internal disaggregation that, due to the information biases that the data present internally, will not be analyzed in detail until later.

Figure 5 World exports by sector, EBOPS 2010 classification



Source: Own elaboration. International Trade Statistics (Trademap, 2020)

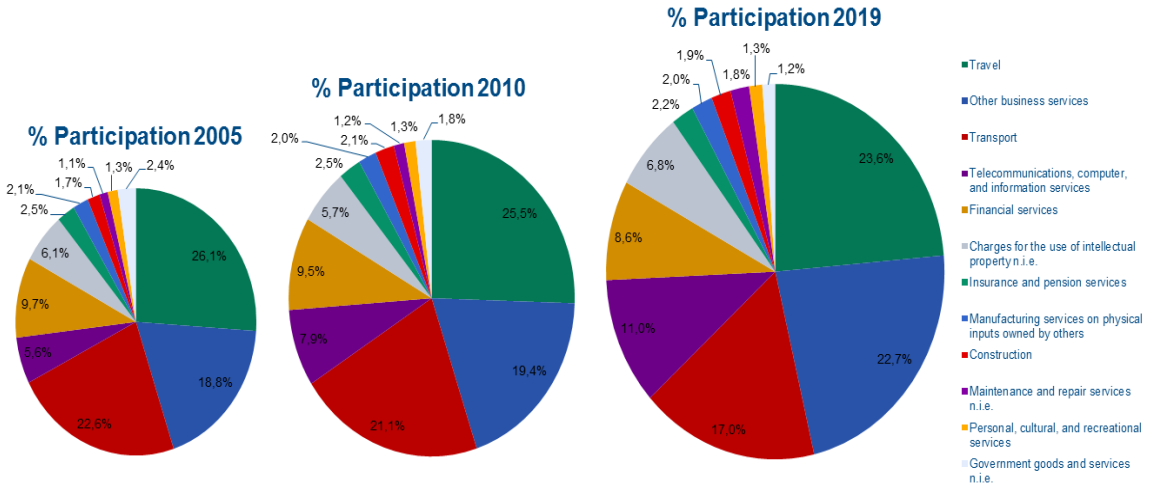


Source: Own elaboration. International Trade Statistics, (Trademap, 2020) [4]

The services sector trends show three important groups separated by their export volume; the first corresponds to travel, other business services, and transport, the most significant in world exports from 2000 to 2019. The next group consists of telecommunications, computer, and information services; financial services and charges for the use of intellectual property n.i.e. The last, which corresponds to the services shown in graph 6, are the ones with the lowest percentage of participation in the total trade in services in the world.

[4] ITC, UNCTAD, WTO trade in services database based on Eurostat, International Monetary Fund, Organization for Economic Co-operation and Development (OECD), and relevant national statistical authorities statistics.

Figure 6 Percentage of participation in the service sectors in the world



Source: Own elaboration. International Trade Statistics, (Trademap, 2020)

Table 1 Services Exports in the world. Thousand USD

Service label	2005	2010	2019
Travel	547.949.330	937.505.827	1.406.558.803
Other business services	395.516.783	712.213.235	1.350.851.816
Transport	473.907.754	774.195.185	1.010.524.072
Telecommunications, computer, and information services	118.053.353	289.011.586	655.915.623
Financial services	203.782.509	348.665.964	511.895.332
Charges for the use of intellectual property n.i.e.	127.890.742	209.516.492	406.081.693
Insurance and pension services	51.454.479	92.913.591	128.287.744
Manufacturing services on physical inputs owned by others	43.660.781	75.038.711	119.679.597
Construction	35.183.544	78.770.972	111.247.570
Maintenance and repair services n.i.e.	23.443.547	43.306.771	106.954.586
Personal, cultural, and recreational services	28.214.747	47.677.167	74.746.418
Government goods and services n.i.e.	51.113.602	66.609.739	72.896.241

Source: Own elaboration. International Trade Statistics, (Trademap, 2020)

In Colombia, exports of services have increased significantly from $ 2,060.42 million in 2000 to $ 9,977.32 million in 2019.

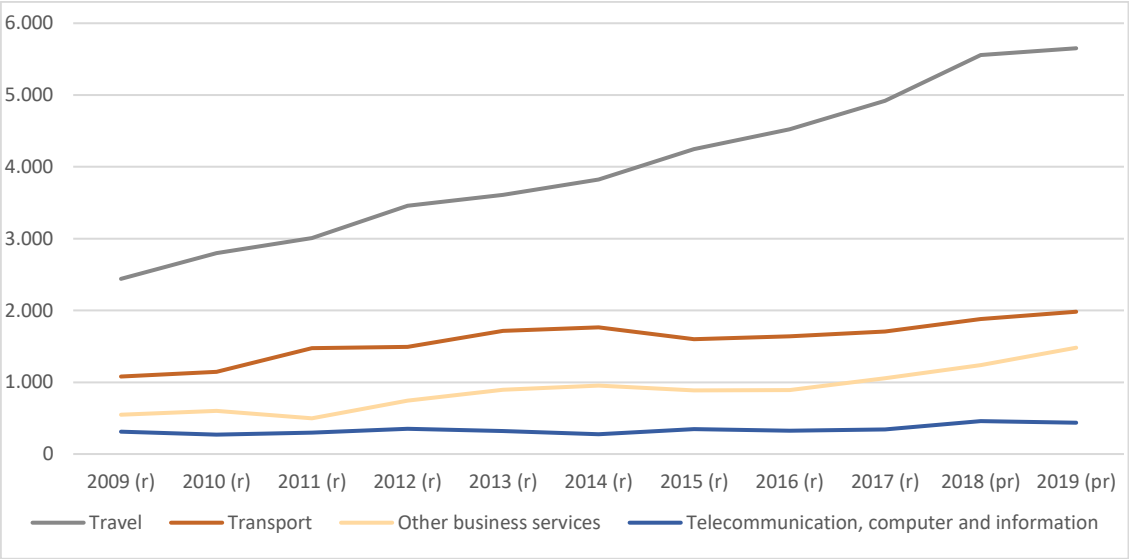
The export trend establishes similarities in terms of the growth trend that services are experiencing. In contrast to the world export landscape, the services representing the largest amount are travel and transportation. Those services exported to a lesser extent present a much more fluctuating trend from 2009 to 2019pr.

Manufacturing services on physical inputs owned by others and construction do not present exports in Colombia's balance of payments.

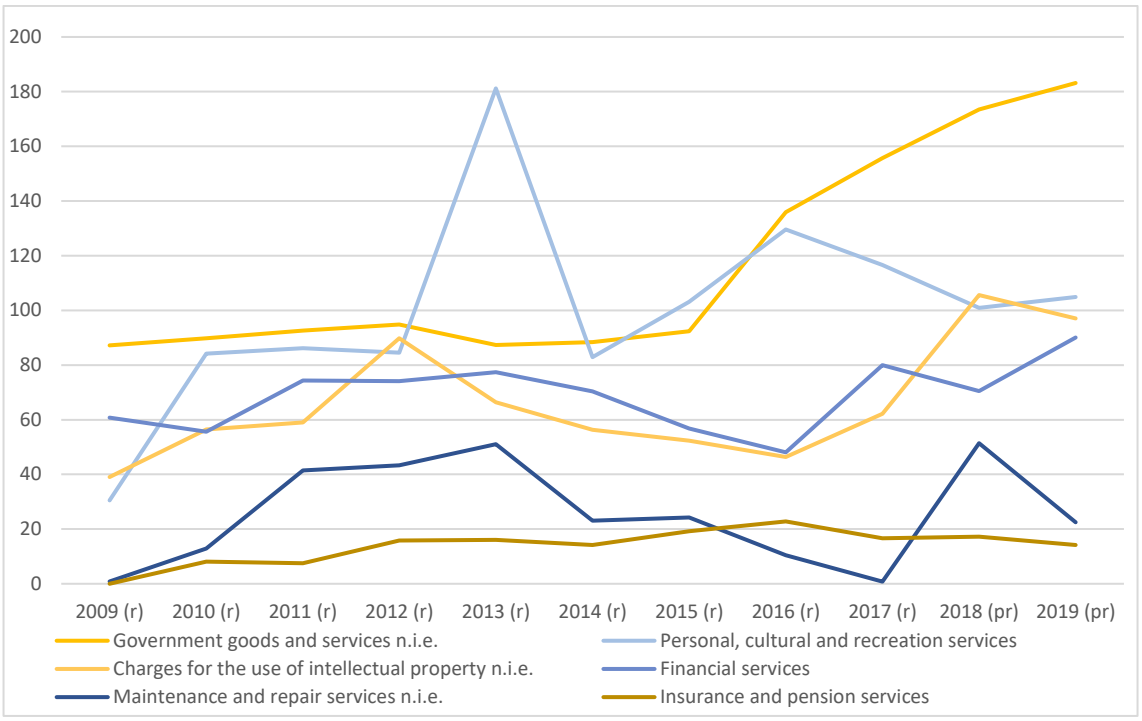
For construction services, only transactions done within one year from the moment the company is established are taken into account; the law in Colombia requires companies that provide construction services to settle in Colombia, so their sales after a year are no longer considered exports.

On the other hand, Manufacturing services on physical inputs owned by others include the costs associated with the maquila process (use of resident labor, rental expenses, payment of public services, local transportation, etc.). In this case, the ownership of the goods does not change, so that no transaction for general goods is recorded between the processor and the owner of the goods. (BanRep, 2017)

Figure 7 Colombia exports by sector, EBOPS 2010 classification. USD Millions.

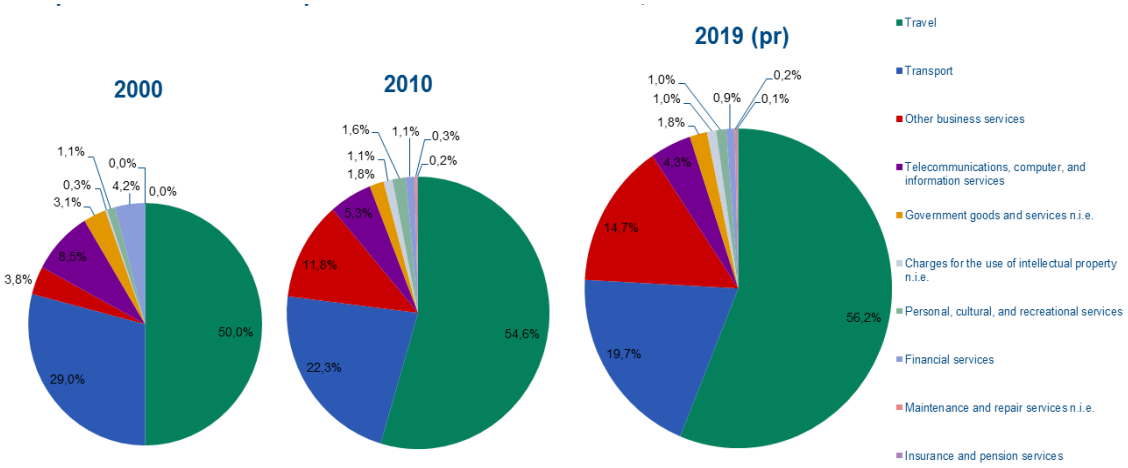


Source: Own elaboration. Colombian Balance of Payments (BanRep, 2019)



Source: Own elaboration. Colombian Balance of Payments (BanRep, 2019)

Figure 8 Percentage of participation in the service sectors in Colombia



Source: Own elaboration. Colombian Balance of Payments (BanRep, 2019)

Table 2 Services export in Colombia. Million USD.

Service label	2000	2010	2019 (pr)
Travel	1.030,40	2.796,58	5.651,80
Transport	597,86	1.143,61	1.982,15
Other business services	77,62	603,17	1.481,28
Telecommunications, computer, and information services	175,60	270,56	436,05
Government goods and services n.i.e.	64,41	89,77	183,17

Charges for the use of intellectual property n.i.e.	5,41	56,49	97,09
Personal, cultural, and recreational services	23,33	84,20	104,85
Financial services	85,71	55,61	90,07
Maintenance and repair services n.i.e.	0,07	12,88	22,45
Insurance and pension services	0,00	8,10	14,16

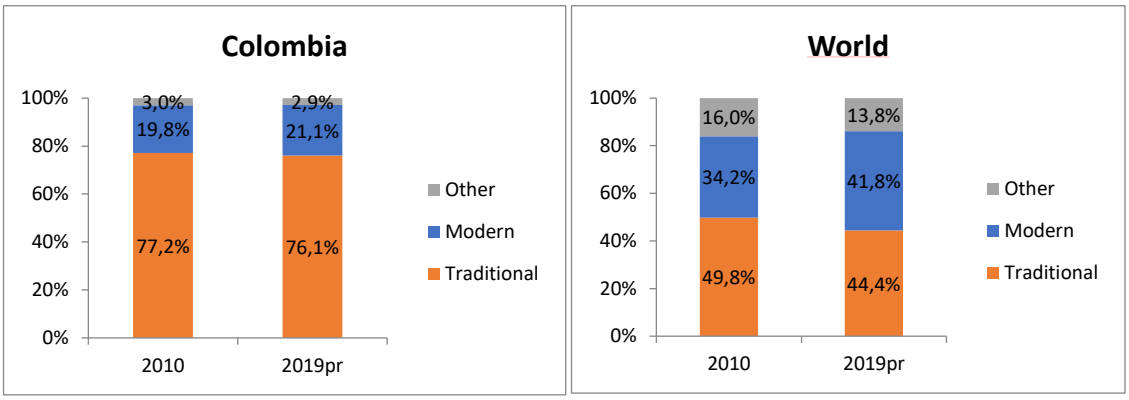
Source: Own elaboration. Colombian Balance of Payments (BanRep, 2019)

The IMF (2017) establishes a classification for services in traditional services and modern services.

Those that have originated from ICT are modern services, emphasizing that the development of this group's activity requires the intensive use of information and communication technologies.
Traditional services follow a less intensive trend in the use of ICT. Although they can be commercialized under these, they are not highly dependent on technologies, or their trade is made to a much lesser extent.

The service sectors in the EBOPS 2010 classification fall under the concepts of modern and traditional services. In Colombia, there are some services that, although internationally, are classified as modern or traditional services, behave differently in Colombia. For this analysis, we will group these service sectors under the label of Other services. (BanRep, 2020)

Figure 9 Traditional, modern and other services



Source: Own elaboration. Colombian Balance of Payments and TradeMap. (BanRep, 2019) (Trademap, 2020)

Table 3 Modern, Traditional and Other services classification

Modern	Traditional	Other
Telecommunications, computing, and information services. Other business services. Charges for IP use.	Travel. Transport. Maintenance and repair services n.i.e.	Construction. Manufacturing services on physical inputs owned by others. Financial services.

Personal, cultural, and recreation services		Government goods and services n.i.e. Insurance and pension services.

Source: (BanRep, 2020)

Traditional services:

Travel

As previously observed, it is the most representative of Colombia's services exports. These services register the goods and services travelers acquire in an economy during their stay in it for less than one year. This criterion does not apply to students or people under medical treatment, who remain residents of their home economy, even if they stay in another economy for a year or more[5]. (BanRep, 2017)

This service sector could be considered the one that collects more economic activities since the expenses (including goods) that a tourist makes in the economy are considered a travel service. Travel services are classified according to EBOPS 2010 as business travel and personal travel.

Transport

They include all the services of manned means of transport (maritime, air, and others) provided by residents to non-residents of one economy. They include services to passengers (purchase and sale of tickets and commissions paid to agencies travel and other reservation service providers); freight; other services related to transportation; and postal and courier services, which comprise different services in any form of immediate, installment, or home delivery. (BanRep, 2017)

Maintenance and repair services n.i.e.

They correspond to commissions obtained by residents for the repair and maintenance (other than routine) of machinery, equipment, and engines of aircraft, ships, and other types of transportation owned by non-residents (and vice versa). Includes spare parts or parts used in the repair to extend the useful life and increase the goods' efficiency and capacity. (BanRep, 2017)

Other services:

Insurance and pension services

They include contracting non-resident insurance with resident insurance companies and vice versa, including direct insurance, auxiliary insurance services, reinsurance, pension services, and standardized guarantees. Direct insurance includes life insurance, freight services (of exported and imported goods), and general. (BanRep, 2017)

[5] The characteristic of excluding health and education travel is specific to Colombia's balance of payments; the BOPM6 does include them as travel services.

The processes undertaken by insurance companies and pension funds include collecting premiums, paying indemnities, and investing funds. To analyze these operations' economical nature, it is necessary to identify the services' elements separately. (IMF, 2013)

Government services

They are not considered commercial services. They cover transactions of goods and services of an official nature (including international organizations) (BanRep, 2017). Some examples of these may be military bases, embassies, or consulates.

Financial services

They cover financial intermediation and auxiliary financial services between residents and non-residents. It also includes commissions from futures market brokers and services related to asset management and securities custody services. The BOPM6 adds the Indirectly Measured Financial Intermediation Services (FISIM), which correspond to the indirect charge for the administration service of cross-border deposit and loan operations carried out by financial institutions with their clients. FISIM can include managing checking accounts, sending bank statements, and transferring funds between bank depositors' accounts.

Modern services in Colombia

The modern services category offers a way of appreciating the evolution of services' trade more directly associated with ICT developments. Modern services in Colombia and the world are increasing their share in total service exports and their importance in terms of the trade amount. Recent technological advances have facilitated the cross-border supply of services, thus generating new opportunities for national economies and individuals. (WTO, 2020)

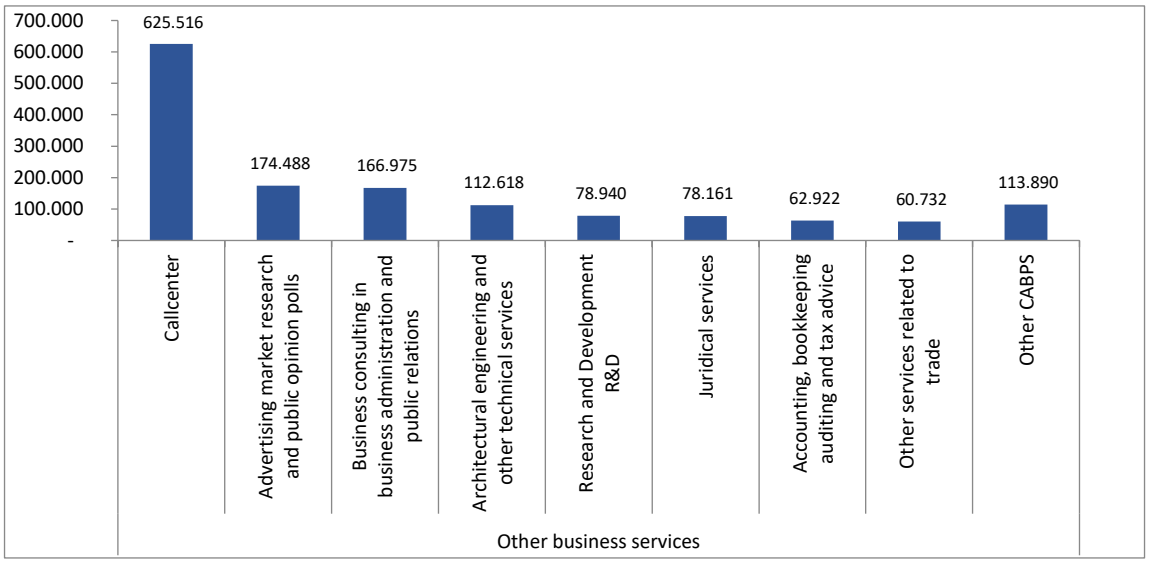
This broader set of technological opportunities has achieved a higher dynamism in foreign trade in recent years and a change in how services are now marketed, with more intensive ICT use for exports.

From a supply point of view, digitization substantially reduces entry costs, increasing competition, and stimulating innovation. From a demand point of view, digitization offers consumers a greater range of possibilities. These will probably continue growing as advances in digital technologies are likely to continue in the future. (WTO, 2019)

Other business services

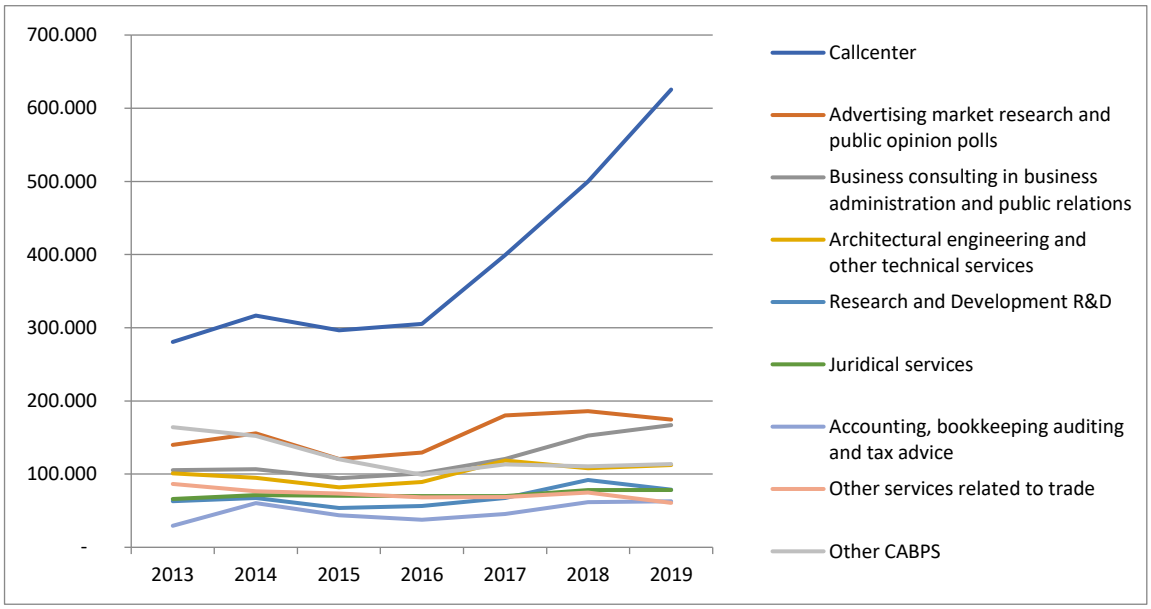
These services comprise three groups: research and development (R&D), professional and business management consulting services, and technical, trade-related, and other business services. The second group includes legal, tax, administrative, public relations services, advertising, opinion polls, and services between related companies. The third group includes architectural, engineering, scientific, and other technical, mining, agricultural and environmental, exploitation leasing (operating), sale and trade, and related to trade and other business services. (BanRep, 2017)

Figure 10 Other business services MTCES 2019. Thousand USD



Source: Own elaboration, based on MTCES (DANE, 2020)

Figure 11 Exports of Other business services MTCES Thousand USD.



Source: Own elaboration, based on MTCES (DANE, 2020)

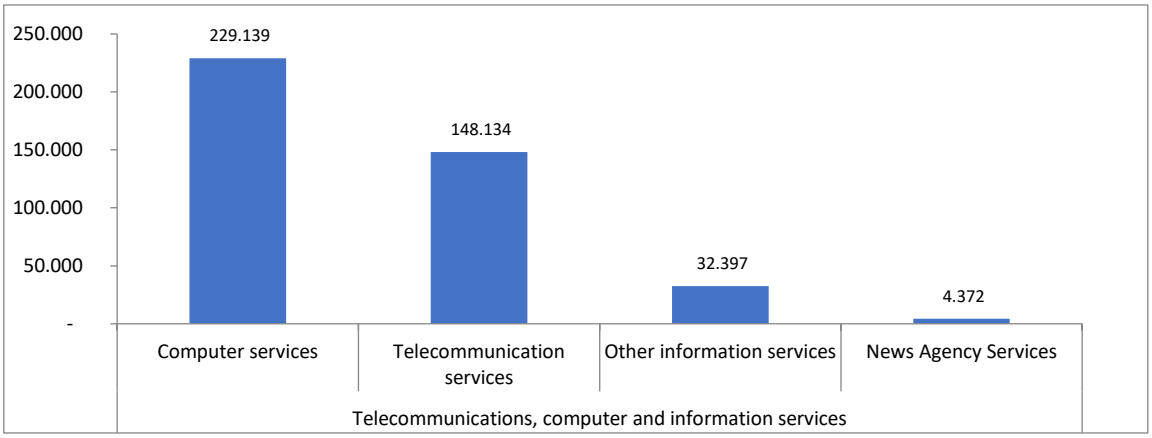
Telecommunications, computer and information services

Telecommunication services comprise the emission or transmission of sounds, images, or data provided to non-residents by resident companies through telephone, radio, television, or satellite. Also included are mobile communication services, primary internet networks, and internet provisioning. (IMF, 2013)

Computer Sciences services comprise those related to computer equipment and its computer programs.

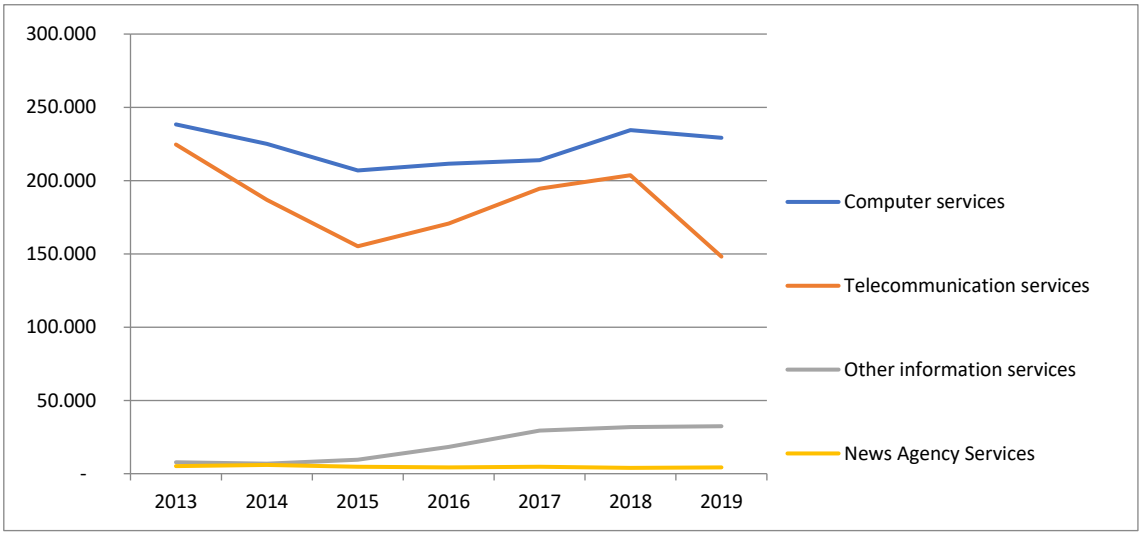
Information services comprise data processing and information processing, including, among others, those provided by news agencies, database design, storage and dissemination services, and the provision of information over the Internet. (IMF, 2013)

Figure 12 Telecommunications, computer, and information services MTCES 2019. Thousands USD



Source: Own elaboration (DANE, 2020)

Figure 13 Exports in Telecommunication, computer and information services MTCES thousand USD



Source: Own elaboration (DANE, 2020)

Charges for the use of intellectual property n.i.e

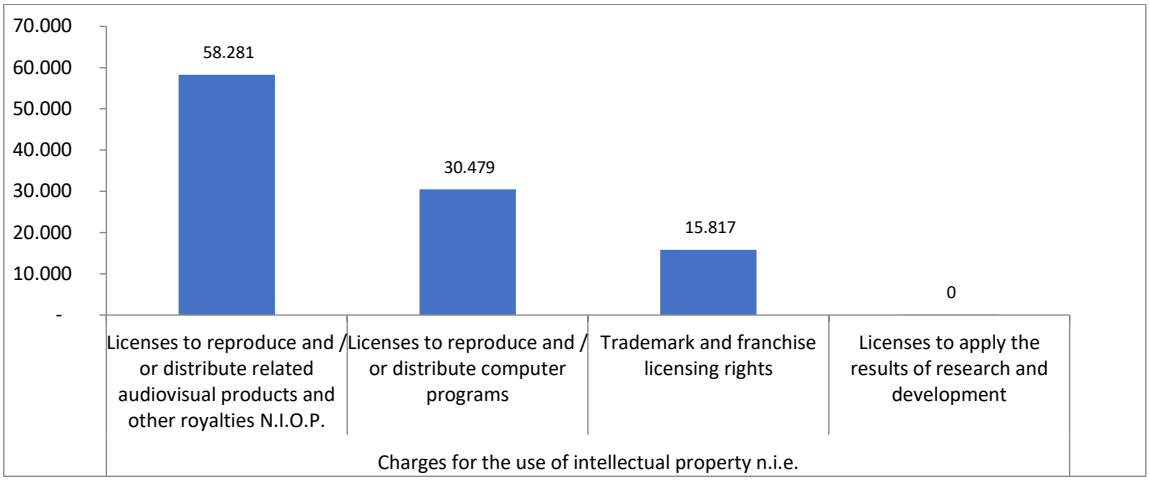
These can be classified into two large groups:

Charges for the use of property rights such as patents, trademarks, copyrights, industrial processes, and designs - including trade secrets - and concessions. These rights can arise from research and development, as well as from marketing.

Charges for licenses to reproduce, distribute, or both, intellectual property incorporated in originals or prototypes produced (such as copyrights for books and manuscripts, computer programs,

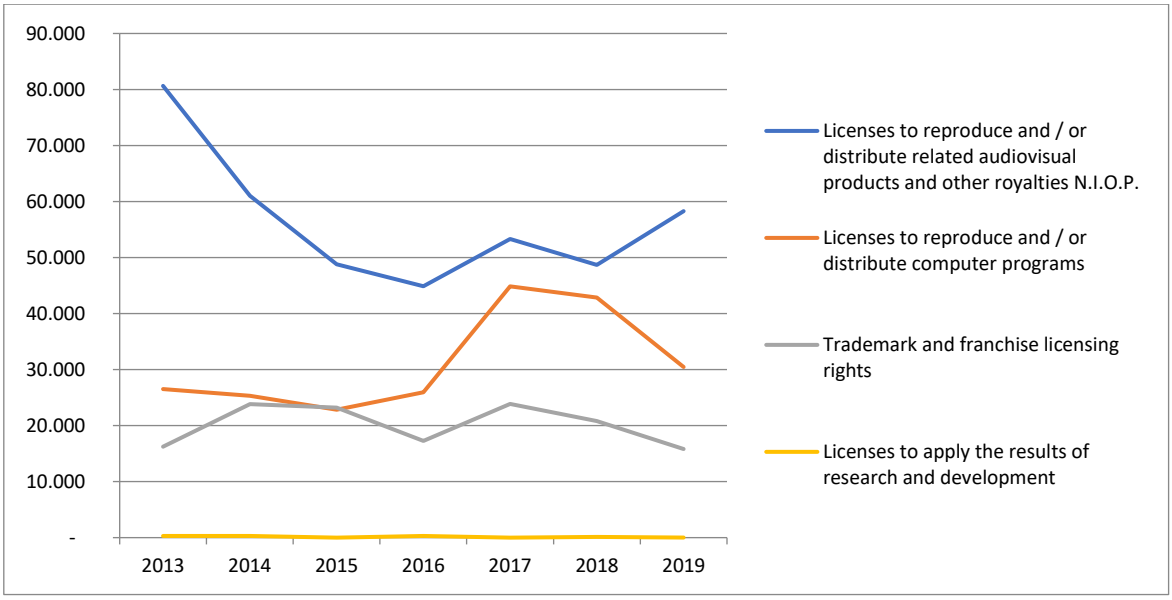
cinematographic works, and sound recordings) and related rights (for example, the corresponding to live performances and broadcasts on television, cable or via satellite).

Figure 14 Charges for the use of intellectual property n.i.e MTCES 2019. Thousand USD



Source: Own elaboration (DANE, 2020)

Figure 15 Exports of Charges for the use of intellectual property n.i.e. MTCES, thousand USD

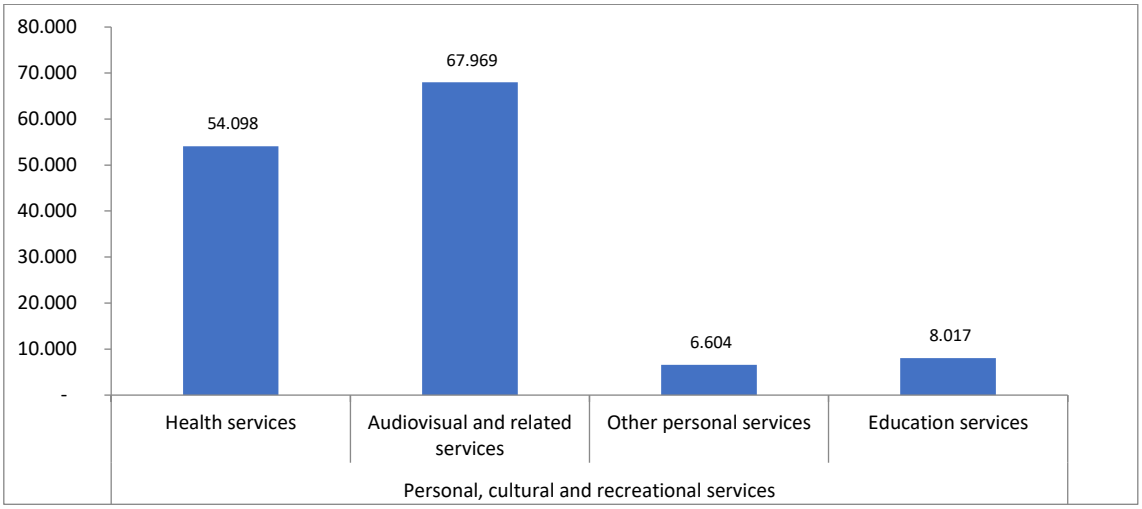


Source: Own elaboration (DANE, 2020)

Personal, cultural, and recreational services

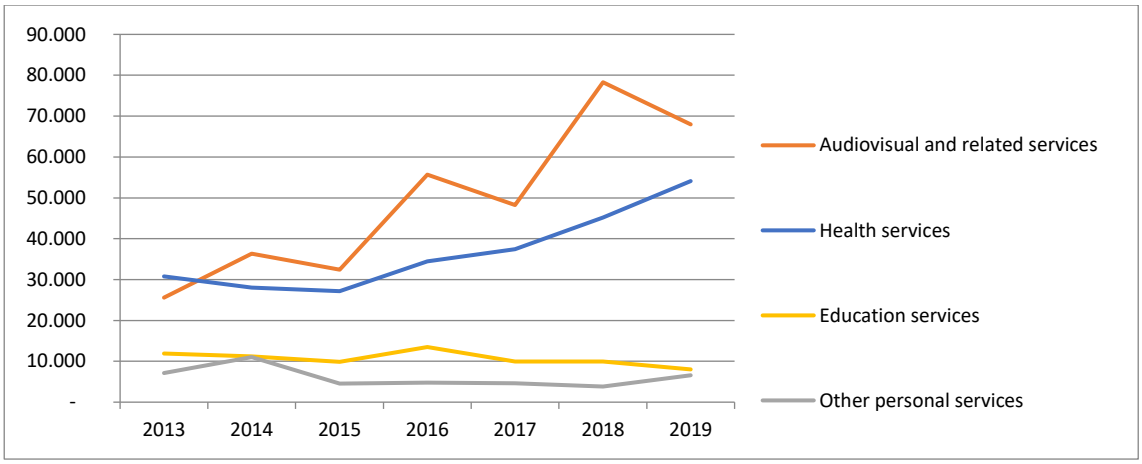
These services comprise four groups: audiovisual and artistic, health, educational[6], cultural, and recreational. (BanRep, 2017). This group includes most services classified as part of the Orange Economy[7] in Colombia.

Figure 16 Personal, cultural and recreational services MTCES 2019. Thousand USD



Source: Own elaboration (DANE, 2020)

Figure 17 *Exports of Personal, cultural and recreational services MTCE thousand USD*



Source: Own elaboration (DANE, 2020)

Modern services according to their mode of supply

[6] The education and health services of this group of services represent those that can be done through trade mode 1 and 4, that is, cross-border or when there is a presence of natural persons.

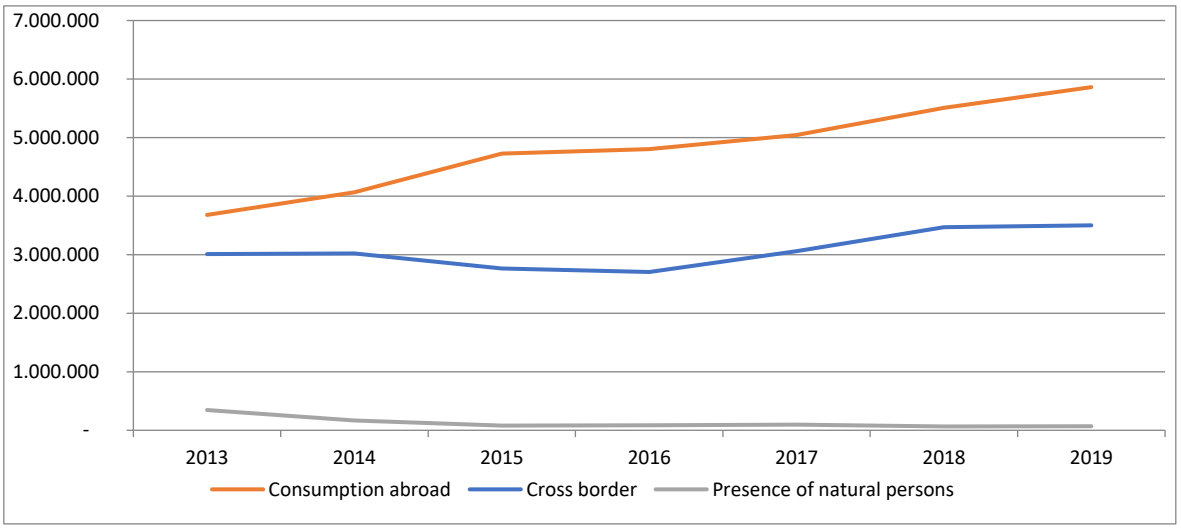
[7] Economía Naranja is a concept associated with cultural, social, and economic development. It differs from other economies because it is based on creating, producing, and distributing goods and services, whose intellectual property rights can protect cultural and creative content. (MinCultura, 2018)

The General Agreement on Trade in Services GATS (WTO, 1995) classifies services by their mode of marketing or supply as follows: Cross-border supply does not require displacement of the parties involved; Consumption abroad, who consumes the service travels abroad to receive it; Commercial presence, when service providers establish (or acquire) a subsidiary, a branch, or a representative office in the territory of another country through which they provide their services and; Presence of natural persons, which implies that the person providing the service moves to the territory of the consumer to supply it on behalf of the company. (MSITS, 2012)

The information available in Colombia that includes the mode of supply in services' trade is DANE's Quarterly Sample of Services' Foreign Trade. However, it is the most complete for this type of analysis even though it does not have information for mode 3 or commercial presence as the balance of payments data. This happens mainly because this mode does not meet the residence criterion: a Colombian company that owns a company in another country does not report the sales made by its subsidiary as Colombian exports. According to the BPM6 Balance of Payments Manual (IMF, 2013), the registration of an operation in the Colombian balance of payments requires that the company making the transaction be a resident of Colombia.

What is recorded in the balance of payments as a direct investment transaction in the financial account is the Colombian company's capital investment in its subsidiary in the other country. The resource that captures these transactions is known as Foreign Affiliates Trade in Services (FATS) and is different from the balance of payments. Similarly, DANE has been expanding its statistical instruments to provide better information on foreign investment for services in Colombia.

Figure 18 Colombian exports by mode of supply (USD Thousands)

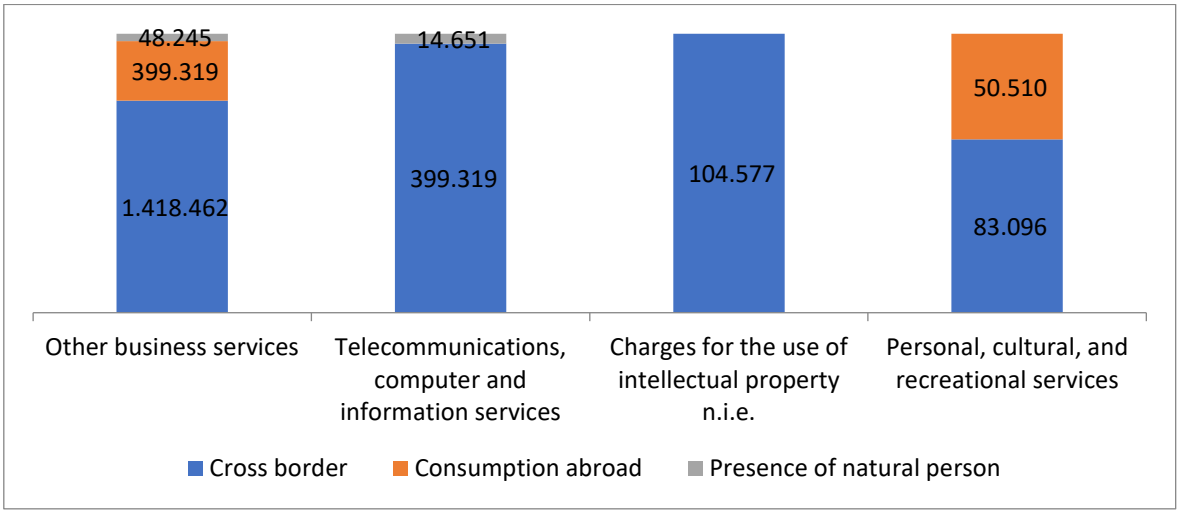


Source: Quarterly sample of foreign trade in services. (DANE, 2020)

The increase in consumption abroad can be explained by the rise in exports in the travel sector that is the most important and representative in the country's trade of services. Cross-border supply,

however, has begun to gain share, and it is where the transactions of modern services are mostly concentrated, as can be seen in figure 19.

Figure 19 Modern services by mode of supply in 2019

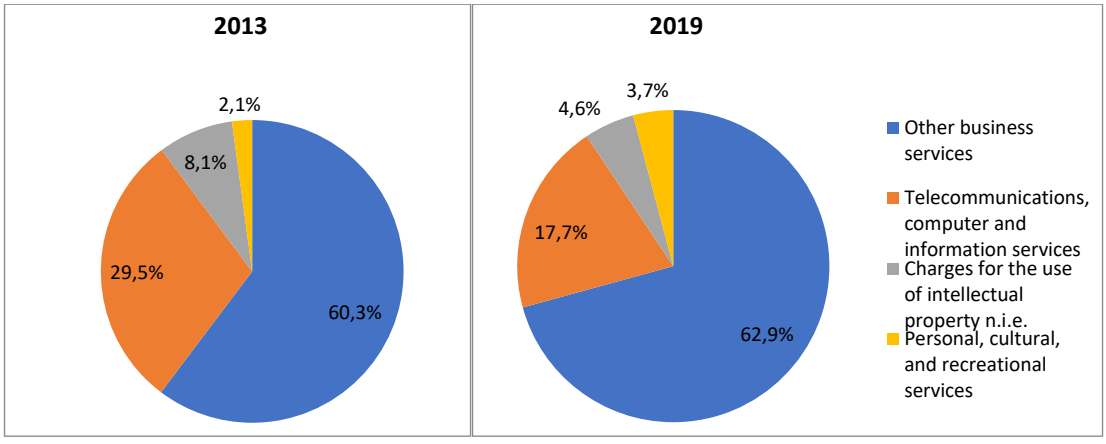


Source: Quarterly sample of foreign trade in services. (DANE, 2020)

Cross border trade of modern services

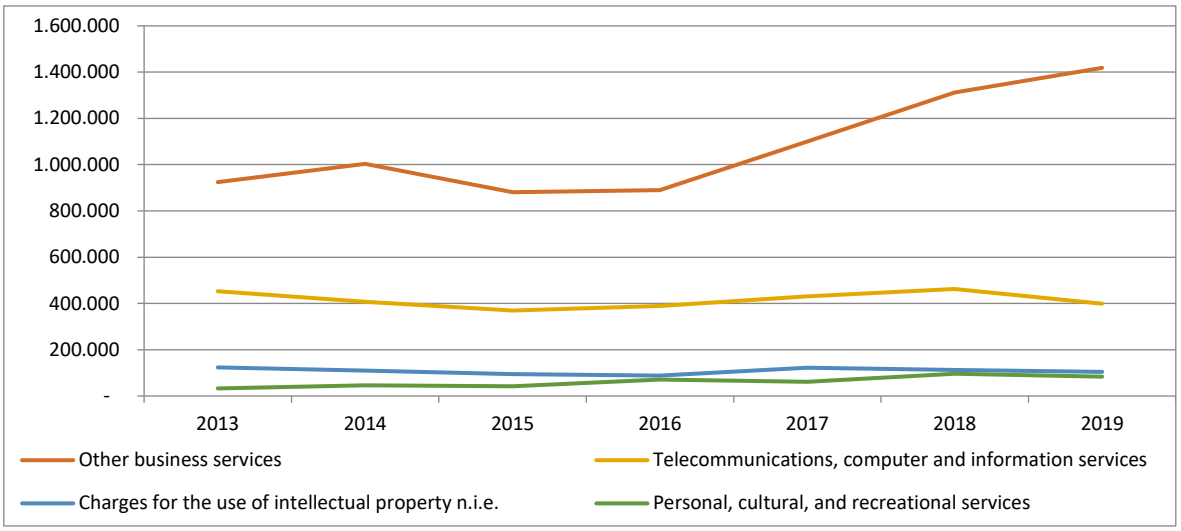
The cross-border trade in services has increased dramatically with the use of information technologies; the possibility of commercializing services will reduce the costs of exporting services and facilitate their integration into value chains.

Figure 20 Cross border for Modern services participation



Source: Quarterly sample of foreign trade in services. (DANE, 2020)

Figure 21 Colombia Cross border modern services exports. Thousand USD.

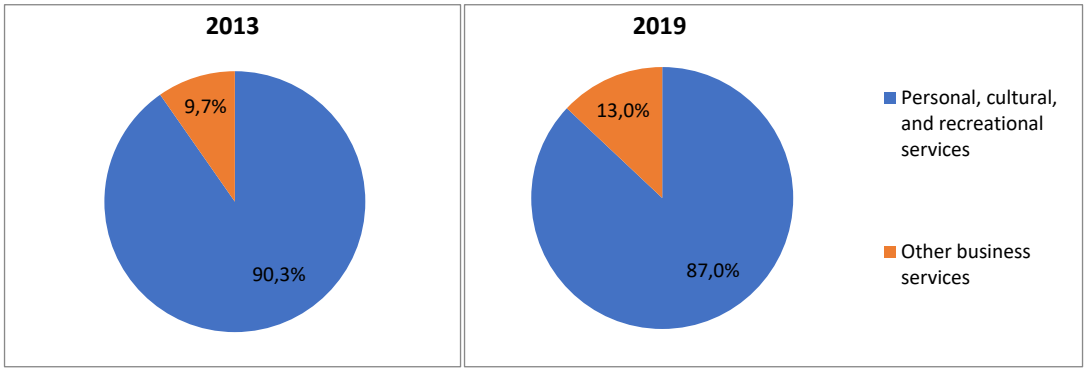


Source: Quarterly sample of foreign trade in services. (DANE, 2020)

Consumption abroad trade for modern services

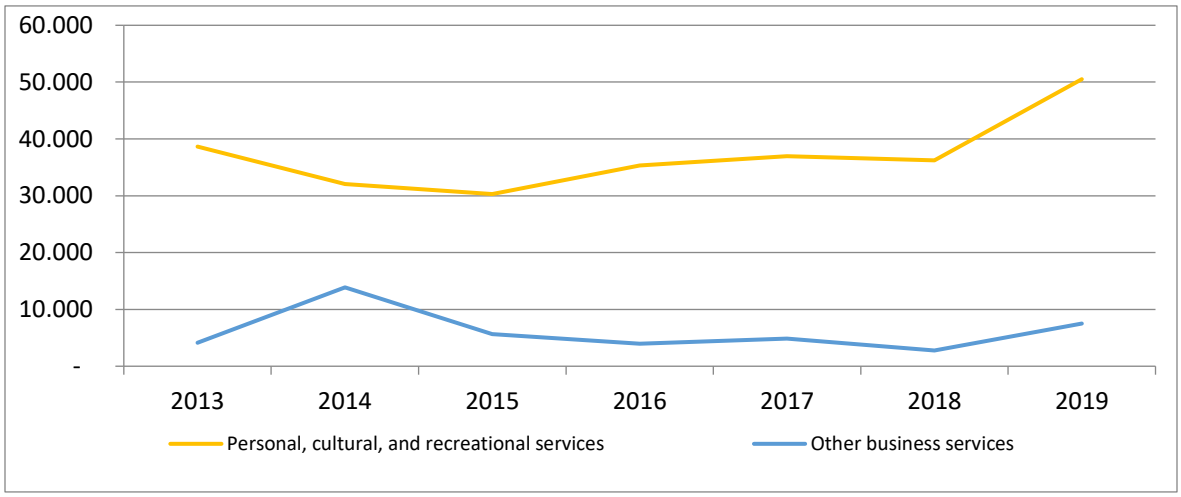
This supply mode is centered on travel services; however, it can be observed that some modern services, despite their intensive use of ICT, are still traded under this mode of supply.

Figure 22 Consumption abroad for Modern services participation.



Source: Quarterly sample of foreign trade in services. (DANE, 2020)

Figure 23 Colombia Consumption abroad modern services exports. Thousand USD

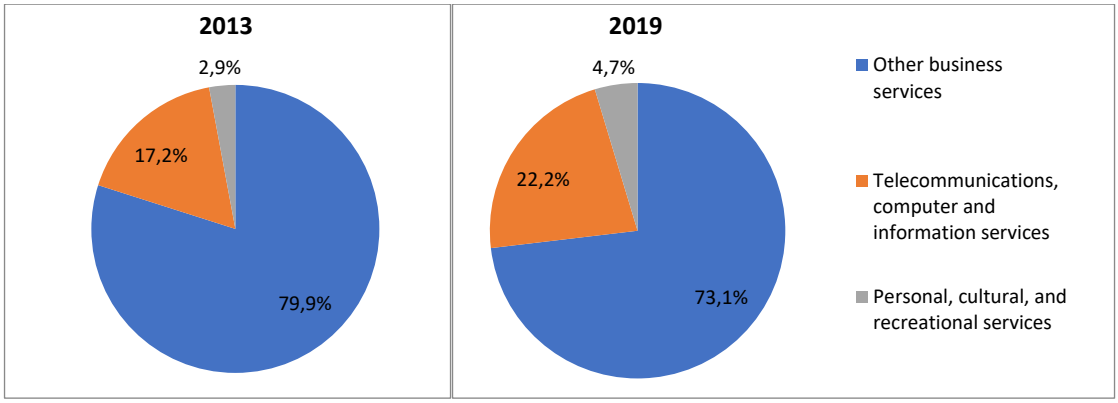


Source: Quarterly sample of foreign trade in services. (DANE, 2020)

Presence of natural person trade for modern services

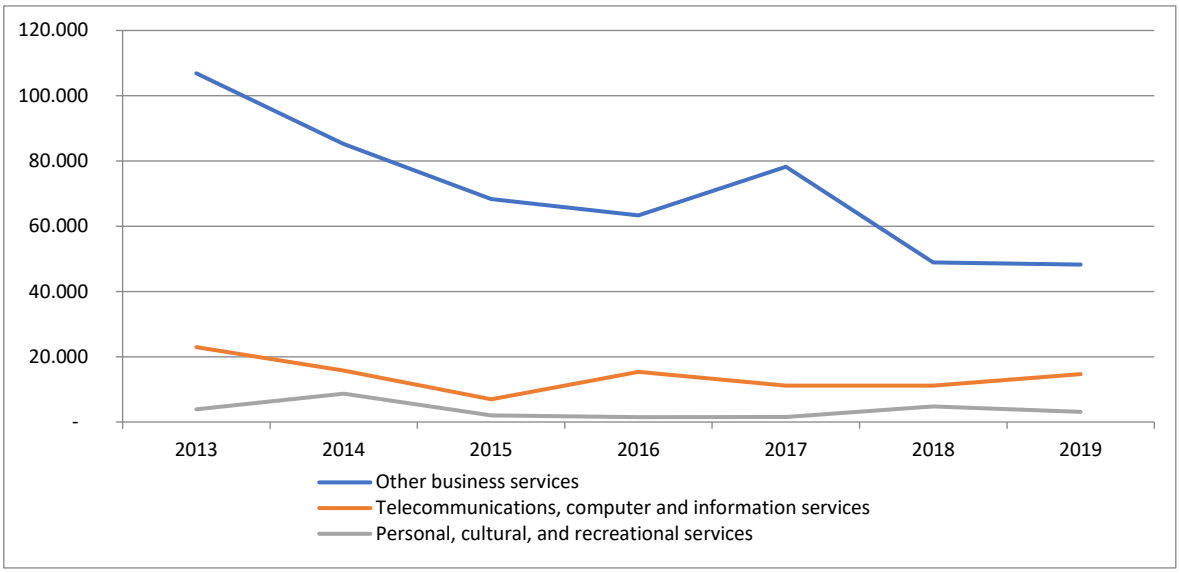
A declining trend is observed in other business services, in addition to a static trend in other modern services such as Telecommunications, computer, and information services and Personal, cultural, and recreational services. This could be explained by the possibility to supply these services on a cross-border basis (mode 1) and the immigration requirements that pose challenges to boost this mode of supply.

Figure 24 Presence of natural person for Modern services participation



Source: Quarterly sample of foreign trade in services. (DANE, 2020)

Figure 25 Colombia Presence of natural person modern services exports. Thousand USD



Source: Quarterly sample of foreign trade in services. (DANE, 2020)

As a clear conclusion, modern services foreign trade has increased significantly in the sector of Other business services; simultaneously, their trade via mode 4 has been decreasing in Colombia. Services companies seem to have found new opportunities in this sector and opted for alternative modes taking advantage of recent market trends.

Mode 2, or consumption abroad exports of modern services from Colombia, seems the most appropriate for personal, cultural, and recreational services. Although the mode with the largest share in Colombian exports is mode 2, it is mostly explained by travel services.

There seems to be an important opportunity of increasing Colombia's exports by leveraging comparative advantages and fostering the growth of modern services.

Pre-identification of modern services bets in Colombia

The document CONPES 3866 of the National Policy for Productive Development (PDP) defined a procedure for prioritizing productive bets, facilitating the transformation and diversification of the Colombian productive apparatus towards more sophisticated goods. (DNP, 2016)

This methodology seeks to replicate the PDP guidelines in modern services. It is a preliminary exercise that should be taken as a reference, but not as a definitive one to prioritize or identify sectors. Due to the lack of services information, different assumptions and changes were implemented to the goods methodology.

The pre-identification methodology consists of two phases: the first criteria is related to comparative advantage, either revealed (RCA) or latent (LCA).

The second phase analyses the set of sectors identified in the first phase, according to the productive capacities and the capacity to export These criteria were applied to select the 30% of the productive bets with the highest value in average. (PDP, 2017).

The period to calculate the different variables is 2014 - 2017. Some of the variables were developed by Colombia Productiva.

This section has two parts: first, it shows the PDP variables, their definitions, and equations; the second describes how the variables were used.

It is worth mentioning that a similar exercise had already been done by the DNP and a consulting team from the Universidad del Rosario. As a result of that research and thanks to Colombia Productiva and MinCIT, additional variables were identified, allowing a pre-identification similar to the one on goods.

Variables defined by the PDP

Revealed Comparative Advantage Index

Revealed Comparative Advantage revealed(RCA) measures if the participation of the service sector in the country's exports is greater than the sector's participation in world exports.

RCAI $\frac{\frac{X_{col}^{i}}{\sum X_{col}}}{\frac{X_{w}^{i}}{\sum X_{w}}}$	Where X_{col}^{i} = Colombian exports of the service sector i EBOPS 2010 $\sum X_{col}$ = Sum of Colombia's total service exports X_{w}^{i} = World exports of the services sector i EBOPS 2010 $\sum X_{w}$ = Total world exports of services

RCA: When the IVC of service i for Colombia is greater than one, that is$RCAI_{col}^{i} > 1$

Latent comparative advantage

Latent comparative advantage (LCA) identifies the sectors that could have a comparative advantage. The Strategic Value (SV)measures the potential gain that would be achieved if the sector reaches a revealed comparative advantage and depends on the respective sector's distance and complexity. For the service sectors, Colombia Productiva carried out an exercise similar to that carried out by the PDP in the pre-identification of goods. They use data from Datlas-Colombia[8].

	$RCAI_{p70,col}$ = 70th percentile of revealed comparative advantage for Colombia's service sectors.

[8] The exercise is not based directly on the methodological documents of the Atlas of Economic Complexity, so it is recommended that the calculations be taken only as a reference.

$LCA_{col}^{i} = \begin{cases} 1 & if\ RCAI_{col}^{i} \geq RCAI_{p70,col}\ y\ SV_{col}^{i} \geq SV_{p70,col} \\ 0 & in\ other\ case \end{cases}$	SV_{col}^{i} = Strategic value of the service sector i, according to EBOPS 2010, for Colombia. $SV_{p70,col}$ = 70th percentile of the strategic value for the Colombian service sectors.

Potential demand

Another set of variables for pre-identification results from discovering the potential demand, both international and local. If the service sector presents any of these, it means that it can be pre-identifiable.

International Potential Demand

If one of these requirements is met: (DNP, 2018)

1- If the service sector was one of the most demanded worldwide during four years:

$Participation\ M_{W}^{i} = \frac{M_{w}^{i}}{\sum M_{w}^{i}}$	Where: M_{w}^{i} : World imports of the services sector i, according to EBOPS 2010 $\sum M_{w}^{i}$: Total world imports of services

2- If World demand is increasing, that is, the compound annual growth rate of world demand for the sector in the last four years is greater than zero, such that:

$\Delta\ M_{w}^{i} >\ 0 = \left(\frac{M_{T}^{i}}{M_{T-(n-1)}^{i}}\right)^{\left(\frac{1}{n}\right)} - 1$	M_{T}^{i} : World imports of services sector i, for the final year. $M_{T-(n-1)}^{i}$: World imports of services sector i, for the initial year. n: Number of years

Local Potential Demand

Similarly, it seeks to identify services with potential demand in the national market or sales potential. However, unlike the previous case, the new variable of Apparent Consumption (AC) must be calculated, and two criteria must be met. The following defines AC and conditions: (Cifuentes, Monsalve, Rivera, & Russi, 2019)

$AC_{col}^{i} = P_{col}^{i} - M_{col}^{i} + X_{col}^{i}$	Where: P_{col}^{i} : National production of the services sector i according to the EBOPS 2010 X_{col}^{i} : Exports of the services sector i according to EBOPS 2010, for Colombia

	M_{col}^{i} : Imports of the services sector i according to the EBOPS 2010, for Colombia

Requirements:

i) The service sector was one of the most demanded in the country during the last four years; specifically, it is within 30% of the sectors with the highest apparent consumption.	$$Participation\ AC = \left(\frac{AC_{col}^{i}}{\sum AC_{col}^{i}}\right)$$ Where: AC_{col}^{i} : Apparent Consumption of services sector i in sector i $\sum AC_{col}^{i}$: Total apparent consumption in services
ii) the growth of the country's sector's apparent consumption during the last four years is greater than zero.	$$\Delta\ AC_{col}^{i} > 0 = \left(\frac{AC_{T}^{i}}{AC_{T-(n-1)}^{i}}\right)^{\left(\frac{1}{n}\right)} - 1$$ Where: AC_{T}^{i} : World imports of services sector i, for 2017 (final year). $AC_{T-(n-1)}^{i}$: World imports of services sector i, for the initial year. n: Number of years.

Variables associated to Capacities

Value-added participation

Value-added[9] $$VA_{t}^{i} = TP_{t}^{i} - IC_{t}^{i}$$	Where: VA_{t}^{i}: Added Value of the services sector i according to EBOPS 2010, in year t TP_{t}^{i}: Total production at basic prices of the service sector i according to the 2010 EBOPS, in year t IC_{t}^{i}: Intermediate consumption at basic prices of the service sector i according to the EBOPS 2010, in year t

[9] This equation is different from the one used in the pre-identification of goods due to the nature of the services and the inability to calculate for services by the original form established by the PDP.

$Participation\ VA_t = \left(\frac{VA_t^i}{\sum VA_t^{col}}\right)$ $\Delta VA_i = \left(\frac{VA_T^i}{VA_{T-(n-1)}^i}\right)^{\left(\frac{1}{n}\right)} - 1$	Where: T corresponds to the last year, and n to the number of years, which in that case n = 4. (An average of the four years is calculated)

Employment

Is the number of employed persons in the sector at the year of the period of the study.

Productive chain

Intersectoral relationship within the economy. The forward and backward linkages of the sector are calculated through intermediate purchases and intermediate sales.

Number of Businesses

Is the total number of companies at the EBOPS level.

Employment complexity

It measures the diversity and sophistication of the "know-how" required to produce something in a country or region.

Export capacity

To measure the level of development of the country's capacities to export in service sectors, the Export Capacity Index is constructed from the following variables: average annual export growth, number of exporting companies, the share of exports, and complexity of exports. (Cifuentes, Monsalve, Rivera, & Russi, 2019)

The complexity of services exports

Due to the lack of services information, the index establishes the complexity of exports measured by the sophistication of the goods[10] produced and exported by a country or region (Hausmann, 2007). It is constructed from the ubiquity of the products, from the number of countries that export the product with RCA and the diversity of the countries that export it, corresponding to the number of sectors in which the country is an exporter RCA.

Export growth

[10] Colombia Productivity calculate the complexity of services exports using some goods sectors that are established in the PDP as highly complex. The definition of complexity of exports is originally unique to goods.

$\Delta X_i = \left(\frac{X_T^i}{X_{T-(n-1)}^i} \right)^{\left(\frac{1}{n}\right)} - 1$	Where: X_T^i : Colombian exports of the services sector i for the final year. $X_{T-(n-1)}^i$: Colombian exports of the services sector i for the initial year. N: Number of years.

Number of exporters

The number of exporting companies by the service sector in the last year of the period of the study.

Exports participation

The participation of the exports of the services sector i, in the total exports of services of Colombia, in years calculated:

$Participation\ X_{col}^i = \left(\frac{X_{col}^i}{\sum X_{col}^i} \right)$	Where: X_{col}^i : Exports of the service sector i for Colombia. $\sum X_{col}^i$: Total exports of services from Colombia.

Modern services pre-identification methodology exercise

First phase: Identification of sectors with a comparative advantage and potential demand.

Revealed Comparative Advantage Index

For this variable, the services with a score >1 have a RCA and were selected.

Also, services with RCA score < 1 and also in the upper 30% have LCA, and were selected too. Finally, services sector with Strategic Value[11] upper 30% were also selected. (Cifuentes, Monsalve, Rivera, & Russi, 2019)

The sources of information are databases for services Balance of Payments from OECD, IFM, and Bank of the Republic.

Potential demand

For these criteria, if a sector selected must have one of the variables of *international potential demand* or *local potential demand*

[11] For the Strategic Value, imports and exports are taken for International values in the OECD services database, while the Balance of Payments is used for national values. (Both in values of Millions of current USD, for the year 2017.

International Potential Demand[12]

This criteria selected 30% of the sectors with the highest world imports, and if its world demand is increasing.

The sources of information are the database for services Balance of Payments from OECD, IFM

Local Potential Demand

The variables used came from the Supply Utilization Account[13] (from National Account). We have the total production value at current prices with Central Product Classification (CPC) version 2 adapted for Colombia to six digits for 400 classifications. Using the Excel file "Nomenclature-act-products" from DANE, a correlative matrix is built for the ISIC and CPC codes to be later able to bring the values to the CAPBS level. Once the data are crossed to calculate the CA, and the criteria described above are applied, the average value of the years 2014-2017 is taken for all the variables. (Cifuentes, Monsalve, Rivera, & Russi, 2019)

Phase 2: Index of "Capacities"

Productive capacity

(DNP, 2018) Establishes the following variables for calculating the productive capacity for services; some are covered here differently than previously done for the pre-identification of goods to make their calculation possible.

- The employment generated by the service sectors in 2017, at the national level.
- The degree of productive linkages of the service sectors in 2017.
- The business fabric of the sector at the national level, as of April 2018.
- The complexity of employment by the service sector, is defined in DATLAS Colombia for 2017.

For the identification of sectors (PDP, 2017), weights are assigned from a methodology of decision matrices of comparison by pairs[14]. (Cifuentes, Monsalve, Rivera, & Russi, 2019) assigns equal weights to all the variables and then apply a normalization of all the variables with the minimum-maximum method. Due to the lack of information and the absence of one of the original variables of the PDP methodology, it was used for this exercise the equal weight assigning in this exercise.

To be weighted, the variables are normalized between 0 and 1, according to the Min-Max method: (Colombia Productiva, 2018) $x_{norm} = \frac{x - \min(x)}{\max(x) - \min(x)}$	Where: x: Variable to be included in the corresponding index $\min(x)$: Minimum value that the variable x takes. $\max(x)$: Maximum value that the variable x takes. x_{norm}: Variable x normalized, $0 < x_{norm} < 1$.

[12] International values based in OECD exports services database.

[13] The Supply Utilization Account extracts from the national accounts the values of the products of imported origin and by difference the products of national origin are obtained.

[14] This method is used to establish the weights in the PDP's asset pre-identification methodology.

Value-added participation

The same production and intermediate consumption data used to calculate the Apparent Consumption were utilized from the correlative between CPC and ISIC to later add at the EBOPS level. The value-added was calculated from the average 2014-2017 (Cifuentes, Monsalve, Rivera, & Russi, 2019).

Employment

For this exercise, the number of employed persons at the ISIC level is taken and added to EBOPS from the Confecámaras respective EBOPS sector's RUES database. (Cifuentes, Monsalve, Rivera, & Russi, 2019)

Productive chain

It was not possible to calculate this variable for services due to the impossibility of calculating intermediate sales out of value-added. This variable was used for the pre-identification of goods sectors of the PDP, but it is not calculable for services due to the way that the added value was calculated. Therefore it is discarded from this analysis.

Number of Businesses

This estimate is made by (Cifuentes, Monsalve, Rivera, & Russi, 2019) based on the RUES 2018 base, adding the number of ISIC level companies to CABPS.

Employment complexity

Colombia Productive calculates this variable for 2017 and is based on the DATLAS-Colombia data. Although it follows a different methodology from that applied by Atlas, it serves as a proxy to continue with the pre-identification of services.

Export capacity

To measure the level of development of the country's capacities to export in service sectors, the Export Capacity Index is constructed from the following variables: average annual export growth, number of exporting companies, the share of exports, and complexity of exports. (Cifuentes, Monsalve, Rivera, & Russi, 2019)

The complexity of services exports

The Observatory of Economic Complexity of the Massachusetts Institute of Technology (MIT) has not calculated the complexity of services exports, so we will include the employment complexity variable calculated by Colombia Productiva before as a proxy. However, the relevance of doing so should be reviewed.

Export growth

Relative growth of the final year of the 4 years (2017) relative to the first year (2014), data from Balance of Payments, BanRep

Number of exporters

For the number of exporting companies by service sector in 2017, DANE's information is available, based on its directory of exporters, which is, in turn, the basis for the Quarterly Sample of Foreign Trade in Services (MTCES in Spanish). (Cifuentes, Monsalve, Rivera, & Russi, 2019)

Exports participation

The exports of the services sector i, in the total exports of services in Colombia. Data were taken from the Balance of Payments of BanRep.

As in the productive capacity, the export capacity variables must be normalized using the min-max method and then assign their weight. The PDP gives a weight for each of the variables in the pre-identification of assets methodology. (Cifuentes, Monsalve, Rivera, & Russi, 2019) assign the same equally:

Variable	Ponderation (%)
Employment complexity	33,1
Growth of exports	28,6
Number of exports	25,6
Exports participation	12,8

Source: Methodology of pre-identification services, based in PDP. (Cifuentes, Monsalve, Rivera, & Russi, 2019)

Once both indices have been calculated, the simple average between them is taken, and a single Pre-Identification Index is obtained. It aims to reflect the country's capacities for each service sector and is used to make a second filter, in which a selection of the 30% of the bets with the highest value are pre-identified. (Cifuentes, Monsalve, Rivera, & Russi, 2019)

Results of the pre-identification exercise

Below we present the values of the variables that resulted from the methodology's implementation that determine specific service sectors as productive bets. The EBOPS highlighted in blue means that they were pre-identified as bets; the variables highlighted in dark green are essential for a positive pre-identification; those highlighted in light green, although gave a positive result, were not so decisive to pre-identify a sector.

Phase 1:

	PHASE 1						
	IVCR		DP International		DP Local		
	VCR y VCL	Strategic Value	DP Internati	Positive gro	age CA 2014-	Positive gro	Particip aver
EBOPS	Average 14-1	Strategic Value	Prom 14-17	Growth	CA	Prome 2014-	Particip. CA
8	0,07	0,868	0,106	2,0%	1.528,05	2,5%	0,6%
9.1	1,40	0,274	0,016	-2,4%	13.203,13	-2,0%	5,2%
9.2	0,26	0,508	0,050	5,3%	436,16	0,1%	0,2%
9.3	0,11	0,180	0,004	3,4%	569,55	-0,8%	0,2%
10.1	-	0,042	0,056	5,1%	731,32	-6,4%	0,3%
10.2	0,44	0,546	0,087	3,6%	12.706,60	-2,2%	5,0%
10.3	0,78	0,088	0,122	0,2%	69.079,24	-1,6%	27,1%
11.1	1,26	0,048	0,007	2,9%	3.674,87	-4,0%	1,4%
11.2	2,46	-0,074	0,003	-5,0%	48.833,19	0,9%	19,1%

Phase 2:

	Productive capacity Index						
	Average VA	Growth prom VA	Employment	Chaining	Business tissue	Employment complexity	ICP
EBOPS	2014-2017	2014-2017	2018	NA	2018	Average 2014-2017	Equal weight
8	0,14%	0,92%	1.608		169		0,08
9.1	6,00%	3,07%	64.075		17.337	2,3%	0,18
9.2	0,08%	8,83%	105.242		18.514	8,8%	0,24
9.3	0,28%	6,47%	11.378		2.505	0,9%	0,11
10.1	0,58%	-1,04%	3.117		1.400	-2,1%	0,06
10.2	1,38%	4,99%	334.966		67.964	7,4%	0,31
10.3	16,08%	6,15%	1.920.235		157.618	0,4%	0,60
11.1	1,31%	1,32%	34.244		12.291	1,7%	0,13
11.2	32,01%	6,52%	424.746		119.789	-1,2%	0,47

	Export capacity Index						Capacity Index
	Exports variables					ICE - Different weights	IC
EBOPS	Complexity	Growth	Participation	RUES compar	DANE Compa	DANE	Average
8	0,049	0,02	0,01	1	186	0,34	0,21
9.1	-0,010	0,05	0,02	5	314	0,37	0,27
9.2	1,311	0,07	0,02	196	473	0,69	0,46
9.3	-0,044	0,16	0,00	8	203	0,37	0,24
10.1	-0,226	0,00	0,00	2	79	0,24	0,15
10.2	0,325	0,00	0,04	54	1154	0,61	0,46
10.3	-0,029	0,00	0,09	49	607	0,42	0,51
11.1	0,007	0,00	0,01	108	19	0,28	0,21
11.2	-0,053	0,00	0,01	16	359	0,35	0,41

After having carried out all the steps of the proposed methodology, we can arrive at the following results for modern services classified by EBOPS 2010:

		Pre-identified
EBOPS 2010	Description	Yes/No
8	Charges for the use of intellectual property n.i.e.	No
9.1	Telecommunications services	Yes
9.2	Computer services	Yes
9.3	Information services	Yes
10.1	Research and development services	No
10.2	Professional and management consulting services	Yes
10.3	Technical, trade-related, and other business services	Yes
11.1	Audio-visual and related services	No
11.2	Other personal, cultural, and recreational services	Yes

The results of this exercise leave several sectors of modern services pre-identified as productive bets. Those EBOPS services that correspond to Software, IT, and BPO services are favored by comparative advantages for the export of services in Colombia almost entirely, except research and science exports.

Other sectors such as personal, cultural, and recreation have also been pre-selected, a critical sector for the creative industries and the orange economy in Colombia.
Charges for the use of intellectual property and audiovisual and related services were not pre-selected. This does not mean that they are not important, because as we saw in the part of this chapter, they have increased in their contribution to exports of services. Their results may be due to different aspects, such as the quality of information available, also structural and environmental elements, such as the prevalence of specific bottlenecks or the lack of enabling conditions.

Conclusions and recommendations

1. Information limitations inhibit the development of assertive policies to promote trade in services in Colombia. Information problems for services are not significantly different in Colombia. There are large biases in the generation of information that can only be solved by constructing more complex and robust information-generating instruments. Even though the National Administrative Department of Statistics (DANE) and the Central Bank are regularly publishing information for trade in services, there are biases related to the high aggregation of sectors, the lack of consensus in sectoral definitions, problems with the business characterization of service companies, and absence in information regarding mode 3 (foreign investment).

2. Colombia must sophisticate and diversify services exports in line with PDP and international trends. The integration of new technologies is key to promoting the development and sophistication of traditional and modern services, adding value and diversifying Colombian services exports.

3. Modern services have the most dynamic growth trend. Colombia has many comparative advantages in the modern services sector, which has been the most dynamic in recent years. Therefore, Colombia should promote regulatory and policy enhancements to foster modern services, especially by cross-border supply.

4. Cross-border trade in services is the most strategic mode of supply. In Colombia, the cross-border trade in modern services has increased with information technologies and reduced costs, especially in the subsector of other business services.

5. It is essential to continue developing pre-identification exercises according to the PDP, which function as a sectorial tool to identify opportunities and productive bets. These exercises could be done in partnership with public and private associations adding new sources of investigation.

6. The services identified in the pre-identification exercise represent Colombia's opportunity to diversify and promote services exports. Moreover, the development of modern services is also an opportunity to improve other economic sectors and new businesses, adding value to Colombian's exports. It is recommended to develop a joint action plan with the private sector and relevant stakeholders to boost these sectors' development.

Annex 1: Measurement of foreign trade in services: challenges, sources of information and methodology

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Foreign trade activities in services have had high and sustained growth in recent decades, becoming a key sector for global economic growth. In the case of Colombia, both production and foreign trade in services have followed the international pattern, with sustained growth and less volatility in the face of external shocks, which places them as an alternative for diversification of the country's external income.

In the development of the service activity, it is key to know the challenges and issues faced by the companies involved in these activities, and the role played by public policy. For the design of the export strategy, it is essential to have reliable, continuous, and updated information, which allows identifying the evolution of the sector, the new dynamics, and the services that are gaining importance in Colombia and the world.

The service activity is characterized by its heterogeneity, intangibility, and continuous transformation, besides being highly marketable thanks to the use of information and communication technologies. Unlike foreign trade operations of goods, which are tangible and have to cross a physical border, which facilitates their control and registration, trade in services is more difficult to identify and measure.

According to the World Trade Organization, there are some tools used to measure this statistic. On the one hand, the application of surveys directly to the companies that carry out trade in services, and on the other hand, the use of administrative records that allow to complement and contrast the information obtained in the surveys.

In the case of Colombia, the measurement of foreign trade in services reported in the balance of payments follows the international standards of the IMF Balance of Payments Manual Sixth Edition (BPM6) and the Manual on Statistics of International Trade in Services (MECIS, 2010) proposed by the United Nations. It covers exports and imports of twelve types of service activities: manufacturing services with physical inputs owned by others; maintenance and repair not included elsewhere (n.i.o.p.); transportation; travel; construction; insurance and pension services; financial services; charges for the use of intellectual property, n.i.o.p.; telecommunications, computer, and

[15] *The opinions contained in this document are the sole responsibility of the authors and do not bind Banco de la República or its Board of Directors.*

information services; other business services; personal, cultural, and recreational services; and government services16.

The sources of information used for measurement are a combination of administrative records and surveys that are applied to companies that export and import services.

Source: Elaborated by the Banco de la República - External Sector

Based on the information reported in the administrative records, income and expenses are estimated quarterly for freight services, travel, insurance and financial services, and government services. These sources include customs records, international traveler statistics, and foreign exchange records. Additionally, accounting information reported by companies to supervisory entities, such as the Superintendencies, and direct reports from public entities and multilateral agencies are used.

Freight and insurance services for the transportation of goods are obtained from customs records. Travel services are measured based on the statistics of entry and exit of international travelers by airport, provided by Migración Colombia and the Aeronáutica Civil de Colombia (Aerocivil), and the declaration of luggage, cash, and representative titles of money - format 530 of the DIAN17. Insurance, financial, and government services are measured based on exchange records submitted to the Banco de la República, accounting reports, and direct reports from public entities and multilateral organizations.

[16] On the methodological aspects of the estimation of these services see the methodological note "Colombia's Balance of Payments: Methodology and Sources of Information for Calculating Balance of Payments Statistics According to the Balance of Payments and International Investment Position Manual, International Monetary Fund, version 6". https://www.banrep.gov.co/es/estadisticas/balanza-pagos

[17] This source of information was valid until July 2019. After that period, a time series projection of total expenditure per traveler is made.

On the other hand, for exports and imports of the rest of the service activities,[18] the estimate is made from the quarterly survey of foreign trade in services that Banco de la República applies since 1994, and is complemented and contrasted with other sources such as the reports of exchange operations made by the companies and reported to Banco de la República, and recently with the Quarterly Sample of Foreign Trade in Services (MTCES) that DANE applies since 2013.

Access to the MTCES has allowed strengthening the measurement of these services, since combining the two surveys has allowed expanding the coverage of companies,[19] also capturing the new dynamics of services in relation to increased access to information and communication technologies, new business practices such as outsourcing, among others.

This improvement in measurement is the result of the joint and continuous work between DANE and Banco de la República, which began towards the end of the last decade in conjunction with the Ministry of Commerce, Industry and Tourism and the DNP, in order to strengthen the estimation of the country's foreign trade in services with the implementation of the pilot test of the new survey of foreign trade in services (MTCES) under the direction of DANE (considering its technical experience and legal authority for the preparation of surveys) and the technical support of BR.

The work tables developed by the technical teams of DANE and Banco de la República have resulted in the continuous improvement of statistics on exports and imports of services, as well as the inter-institutional agreements and commitments leading to DANE being the entity that continues with the application of the survey so that it is shared with Banco de la República and continues to be one of the inputs for the measurement of foreign trade in services in the balance of payments.

Finally, it is important to emphasize that continuous, coherent, reliable, and timely information is a valuable asset for the design and implementation of strategies leading to the diversification of the Colombian export basket and the establishment of foreign trade in services as a source of economic growth and foreign exchange income for the country. Given the challenges and complexity involved in the measurement of foreign trade in services, it is essential to have constant inter-institutional support from the entities responsible for and involved in its measurement and in the design of public policies so that efforts are prioritized in the activities that face the greatest challenges in their identification and measurement.

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[18] These include transportation services (except imports of freight forwarding services), charges for the use of intellectual property, n.i.o.p., construction, telecommunications, computer and information services; other business services and personal, cultural and recreational services.

[19] The Banco de la República survey captures the information reported by 585 companies, among which are the most representative companies in terms of value reported by each sector. On the other hand, MTCES-DANE captures the information reported by 1,406 companies, among which are recently created companies that coincide with the new trends in services.

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