Statistics from the **TELECOMMUNICATIONS SECTOR**

COSTA RICA **2016**

sutel
SUPERINTENDENCIA DE TELECOMUNICACIONES

First edition:
June 2017

Desing, diagram and printing:
Publiart S.A.
www.publiartcr.com

310 ISSN: 2215-3683
S959e

Statistics from the Telecommunications Sector. Costa Rica. 2016.
Alemán, Ileana; Arias, Cinthya; Calderón, Laura; Carballo, Josué;
Delgado, Luis Alonso; Fallas, Glenn; García, Juan Gabriel;
Herrera, Walther; Irigaray, Erick; Mejías, Karla; Rodríguez, Rodolfo;
Rodríguez, Victoria; Ruiz, Max; Salazar, Natalia; Segura, Ana Lucrecia.
Superintendencia de Telecomunicaciones (SUTEL).
[San José, Costa Rica].: SUTEL, 2017

1. STATISTICS 2. TELECOMMUNICATIONS 3. COSTA RICA
181 p: tables, charts.;21,59 cm x 27,94 cm

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Message from the President of the Council of SUTEL

Nine years after the General Telecommunications Law No. 8642 was passed, the evolution of the country is evident in the telecommunications sector, which, nowadays, is more dynamic and its services are easier to obtain by all the users and at affordable prices.

For the fifth time, the Telecommunications Superintendence (SUTEL) presents the Report "Statistics from the Telecommunications Sector 2016", with the main indicators generated in terms of subscriptions, income, investment, traffic and human resources, among others.

Currently, the market gathers a total of 135 authorized telecommunications operators and suppliers. Likewise the income reached in the sector presented a 3% increase, going from 752.158 million colones in 2015 to 752.164 million colones in 2016. In turn, such figure represents 54% more than the total amount of 2012, which means that the income of the sector is continuously increasing.

Regarding the ratio of the total income generated by the sector and the Gross Domestic Product (GDP), it reached, for the third consecutive year an amount equivalent to 3%.

In terms of the investment made by the telecommunications service operators and suppliers, it remained, in percentage terms, within the range of 1% of the GDP for the period 2012-2016.

The good news for the sector is that the human resources employed are still growing at a 4% rate, moving from 11.426 workers in 2015 to 11.885 workers in 2016, which represents 459 new jobs in telecommunications. Likewise, it is important to highlight the increase of 2% in female participation in the sector in comparison with 2015; which means that a total of 3061 women are working directly in the sector.

In terms of the evolution of income, fixed telephony, including traditional basic telephony and VoIP, presents an increase of 1.3%, moving from 86.363 million colones in 2015 to 87.501 million colones in 2016; this is particularly due to the increase in the number of VoIP subscriptions which have gone from 55.389 in 2015 to 69.854 in 2016.

Mobile telephony (not including mobile Internet) is still the service that generates more income for the telecommunications sector, since this is the communication means that is been increasingly used by the citizens. The service presents an 11% increase in the number of total subscriptions, going from 7.535.599 in 2015 to 8.330.064 in 2016.

Fixed wired and wireless Internet service had a 10% growth comparing the income of 2016 with that of 2015. In the case of data transfer over mobile networks, the service is increasing, since the income grew 14% with respect to 2015. Additionally, more than 47.000 terabytes were consumed in mobile data traffic compared to the previous year.

In the international context, it is important to highlight that, according to the market indicators, Costa Rica remains among the first five countries in terms of the Access Promotion Index 2016, from a list of 58 low and middle income nations.

As part of the evolution of this statistical report, for the first time, SUTEL incorporates data from quality evaluation of the mobile services provided by the main telecommunications operators of the country in their 2G, 3G and 4G networks, which will serve as a source of information and reference for all the users. Likewise, the report presents information on the perception of the users in terms of all the telecommunications services and their suppliers.

We thank all the officials of SUTEL for their commitment and dedication, which have contributed to the generation of this document, and we also thank all those stakeholders of the sector that made this possible through their contributions with data. These indicators are, without doubt, the best evidence of the telecommunications market evolution.

Eng. Gilbert Camacho Mora
President of the Council of SUTEL

Presentation

Telecommunications in Costa Rica

The fifth annual statistical report of the telecommunication sector shows a global vision of development of such sector in Costa Rica, with internationally comparable information and methodologies that had been globally approved.

The indicators in the national market comprise an objective evaluation of the country performance in the field of telecommunications and their evolution through the years, particularly between 2010 and 2016.

Statistical data represent a vital tool for strategic decisions by different members in our society; for example, statisticians, academicians, government authorities, telecommunications service operators and suppliers and citizens in general, since their results represent reliable information and it is according to what the market provides.

This report presents the collection, processing and generation of data through a methodological process that has been globally validated by the International Telecommunications Union (ITU); the process has been recognized for its rigor in all the stages of the process.

In this sense, and as part of the opportunities for growth and evolution of the national market, we have incorporated in the report elements related to the quality of the telecommunications services, from the perspective of the user.

The 2016 statistical report of the Telecommunications Superintendence is the result of a constant, tenacious and devoted effort from different agents, together with SUTEL, to generate a product that could be used as a measurement tool in terms of market behavior and its interaction with its users.

We thank all the telecommunications operators and suppliers that have been part of this process contributing with valuable information, and all the officials that have contributed in the processing and analysis of the information for all Costa Ricans to have access to the statistical information in the telecommunication sector.

Walther Herrera C.
Director
Directorate-General for Markets

SERVICES
Methodology and Description

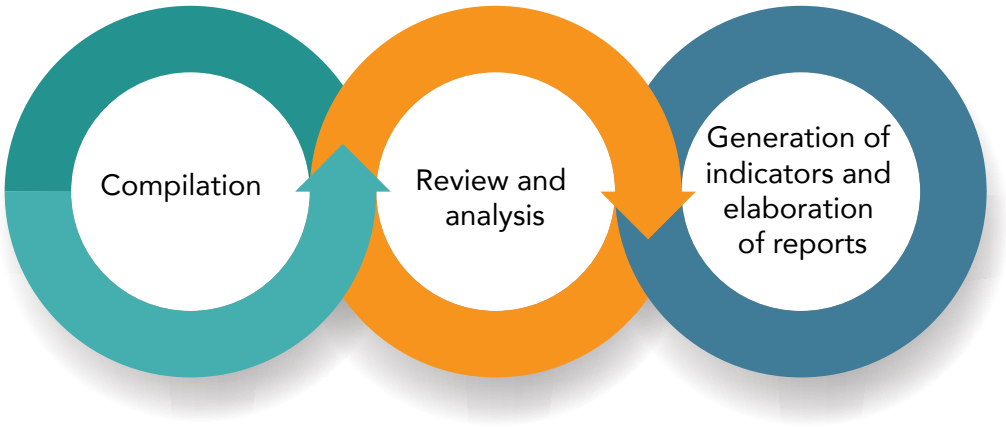
The generation of indicators for the telecommunications sector is made by SUTEL applying processes for the compilation and definition of indicators according to the best international practices and the guidelines of the International Telecommunications Union (ITU).

Methodology

For the generation of the performance indicators 2016 for the Costa Rican telecommunications sector, just as in previous years, there are three different phases: compilation of information, review and analysis, and generation of results.

Figure 1

Process for the compilation, review and analysis, and generation of indicators for the telecommunications sector



Source: SUTEL, General Market Division

The following charts synthetize the main tasks performed in each of these stages.

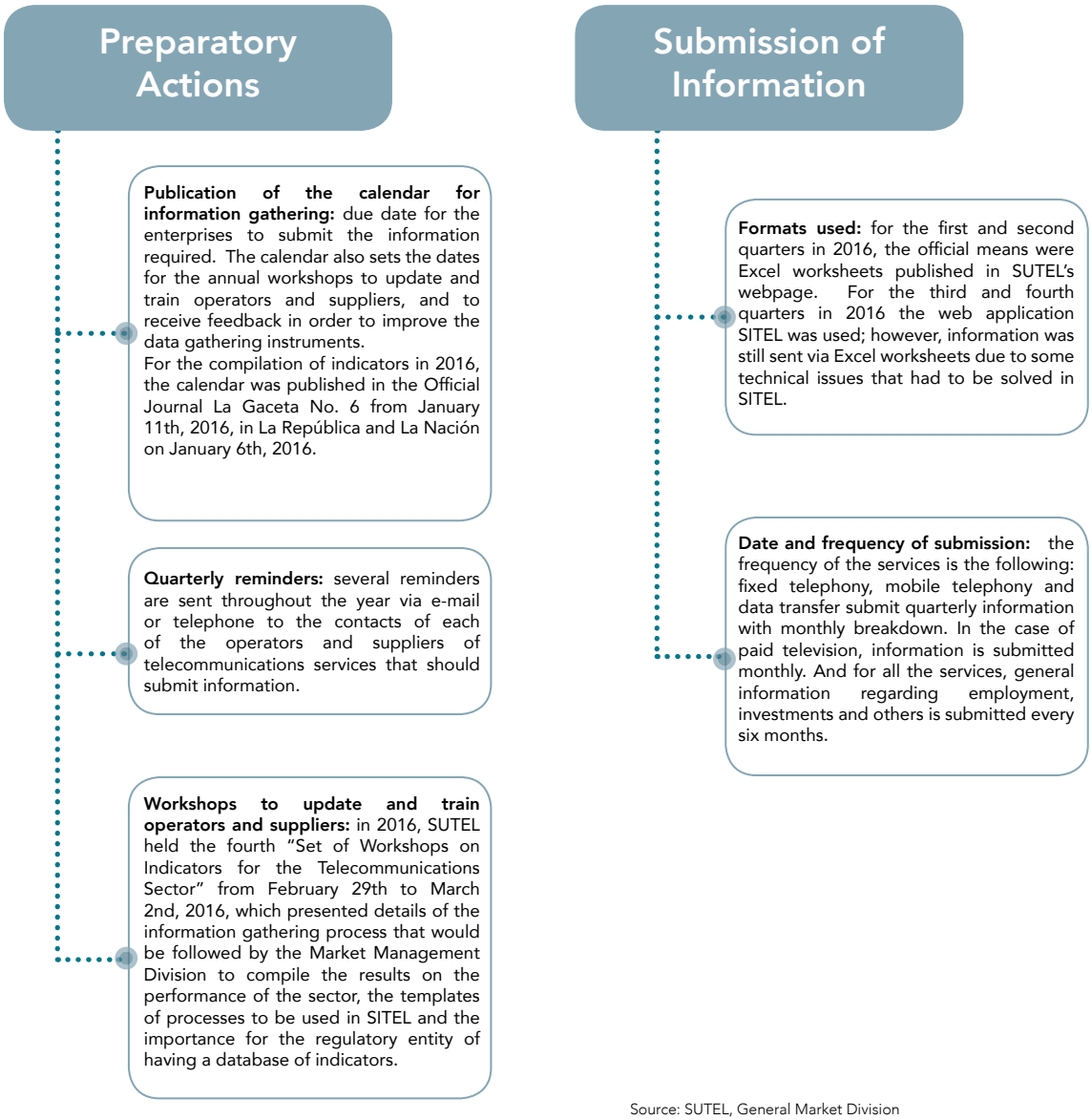
It is important to mention that in 2016, with the entrance into operation of the System of Indicators of the telecommunications sector, SITEL, the information was partially compiled through this system, but it was done in parallel to the compilation of data for the construction of indicators using the traditional means, which has been vital to ensure the adequate operation of SITEL that will certainly facilitate the process of data reporting for operators and data processing for future reports.

Compilation of Information

In order to adequately and timely compile the information, SUTEL performs a series of tasks divided into two phases: the previous preparatory actions with the operators and the establishment of guidelines for the submission of information.

Figure 2

Process for the compilation of information for the construction of indicators in the telecommunications sector



Source: SUTEL, General Market Division

Regarding the workshops to update and train operators and suppliers of telecommunications services, it is important to mention that, in 2016, 113 representatives of operators and suppliers of telecommunication services attended the activities, and they represented 35 operators with active commercial offers. See Table 1.

Table 1

Telecommunications Superintendence: Attendance to the workshops on indicators for the telecommunications market, February – March 2016

Date	Service	Operator	Representative
29/02/2016	Traditional Fixed Telephony	Instituto Costarricense de Electricidad	1
29/02/2016	IP Telephony	American Data Networks	2
		Blue Sat Servicios Administrados de Telecom S.A	1
		BT Latam Costa Rica	1
		E-Diay S.A.	2
		Instituto Costarricense de Electricidad	4
		InterPhone S.A.	1
		Itellum Ltda.	2
		Millicom Cable Costa Rica, S.A. (TIGO)	3
		Othos Telecom	2
		Radiográfica Costarricense S.A. (RACSA)	4
		Telecable Económico T.V.E. S.A	5
		Televisora de Costa Rica S.A. (Cable Tica, Tuyo Móvil)	1
		Transdatelecom S.A	2
Total			31
01/03/2016	Mobile Telephony	Claro Costa Rica CR	2
		Instituto Costarricense de Electricidad	6
		Radiográfica Costarricense S.A. (RACSA)	4
		Telefónica de Costa Rica TC S.A. (Movistar)	2
Total			14
01/03/2016	Paid Television	Blue Sat Servicios Administrados de Telecom S.A	1
		Cable Caribe S.A.	1
		Cable Talamanca S.A.	1
		Cable Zarcero S.A (Mega Cable)	2
		Cooperativa de Electrificación Rural de Alfaro Ruiz (CoopeAlfaro Ruiz)	2
		Cooperativa de Electrificación Rural de Guanacaste R.L.	1
		Cooperativa de Electrificación Rural de San Carlos R.L. (Coopelesca R.L.)	2
		Cooperativa de Electrificación Rural Los Santos R.L. (COOPESANTOS)	2
		Gregorio Velo Giao	1
		Itellum Comunicaciones Costa Rica S.R.L.	2
		Millicom Cable Costa Rica, S.A. (TIGO)	2
		SKY Fiber Costa Rica, S.A.	3
		Transdatelecom S.A	2

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Date	Service	Operator	Representative
Total			**22**
02/03/2016	Access to Internet and Dedicated Lines	American Data Networks	2
		Blue Sat Servicios Administrados de Telecom S.A	1
		Boomerang Wireless, S.A.	2
		BT Latam Costa Rica	1
		Claro C. R. Telecomunicaciones, S. A.	2
		Cooperativa de Electrificación Rural de Alfaro Ruiz (CoopeAlfaro Ruiz)	2
		Cooperativa de Electrificación Rural de San Carlos R.L. (Coopelesca R.L.)	2
		Cooperativa de Electrificación Rural Los Santos R.L. (COOPESANTOS)	2
		Empresa de Servicios Públicos de Heredia (ESPH)	2
		Fiber To The Home (Fith)	1
		Instituto Costarricense de Electricidad	4
		Itellum Comunicaciones Costa Rica S.R.L.	2
		OBCR Orange Business Costa Rica S.A.	1
		Radiográfica Costarricense S.A. (RACSA)	7
		Redes Inalámbricas de C.R. (REICO)	2
		RSL Telecom (Panamá) S.A.	2
		Tecnología y Sistemas WILCASJI S.A.	1
		Telecable Económico T.V.E. S.A	4
		Telefónica C. R. (Movistar)	1
		Televisora de Costa Rica S.A. (Cable Tica, Tuyo Móvil)	1
		Transdatelecom S.A	2
		Ufinet Costa Rica S.A.	2
Total			**46**
Overall Total			**113**

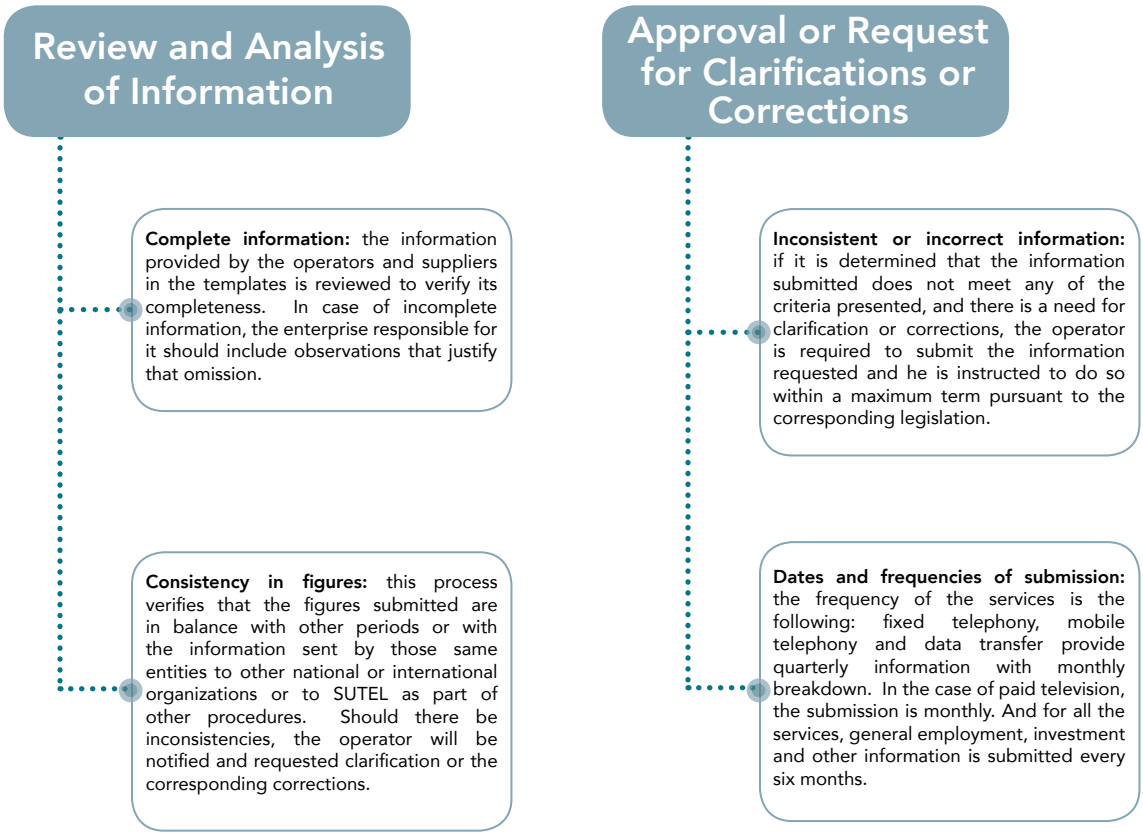
Source: SUTEL, General Market Division

Review and Analysis of Information

Once the information is received, it is reviewed and analyzed by the professionals in the team of indicators of the Market Management Division (MMD). The actions undertaken as a result of this general verification include the determination of the completeness and consistency of the figures. If they are not complete or consistent, operators are requested to submit clarifications or corrections.

Figure 3

Process to review and analyze the information for the construction of indicators for the telecommunications sector



Source: SUTEL, General Market Division

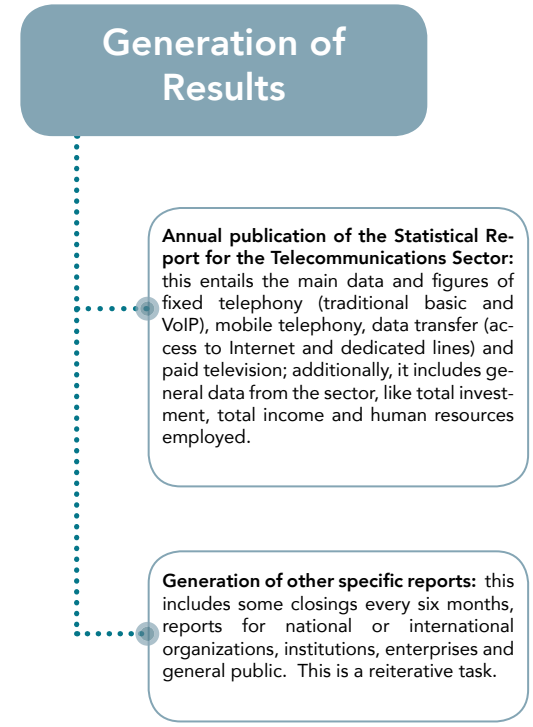
It is important to mention that, in addition to the review work, there are meetings throughout the year with different operators in order to clarify indicators required in the templates and to share the observations made by this Superintendence regarding the data they have provided.

Generation of Results

This activity corresponds to the stage of generation of reports with the information provided by the operators of networks and the suppliers of telecommunication services, as well as with the information compiled from secondary sources.

Figure 4

Process for generation of results and final elaboration of indicators for the telecommunications sector



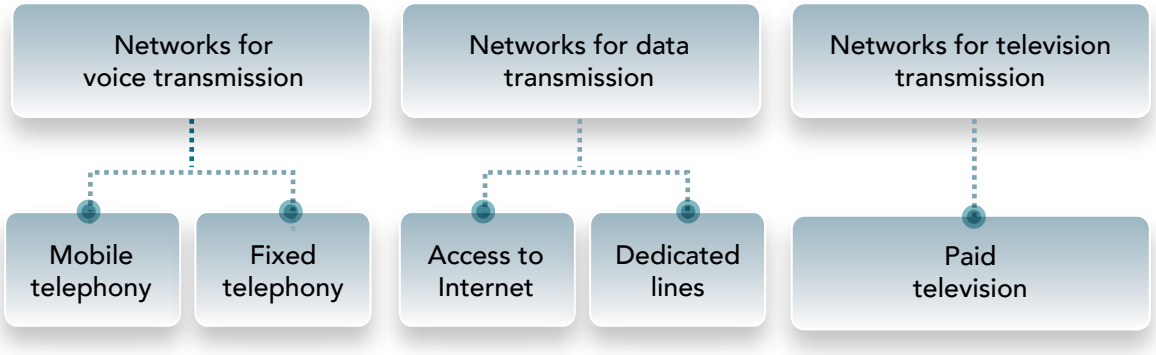
Source: SUTEL, General Market Division

Description of the Telecommunications Services

In order to standardize and simplify the approaches to compile market information provided by the service suppliers and the network operators, we have divided the telecommunications services available to the public into the network deployed and the type of signal they carry.

Considering the above, the telecommunications services contemplated in this publication are classified into three categories: voice services, data transfer services and paid television services. This classification and the sub-groups included in each case are presented in Figure 5.

Figure 5
General Classification of Services



Source: SUTEL, General Market Division

The services provided via networks for voice transmission include the following:

- **Mobile telephony services:** it offers the users two subscription modalities: pre-paid and post-paid; therefore, the analysis and follow up of this service is performed by studying the number of subscriptions, the level of income, voice traffic and the prices offered to the market according to such modalities.

- **Fixed telephony prices:** this service, defined in article No. 3 of the Regulations on the Regime of Protection to the Final User of Telecommunications Services, is subdivided, for the purpose of this report, into three different types of service provision: traditional basic telephony, IP telephony and public telephony. As provided by article 3 of the regulations mentioned above, the provision of fixed telephony services includes any means of access as long as the terminals associated do not allow for mobility. The follow up to these services is done by assessing the evolution of the income, the number of subscribers and voice traffic in the network.

Regarding the data transfer service, it is defined in article No. 8, paragraph 75 of the Regulation for the Provision and Quality of the Services; and, for this publication, a sub-analysis is performed by sub-dividing this service into two markets:

- **Service of access to Internet:** a quantification of the number of subscribers, of the income reported by the enterprises and the traffic of data by type of access network.

- **Service of dedicated lines:** this reviews the number of connections, the technologies to provide the service and the income registered.

Finally, although it is not considered a telecommunications service, the television transmission networks are also included. This section includes:

- **Paid television:** Televisión satelital, televisión por cable, televisión IP y televisión MMDS.

Below are the details of the modalities for commercialization and the characteristics of the

networks that support each of the services entailed in these three groups:

Table 2

Telecommunications services taken into account in the study

Category of telecommunications service	Modalities of commercialization	Characteristics of the networks that support it
Mobile telephony	Instant messaging (SMS), Multimedia messaging (MMS), Voice post-paid, voice pre-paid	Facilitates communications of voice over wireless means in the access, allows sending and downloading data through the air interface. Its evolution is aiming towards an all-IP architecture.
Fixed telephony	Traditional basic telephony, voice over IP (VoIP), RDSI.	Known as PSTN, it uses a set of exchange switches and panel links to establish temporary connections between two extremes, which is known as circuit commuting. Additionally, with the implementation of a softswitch and other active elements, the PSTN network can be inter-connected with any data network and provide voice over IP.
Paid television	Satellite television, cable television, IP television and MMDS television	The service is provided through different technologies, it can be a satellite system or a cable system based on DOCSIS 2.0 or higher. It can transmit data and, because of this, although paid television is not a telecommunications service, it might be interesting to analyze its evolution.
Data transfer	Access to Internet, international carrier, mobile data, dedicated lines	Communications are achieved by generating packages of information that are re-sent through the network, regardless of the propagation means or the network used. It is based on two techniques: datagram routing and virtual channels.

Source: SUTEL, General Market Division

Summary of Indicators Presented

This section presents the general definitions of each indicator that was included in this report with the objective of providing clarity to the reader on the market information that was processed, which volume and variety are expected to increase through time.

Table 3

Indicators for the fixed telephony service, 2016

Indicator	General definition
Total active fixed telephony lines	Total number of lines in service and duly allocated to a customer, which are not in definite suspension of the service (articles 12 and 34 of the RPUF) and which present at least one ratable event during the last rating month or that has a valid service provision contract with the operator.
Subscriptions of active VoIP lines	Number of active subscriptions to fixed lines that use the protocol of voice over Internet transmission (VoIP). It only includes the total number of subscriptions to the VoIP service that have generated inbound and outbound traffic during the last three months. It excludes VoIP applications software (for example, VoIP from Skype between computers and from a computer to a telephone).
Total traffic in traditional basic telephony	Traffic that corresponds to the calls made through the analogue, digital or both fixed telephone lines.
Total traffic in VoIP	Traffic that corresponds to the calls made through fixed managed VoIP telephony (protocol of voice transmission over Internet).
Inbound international telephone traffic	Total traffic with international origin and fixed destination on net.
Outbound international telephone traffic	Total traffic with fixed origin on net and international destination.
Total income in basic traditional telephony (retail)	This corresponds to the income from basic rate + excess + other line items associated to the provision of the fixed telephony service.
Total income in VoIP (retail)	This indicator is equivalent to the income associated to basic rate + excess + other line items associated to the provision of the VoIP service.

Source: SUTEL, General Market Division

Table 4

Indicators for the data transfer service, 2016

Indicator	General Definition
Active Internet Subscriptions fixed wired	Sum of the active subscriptions to the service that provides access to fixed wired Internet (cable modem, xDSL, fiber, home or building and other fixed wired technologies).
Active Internet Subscriptions fixed wireless	Sum of the active subscriptions to the service that provides access to fixed wireless Internet (Satellite, fixed WiMax and other fixed wireless technologies).
Active Subscriptions to mobile Internet	Sum of active subscriptions to the service that provides mobile Internet (pre-paid and post-paid cellular, Data Card, mobile WiMax and other mobile technologies).
Number of dedicated lines (dedicated links)	Number of dedicated private connections. A dedicated line connects two locations of the telecommunications service for voice or private data. These lines do not have a special cable, but a reserved circuit between two points. Usually, the enterprises rent these lines for the connection of their offices because they guarantee the necessary bandwidth for the traffic of the network.
Internet traffic	This refers to the number of data transmitted and downloaded (in GigaBytes) by all the users of the Internet access service.
Total income for the provision of dedicated lines	Total amount of income billed for the provision of the dedicated lines service.
Maximum downloading speed offered	Maximum Internet speed offered to download data in the Internet access service.
Minimum downloading speed offered	Minimum Internet speed offered to download data in the Internet access service.
Total income billed for access to fixed wired Internet	This corresponds to the total amount of income billed in association with the provision of fixed wired Internet services.
Total income billed for access to fixed wireless Internet	This corresponds to the total amount of income billed in association with the provision of fixed wireless Internet services.
Total income billed for access to mobile Internet	This corresponds to the total amount of income billed in association with the provision of mobile Internet access services.

Source: SUTEL, General Market Division

Table 5

Indicators of the Mobile Telephony Service, 2016

Indicator	General Definition
Active post-paid mobile subscriptions	Total number of subscriptions to post-paid mobile telephones that pay a monthly subscription rate and that present at least one ratable event during the rating month and are not in definite service suspension pursuant to articles 12 and 34 of the RPUF.
Active pre-paid mobile subscriptions	Total number of subscriptions to pre-paid mobile telephones that have at least one ratable event to the balance of the service within ninety calendars day before the last rating and that belong to the pre-paid platform.
Total capacity of mobile lines installed	This corresponds to the maximum number of mobile lines that can be connected. This number includes mobile lines already connected and mobile lines available for later connections, including those for technical use of the switch (test numbers).
Mobile traffic (voice, SMS and MMS)	This refers to the total traffic of the mobile telephony service.
Mobile traffic – fixed own	Traffic originating in own mobile network (on net mobile) with destination on own fixed network (fixed network of the same operator).
Mobile traffic on net	Traffic with origin in mobile network with destination on the same mobile network (traffic on net).
Mobile traffic – other mobile networks	Traffic with origin in own mobile network (on net mobile) with destination on other mobile networks (mobile networks of other operators).
Traffic of other mobile networks – own mobile	Traffic with origin in the mobile networks of other operators (off net mobile) with destination on own mobile network (on net mobile).
Traffic from own fixed – own mobile	Traffic with origin in own fixed network with destination on own mobile network (on net mobile).
Mobile traffic – other fixed networks	Traffic with origin in own mobile network (on net mobile) with destination on other fixed networks (off net fixed).
Traffic from other fixed networks – own mobile	Traffic with origin in fixed networks of other operators (off net fixed) with destination on own mobile network (on net mobile).
Mobile traffic - international	Traffic with origin in own mobile network (on net mobile) with international destination (off net international).
Traffic from international networks – own mobile	Traffic with origin in international networks (off net international) with destination to own mobile network (on net mobile).
Mobile traffic in transit	Traffic with off net origin (other fixed, mobile and international long distance networks) with off net destination (other fixed, mobile and international long distance networks) in transit through own mobile network.
Total mobile voice traffic per payment modality	This corresponds to the sum of mobile voice traffic according to payment modality (pre-paid and post-paid). To construct this indicator, it is necessary to add on net traffic plus outbound off net traffic. Total mobile voice traffic: Mobile voice traffic on net + mobile voice traffic off net total (mobile voice traffic outbound to other mobile networks, to own fixed network, to other fixed networks and to international networks)

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Indicator	General Definition
SMS traffic on net post-paid	Brief messaging traffic (SMS) exchanged between subscriptions to the same mobile network, under the post-paid modality.
SMS traffic on net pre-paid	Brief messaging traffic (SMS) exchanged between subscriptions to the same mobile network, under the pre-paid modality.
SMS traffic off net post-paid	Brief messaging traffic (SMS) sent and received by subscriptions to the mobile telephony service under the post-paid modality.
SMS traffic off net pre-paid	Brief messaging traffic (SMS) sent and received by subscriptions to the mobile telephony service under the pre-paid modality.
National SMS traffic post-paid or pre-paid	Brief messaging traffic (SMS) sent to national destinations from mobile telephones under the post-paid or pre-paid modality.
National SMS traffic post-paid or pre-paid	Brief messaging traffic (SMS) sent to international destinations from mobile telephones under the post-paid or pre-paid modality.
MMS traffic on net post -paid	Traffic of Multimedia (MMS) messages exchanged between subscriptions of the same mobile network under the post-paid modality.
MMS traffic on net pre-paid	Traffic of Multimedia (MMS) messages exchanged between subscriptions of the same mobile network under the pre-paid modality.
MMS traffic off net post-paid	Traffic of Multimedia messages (SMS) sent and received by subscriptions to the mobile telephony service under the post-paid modality.
MMS traffic off net pre-paid	Traffic of Multimedia (MMS) messages sent and received by subscriptions to the mobile telephony service under the pre-paid modality. Excludes: MMS on net traffic.
National MMS traffic post-paid or pre-paid	Traffic of Multimedia (MMS) messages sent to national destinations from mobile telephones under the post-paid or the pre-paid modality.
International MMS traffic post-paid or pre-paid	Traffic of Multimedia (MMS) messages sent to international destinations from mobile telephones under the post-paid or the pre-paid modality.
Outbound roaming telephone traffic	Total number of minutes of communication traffic made by own customers through local networks in roaming with foreign networks, when they are out of the zone of services of the local network (outbound roaming)
Inbound roaming telephone traffic	Total number of minutes of communication traffic received by own customers through local networks in roaming with foreign networks, when they are out of the zone of services of the local network (outbound roaming)
SMS and MMS traffic in international outbound roaming	Traffic generated by resident mobile subscribers when sending SMS and MMS when they are out of the zone of service of the local network.
SMS and MMS traffic in international inbound roaming	Traffic generated by resident mobile subscribers when receiving SMS and MMS when they are out of the zone of service of the local network (inbound roaming).
Data traffic in inbound roaming (TB)	Traffic transmitted (in TB) by resident subscribers in accessing Internet services when they are located out of the zone of services of the local network (inbound roaming).

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Indicator	General Definition
Data traffic in outbound roaming (TB)	Traffic received (in TB) by resident subscribers in accessing Internet services when they are located out of the zone of services of the local network (outbound roaming).
Average prices	These are the average prices for a call from a mobile telephone (pre-paid or post-paid).
Average price of a local 1 minute call (peak hours, on net) for mobile cellular telephony	Price of a local call for one minute, made during peak hours from a mobile telephone line. The calculation of this indicator can be made based on the distribution of the income generated from mobile calls (pre-paid or post-paid) on net, made during the time window considered as "peak" or high consumption hours, divided by the number of minutes consumed (traffic) in these calls. It includes taxes.
Average price for a local call per minute (out of peak hours, on net) for mobile cellular telephony	Price of a local call for one minute, made out of peak hours from a mobile cellular telephone (pre-paid or post-paid) to another mobile cellular telephone of the same network. The calculation of this indicator can be done based on the distribution of the income generated under the concept of pre-paid mobile calls on net made during the "non-peak" hours or low consumption hours, divided by the number of minutes consumed (traffic) in these calls. It includes taxes.
Average price of a local call per minute (out of peak hours, off net) for mobile cellular telephony	Price of a local call per minute made out of peak hours from a mobile cellular telephone (pre-paid or post-paid) to the mobile cellular telephony of another network. The calculation of this indicator can be made based on the distribution of the income generated under the concept of pre-paid or port-paid mobile calls off net made during "non-peak" or low consumption hours, divided by the number of minutes consumed (traffic) in these calls. It includes taxes.
Average price of a local call per minute (peak hours to a fixed network) for mobile cellular telephony	Price of a local call per minute made in peak hours from a mobile cellular telephone (pre-paid or post-paid) to the fixed telephone network. The calculation of this indicator can be made based on the distribution of income generated for pre-paid or port-paid mobile calls made to a fixed network during the peak hours or high consumption hours, divided by the number of minutes consumed (traffic) in these calls. It includes taxes.
Average price of a local call per minute (non-peak hours, to a fixed network) for mobile cellular telephony	Price of a local call per minute made out of peak hours from a mobile cellular telephone (pre-paid or post-paid) to the fixed telephone network. The calculation of this indicator can be made based on the distribution of the income generated for pre-paid or post-paid mobile calls made to a fixed network during the non –peak or low consumption hours, divided by the number of minutes consumed (traffic) in these calls. It includes taxes.
Average price of a local call per minute (peak hours , on net) for mobile cellular telephony	Price of a local call per minute on weekends or nights, from a mobile cellular telephone (pre-paid or post-paid) to the mobile cellular telephony of the same network. Taxes should be included. Otherwise, there shall be a note indicating the applicable rate. The calculation of this indicator can be made based on the distribution of the income generated by mobile pre-paid or post-paid calls on net made during the weekend or at night, divided by the number of minutes (traffic). It includes taxes.

Continuation...

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Indicator	General Definition
Average price of a local call per minute (peak hours, off net) for mobile cellular telephony	Price of a local call per minute made in peak hours from a mobile cellular telephone (pre-paid or post-paid) to the mobile cellular telephony of another network. The calculation of this indicator can be made based on the distribution of the income generated by the pre-paid or post-paid off net mobile calls, divided by the number of minutes consumed (traffic) in these calls. It includes taxes.
Average price of a local call per minute (weekend, night, to a fixed network) for mobile cellular telephony	Price of a local call per minute made during the weekend, at night, from a mobile cellular telephone (pre-paid or post-paid) to the fixed telephone network. The calculation of this indicator can be made based on the distribution of the income generated by pre-paid or post-paid mobile calls to a fixed network made during the weekend, at night, divided by the number of minutes (traffic). It includes taxes.
Average SMS (on net) price for pre-paid and post-paid mobile cellular telephony	Average price of sending a brief message (SMS) from a mobile cellular telephone (pre-paid or post-paid) to the mobile cellular telephony of the same network. The calculation of this indicator can be made based on the distribution of the income generated divided by the number of SMS on net. It includes taxes.
Average SMS (off net) price for pre-paid and post-paid mobile cellular telephony	Average price of sending a brief message (SMS) from a mobile cellular telephone (pre-paid or post-paid) to the mobile cellular telephony of another network. The calculation of this indicator can be made based on the distribution of the income generated divided by the number of SMS off net. It includes taxes.
Income for pre-paid or post-paid mobile telephone service	Income associated to the pre-paid or post-paid mobile telephony service. This is constructed from the aggregation of the income for the monthly rate, the income for excess minutes and the income that corresponds to other charges generated as part of the provision of the mobile telephony service; they are not part of the monthly rate or of the inherent rate for excess minutes, as the fines for suspension or re-connection.
Income for mobile voice traffic on net pre-paid or post-paid	Income associated to the mobile voice traffic originated in own mobile network (on net mobile) with destination to the same mobile network (on net mobile).
Income for outbound mobile voice traffic pre-paid or post-paid	Income associated to the mobile voice traffic originated in own mobile network (on net mobile) with off net destination (own fixed network, other fixed networks, other mobile networks, international networks).
Income for monthly subscription or minimal rate pre-paid or post-paid	Income obtained from the collection of recurrent taxable rates in the subscription of the pre-paid or post-paid mobile telephony service.
Income for excess in fixed mobile telephone service pre-paid or post-paid	Income associated to the excess minutes or minutes not contemplated in the minimal rate of the pre-paid or post-paid service. This includes excess minutes for local and international calls.
Income for inbound mobile voice traffic pre-paid or post-paid	Income associated to the traffic with off net origin (own mobile network, other fixed networks, other mobile networks, international networks) and on net destination (own fixed network).
Income for international outbound mobile voice traffic pre-paid or post-paid	Income associated to the mobile voice traffic originated in own mobile network (on net mobile) with international off net destination.
Income for international inbound mobile voice traffic pre-paid or post-paid	Income associated to the traffic with international off net origin and on net destination (own mobile network).

Continuation...

Continuation...

Indicator	General Definition
Income for number of on net SMS post-paid or pre-paid	Income associated to the traffic of brief messages (SMS) exchanged between users of the same mobile network under the post-paid or pre-paid modality,
Income for number of off net SMS post-paid or pre-paid	Income associated to the traffic of brief messages (SMS sent to national and international destinations from mobile telephones, under the post-paid or pre-paid modality.
Income for the number of on net MMS post-paid or pre-paid	Income associated to the traffic of multimedia messaging service (MMS) exchanged between users of the same mobile network, under the post-paid or pre-paid modality.
Income for the number of off net MMS post-paid or pre-paid	Income associated to the traffic of multimedia messaging service (MMS) sent to national and international destinations from mobile telephones, under the post-paid or pre-paid modality.
Income for MMS sent to national destinations post-paid or pre-paid	Income associated to the total traffic of multimedia messages (MMS) sent to national destinations. It does not include messages sent from a computer to other computers or to mobile telephones.
Income for MMS sent to international destinations post-paid or pre-paid	Income associated to the total traffic of multimedia messages (MMS) sent to international destinations. It does not include messages sent from a computer to other computers or to mobile telephones.
Income for the number of SMS sent to national destinations post-paid or pre-paid	Income associated to the traffic of brief messages (SMS) sent to national destinations from mobile telephones.
Income for the number of SMS sent to international destinations post-paid or pre-paid	Income associated to the traffic of brief messages (SMS) sent to international destinations from mobile telephones.
Income for the total number of MMS	Income associated to the total traffic of multimedia messages (MMS) sent to national and international destinations. It does not include messages sent from a computer to other computers or to mobile telephones.
Income for outbound roaming telephone traffic (minutes)	Income generated by the subscribers to mobile telephony in making and receiving calls when they are out of the zone of service of the network from their country; for example, when they travel overseas.
Income for inbound roaming telephone traffic (minutes)	Income generated by the visiting subscribers (foreigners) in making or receiving calls in a country. This income is obtained by the operators of the network in the country of the visiting subscribers.
Income for outbound roaming in SMS and MMS	Income generated by the subscribers to mobile telephony in sending SMS and MMS when they are out of the zone of service of the network from their country.
Income for inbound roaming in SMS and MMS	Income for the traffic generated by the visiting subscribers (foreigners) in receiving SMS and MMS. This income is obtained by the operators of the network in the country from the visiting subscribers.
Inbound roaming in data traffic (TB)	Income for the traffic generated by the visiting subscribers (foreigners) in accessing the Internet. This income is obtained by the operators of the network in the country of the visiting subscribers.
Outbound roaming in data traffic (TB)	Income generated by the subscribers to mobile telephony in accessing the Internet when they are out of the zone of service of the network from their country.

Continuation...

Continuation...

Indicator	General Definition
Wholesale income for the mobile telephony service	Wholesale income associated to the provision of the mobile telephone service. This refers specifically to the income from the charges of termination of calls in own network. This indicator is estimated based on the sum of the income received from the incoming traffic in own mobile networks.

Source: SUTEL, General Market Division

Table 6

Indicators of the paid television service, 2016

Indicador	Definición general
Total number of subscriptions to multi-channel television via Cable TV services	Number of subscriptions to multi-channel television, transmitted via ground means through hybrid fiber optic and coaxial wire (HFC) networks. These networks allow for the provision of other telecommunications services.
Total number of subscriptions to multi-channel television via direct household antennas (DTH)	Number of subscriptions to multi-channel television that correspond to television signals received from a communications satellite and that are transmitted from the operator to the receiving device of the final user.
Total number of subscriptions to multi-channel television via IPTV	Number of subscriptions to multi-channel television through broadband connections over the IP protocol.
Total number of subscriptions to multi-channel television through Microwave Multipoint Distribution Service (MMDS).	Number of subscriptions to multi-channel television using the Microwave Multipoint Distribution Service which transmits signals wirelessly to the final user. This service allows for the provision of other telecommunications services.
Income for paid television service (income for subscriptions, connection, basic plan and value added)	Total income billed for the paid television service, without deductions (taxes, returns, discounts, bonuses, offers, cancelled sales, and other), obtained in the country by the paid TV service providers.

Source: SUTEL, General Market Division

1

General EVOLUTION of the Sector

By 2016, the telecommunications sector presents less growth and more internal revitalization through the diversified commercialization of its services and the use of the Mobile Network, since this latter generates 70% of the total income of the sector.

General Evolution of the Sector

This chapter refers to the crosscutting elements of the sector, particularly its performance in the period 2012-2016, without undermining the retrospective analysis in terms of the behavior of subscriptions, income, investments, human resources and other relevant issues in the sector.

These general results will be approached in more detail in the sections related to each service.

Composition of the supply available

Regarding the number of operators and suppliers of telecommunications services, by the end of 2016 there were 136 operators and suppliers authorized by SUTEL. This number presents a reduction in the number of network operators available, as well as in service suppliers, particularly during the last year, when it decreased by 3%.

In this sense, it is important to mention that, for the elaboration of the current report, only those enterprises that were commercializing telecommunications services with a title that authorizes them as service suppliers were considered, and there were 7 operators under concession for the exploitation of spectrum.

Table 7 shows the total number of authorized operators and the percentage of those operators that sent information, uploaded the information into the Telecommunications Indicator System and adequately fulfilled the observations made by SUTEL in time and format.

It is important to clarify that not all the authorized operators and suppliers were commercializing authorized services in each of the periods of the analysis. This means that some of them are in a pre-operational stage. Thus, the number of authorized operators or suppliers is not directly related to the number of entities that offer the services monitored for the generation of this statistical analysis. Additionally, each supplier and operator can provide more than one service and can have or not have all the authorized services under an active commercialization status.

In this respect, it is relevant to mention that for the analysis of the period 2015-2016, we considered 83% of all the operators and suppliers that are commercializing the services (authorized, in concession or both). These operators considered for the analysis concentrate over 98% of the total subscription and income generated in each of the services analyzed. Table 8 shows the percentage represented by the operators included in the generation of results, according to the service provided.

The authorized services that were not contemplated in this report, per the service grouping proposed by SUTEL since 2013, were: geo-location, video-conference and trunking. This is

because those services require a concession of frequencies of the radio-electrical spectrum for private commercial use; therefore, the telecommunications network used to provide those services is private and, as resolved by SUTEL, they are not empowered to interconnect with public telecommunications networks. Therefore, the services provided are not deemed publicly available communication services, and they are not subject to the other legal provisions.

Subscriptions in the Sector

This section considers the dynamic of the sector, particularly regarding subscriptions and the penetration registered in the different services per closing figures in 2016. However, the main indicators related to this topic can be seen in table 9, and further detail regarding the behavior of the previous years is presented in the sections that correspond to each service.

- **Fixed telephony**

  The fixed telephony service (traditional basic and VoIP) showed a reduction in the number of subscribers in 2016. The 1.031.719 customers the service had in late 2011 decreased to 849.826 by the end of 2016, which is translated into a 17% reduction in that period. Likewise, in terms of penetration, it went from 22% to 16% subscriptions for every 100 inhabitants for that same period. The main reason for this behavior is the reduction of subscriptions in the service of traditional basic telephony.

- **Mobile telephony and access to mobile Internet**

  By 2016, the total number of mobile subscriptions reached 8.330.664, which implies a penetration of the service of 170 subscriptions for every 100 inhabitants. Regarding the behavior of subscriptions per payment modality, pre-paid services present a considerable growth in mobile telephony, with 6.468.693 subscriptions in 2016. Additionally, the post-paid modality increased to 1.961.971, which means an 18% increase for the last year.

  Regarding the service for mobile Internet access, from 2012 to 2016 there has been an important increase going from 2.670.708 subscribers in 2012 to 5.248.233 subscribers at the end of 2016. This represents a 97% growth for the period, which implies a penetration of 107% in the last year.

- **Internet access (except mobile Internet)**

  The service for fixed Internet access reached, at the end of 2016, 636.87 subscriptions, out of which 625.466 correspond to wired service and 10.621 to wireless service.

  Additionally, while in the last year the total of fixed connections to Internet increased by 14% and the wired modality grew by 15%, the wireless subscriptions decreased by 17%, moving from 12.843 to 10.621.

- **Dedicated lines**

  The number of connections in this service reached a total of 16.032 at the end of 2016. The behavior of this item has been fluctuating throughout the period. However, for the total period, a variation of 34% is estimated. With respect to 2015, the variation was 13%, which represents a significant recovery when compared to the period 2014-2015, where there was a reduction of -22%.

Income generated by the sector

This section focuses on the analysis of the evolution of total income generated by the telecommunications sector. However, it is relevant to consider that this analysis only contemplates the services of fixed telephony, mobile telephony and data transfer, with the exclusion of the paid television service which, in itself, is not considered a telecommunications service, because it shares a telecommunications network but with a different purpose. As provided in item 123 of Agreement 022-089-2011, "Review of the valid rate list", SUTEL regulates only the transportation of information regarding paid television service, but not the service as such.

The total income generated by the telecommunications sector in 2016 reached the sum of 774.858 million colones, 3% more than the figure registered in 2015 (752.164 million colones) and 54% more than the figure from 2012 (501.648 million colones). This evidences that this line is continuously increasing. However, for this past year, the growth is less accelerated (see Chart 1).

Likewise, the ration between total income and Gross Domestic Product (GDP) in percentage terms was 3.0% for 2016. That value is consistent with the growth in the total income in absolute terms in this sector and with the trend throughout the period 2012-2015. According to this information, it is important to mention that the estimation of this ratio includes, as denominator, the value of the Gross Domestic Product at current market prices for the year of reference. The reason for using this is that both the income and the investment made by the operators and/or suppliers include the tax charges incurred during such period. Thus, given the definitions provided by SUTEL for each of the indicators, as well as the recommendation from the Banco Central de Costa Rica, in order to offer more reliable and accurate input regarding the GDP values to consider, these shall use the current market prices (see Chart 2).

Regarding the composition of the total income for 2016, the mobile telephony service is still the main source of income for the sector, despite its trend downwards since 2014. When considering only voice, mobile telephony in 2016 presented, for the second consecutive year, a reduction of three percent in the share of the total income, reaching 45% for that year. A similar situation occurs with the fixed telephony service that continues decreasing in absolute terms, but its percentage contribution to the rest of the services remained in 5% for the last year. In addition, the Internet access service as a whole (fixed and mobile) got

[1] Gross Domestic Product per industry at current market prices

to 39% in 2016. In this case, this is the service with the greatest increase in terms of share of total income for 2016, which confirms the trend shown since 2012 and closes the gap regarding mobile telephony service that, for 2016, remains in 6% compared to 32% in 2012. On the contrary, the dedicated lines service maintains its percentage share for the last year (see Chart 4).

- **Fixed Telephony**

  The fixed telephony service, including traditional basic telephony and VoIP for 2016 reverses its descending trend in income and presented a 1% increase going from 86.357 million colones in 2015 to 87.501 million colones in 2016, mainly due to the increase in the number of VoIP subscriptions, and in traffic and income, a behavior that will be analyzed in further detail in the section related to the fixed telephony service.

- **Mobile Telephony and access to Mobile Internet**

  The total income associated to the mobile telephone service of voice and messaging (SMS and MMS) in 2016 reached 34.713 million colones, 3% less than in 2015 (358.377). This situation is evidenced despite of an 11% increase in the number of total subscriptions to this service going from 7.535.599 in 2015 to 8.330.664 in 2016. However, despite this reduction, the service maintains its condition of the service that makes the greatest contribution to the income generated in the telecommunications market (see Chart 4).

  Additionally, when considering the income related to mobile networks– that is, voice and data – it is relevant to highlight that the income generated from the mobile network continue increasing and, by 2016, it reached the highest figure for the period 2012-2016. In this sense, and given the provisions of the paragraph above, the growth in the use of data offset the drop in the use of mobile networks for voice services.

  However, the growth registered in income from mobile networks for last year was 3%, going from 528.751 million colones in 2015 to 542.216 million colones in 2016, a behavior that contrasts with the increase presented in the periods 2012-2013 and 2013-2014, which were 23% and 27%, respectively.

  Finally, when comparing the share of mobile network with respect to the rest of the services, in 2016 they represented 70% of the total for the sector (see Chart 5).

  In this sense, regarding the distribution percentage of these two components, for 2016, voice income represented 64% (347.713 million colones) and the income for mobile Internet access represented 36% (194.503 million colones); this composition has been modified since 2012 in favor of mobile Internet access, with outstanding growth of the income generated from this modality of service because from 2014 to 2016, the average annual growth rate was 28%, and the average annual growth rate for voice services was 7% for that same period. (see Chart 3).

- **Internet access (except for mobile Internet)**

  The total income associated to the service of fixed wired and wireless Internet access reached, in 2016, the amount of 110.707 million colones, which implies a 10% growth with respect to 2015. This increase is mainly determined by the evolution of the income in the fixed wired Internet access service which, again increased for the second year in a row by 11%, going from 96.468 million colones in 2015 to 106.787 million colones in 2016. Additionally, the fixed wireless Internet access service continues decreasing going from 4.381 million colones to 3.920 million colones in 2015 and 2016, respectively (-11%).

- **Dedicated lines**

  The income associated to the dedicated lines service presents a decrease for the third straight year. In 2013-2014, 2014-2015 and 2015-2016, the income decreased in -1%, -11% and -5%, respectively; and in the last year, the income was 34.433 million colones, 1.769 million colones less than in 2015.

Total Investment

Regarding the total investment made by the operators and suppliers in the provision of the telecommunications services during the period 2012-2016, and in terms of a percentage of the Gross Domestic Product at current market prices (GDP), the amount has remained in figures close to 1% (see Chart 6).

Based on such ratio, and in consistent terms, it is important to mention that the denominator corresponds to the value of the Gross Domestic Product at current market prices for the year of reference, because the investment made by the operators and/or suppliers include the taxes incurred throughout such period. Regarding the estimation of this ratio, as mentioned before, the period with the greatest increase was 2010-2011, mainly because of the incorporation of new operators and/or suppliers, and the fact that most of them had to make an important investment for the deployment of their networks and infrastructure in telecommunications to provide the services.

However, during the years after 2012, this ratio has presented a slight decreasing trend, but with values of around 1% of the GDP. Nonetheless, it is important to mention that in absolute terms, the investment in 2015 grew 4% with respect to 2014 (7.079 million colones). However, by 2016, the investment indicator presented an absolute reduction of 52.905 million colones with respect to 2015. This is justified mainly because this line measures new investments executed in each period, not the value of the investment accrued by operator and supplier; therefore, there is evidence that actually the most relevant operators in terms of market share and income in the sector have reduced their investments for the provision of the different telecommunications services in the last year (see Chart 6).

Human Resources Employed

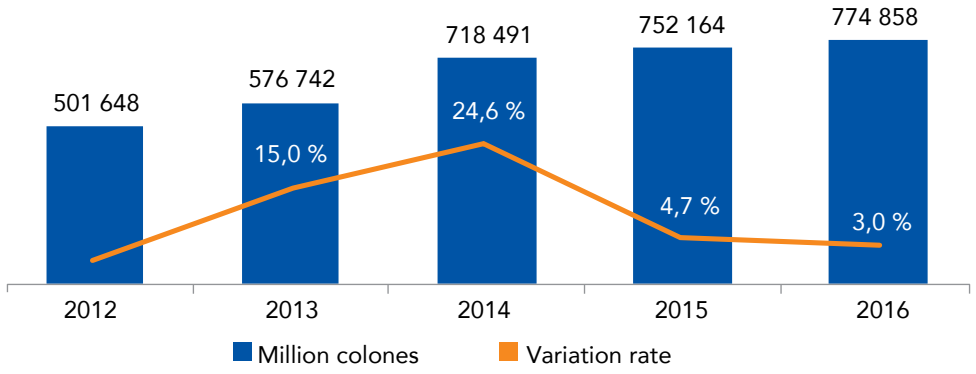
The human resources directly employed in the telecommunications sector remains in constant growth, going from 11.426 in 2015 to 11.885 employees by 2016, a 4% increase in this last year. However, despite of presenting an increase, it is moving at a slower pace than in previous years (see Chart 7).

Regarding the ratio of human resources employed in the sector as a percentage of the economically active population and the total population of Costa Rica, by 2016 the first ratio increased to 0.54%, representing the greatest increase since 2012, as shown in Chart 9. In addition, the ratio of the personnel employed for the provision of telecommunications services and the total population of Costa Rica remains in 0.24% in 2016, as it has been the case since 2011 (see Chart 8).

Likewise, the female population employed in the sector continues growing (2%) by 2016. In this context, as mentioned in previous reports, the sector is getting into a mature stage reflecting crosscutting indicators that have grown by 2016, but at a lower rate than reported in previous years (see Chart 10).

Chart 1

Costa Rica: Total income of the telecommunications sector 2012-2016
(Annual rates in million colones and variation percentage)



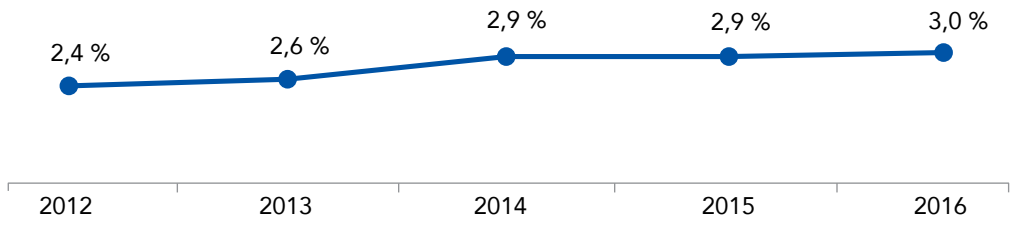
Source: SUTEL, Market Management Division.

Chart 2

Costa Rica: Total income of the telecommunications sector as a proportion of the GDP[1], 2012-2016
(Annual rates is percentages)

The ratio of total income from the sector and the GDP reached

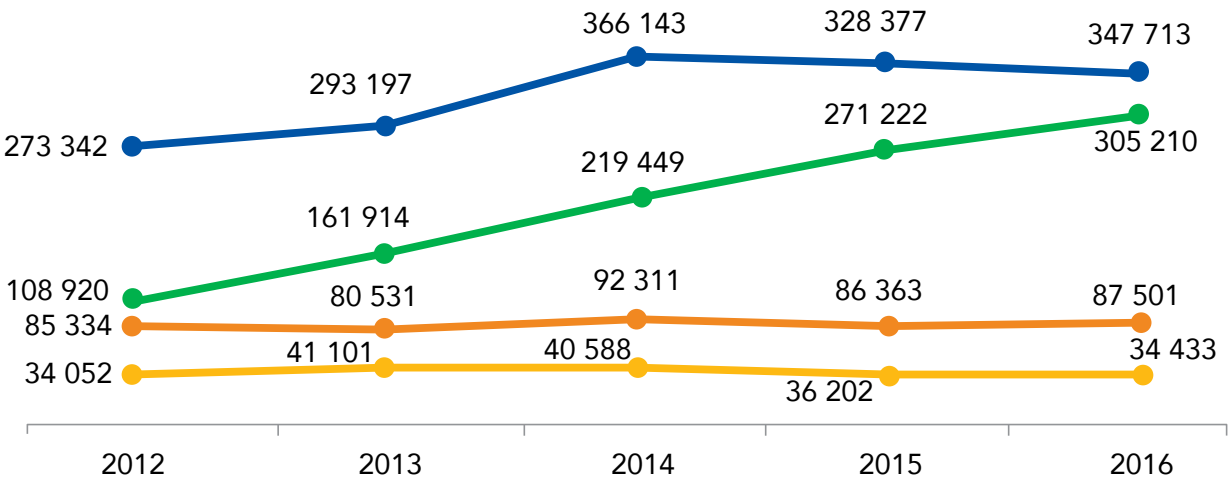
3 %



Nota:[1]/Gross Domestic Product at current market prices.
Source: SUTEL, Market Management Division.

Chart 3

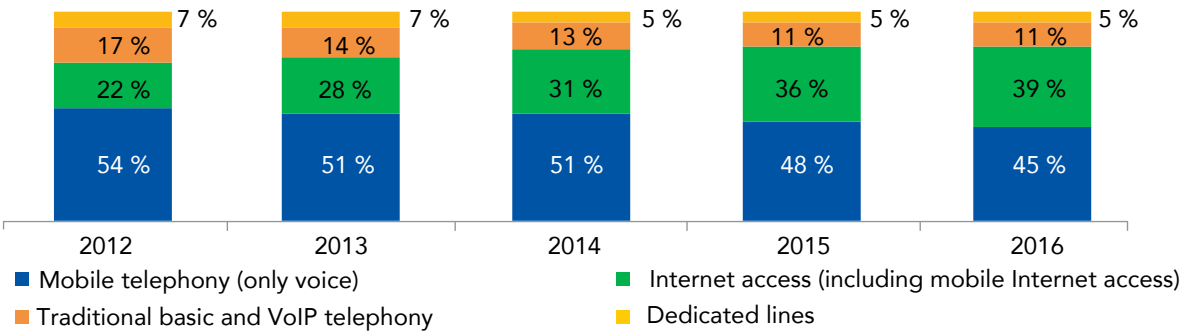
Costa Rica: Total Income of the telecommunications sector according to the service, 2012- 2016
(Annual rates in million colones)



Source: SUTEL, Market Management Division.

Chart 4

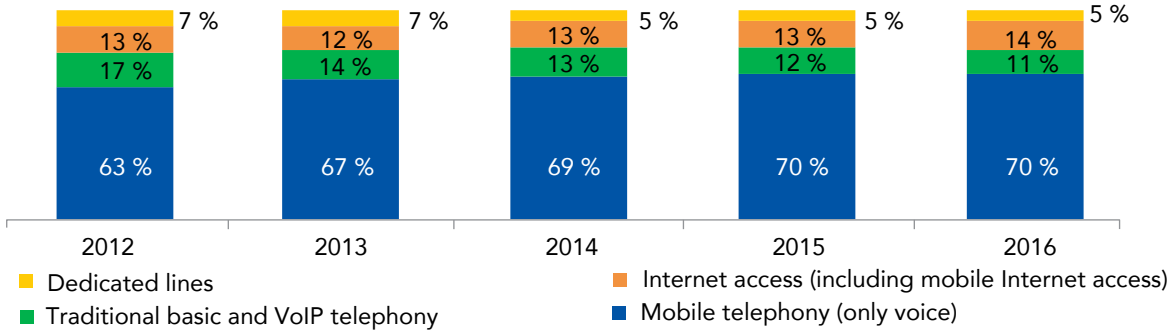
Costa Rica: Total income of the telecommunications sector according to the service, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

Chart 5

Costa Rica: Total income of the telecommunications[1] sector according to service, 2012-2016
(Annual figures in percentages)



Note: [1]/The income for mobile telephony also includes the income generated by the mobile Internet access service

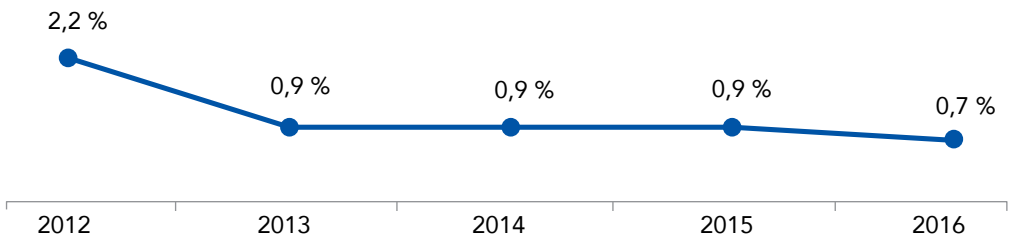
The mobile network concentrates

70 %

of the total income generated in 2016

Chart 6

Costa Rica: Total investment of the telecommunications sector as a proportion of the GDP[1], 2012-2016
(Annual figures in percentages)



Note: [1]/Gross Domestic Product at current market prices.
Source: SUTEL, Market Management Division.

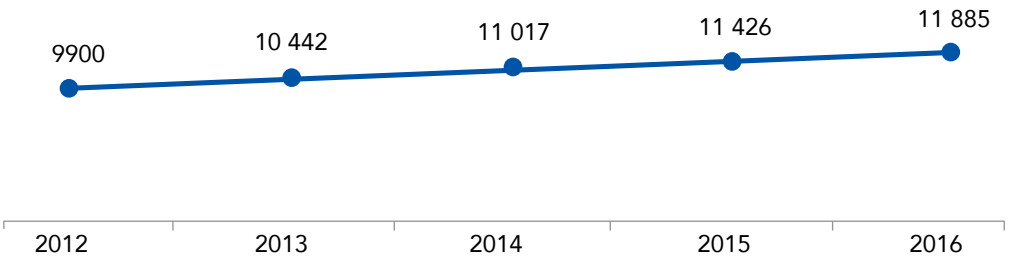
In 2016, there were

459

new jobs in the sector

Chart 7

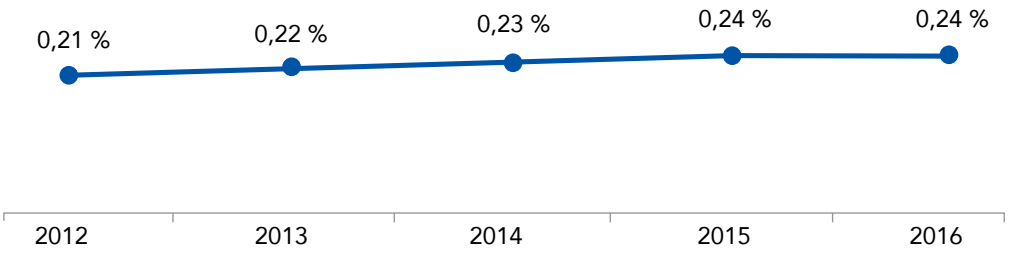
Costa Rica: Labor force in the telecommunications sector 2012-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 8

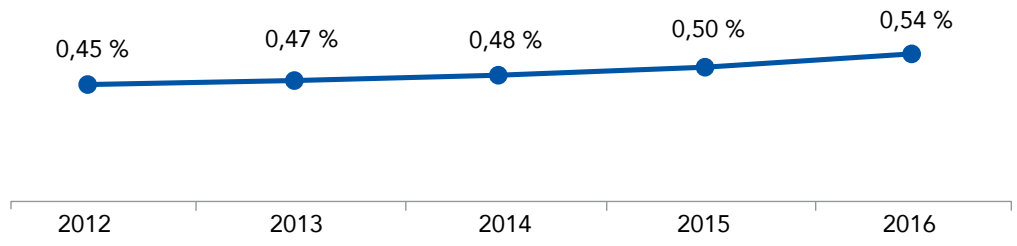
Costa Rica: Percentage of labor force in the telecommunications sector with respect to the total population 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division and INEC.

Chart 9

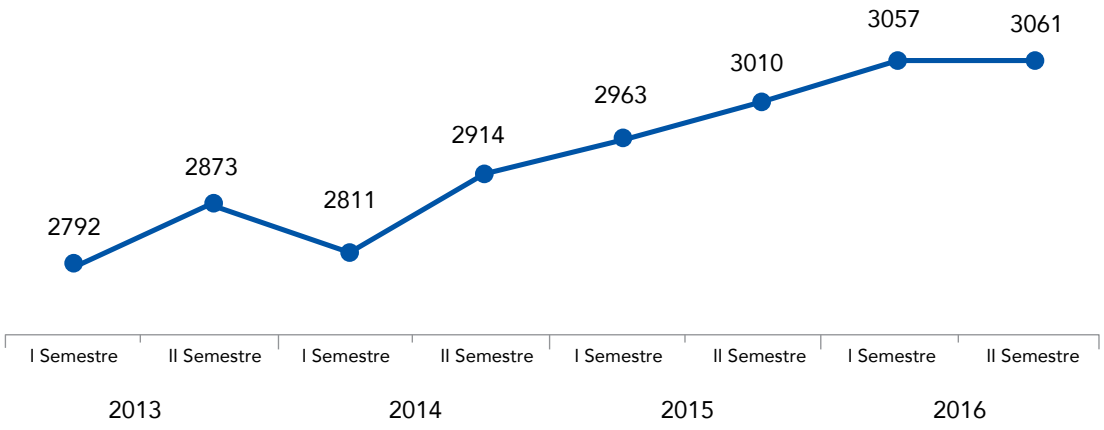
Costa Rica: Percentage of the labor force in the telecommunications sector with respect to the economically active population 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division and INEC.

Chart 10

Costa Rica: Female labor force in the telecommunications sector, 2013-2016
(Figures per semester)



Source: SUTEL, Market Management Division.

In 2016, there was a

2 %

increase in the number of women employed in the sector.

Table 7

Costa Rica: Number of telecommunications services operators and suppliers, 2012-2016

	2012	2013	2014	2015	2016
Total authorized enterprises	118	117	122	139	135
Response rate to indicators	89 %	84 %	84 %	88 %	83 %

Source: SUTEL, Market Management Division.

Table 8

Costa Rica: Percentage distribution of enterprises according to the service included in the report of sector indicators 2012-2016

	2012	2013	2014	2015	2016
Fixed telephony	100 %	92 %	94 %	94 %	94 %
Mobile telephony	100 %	100 %	100 %	100 %	100 %
Data transfer	98 %	97 %	98 %	97 %	97 %
Paid television	100 %	100 %	100 %	100 %	100 %

Source: SUTEL, Market Management Division.

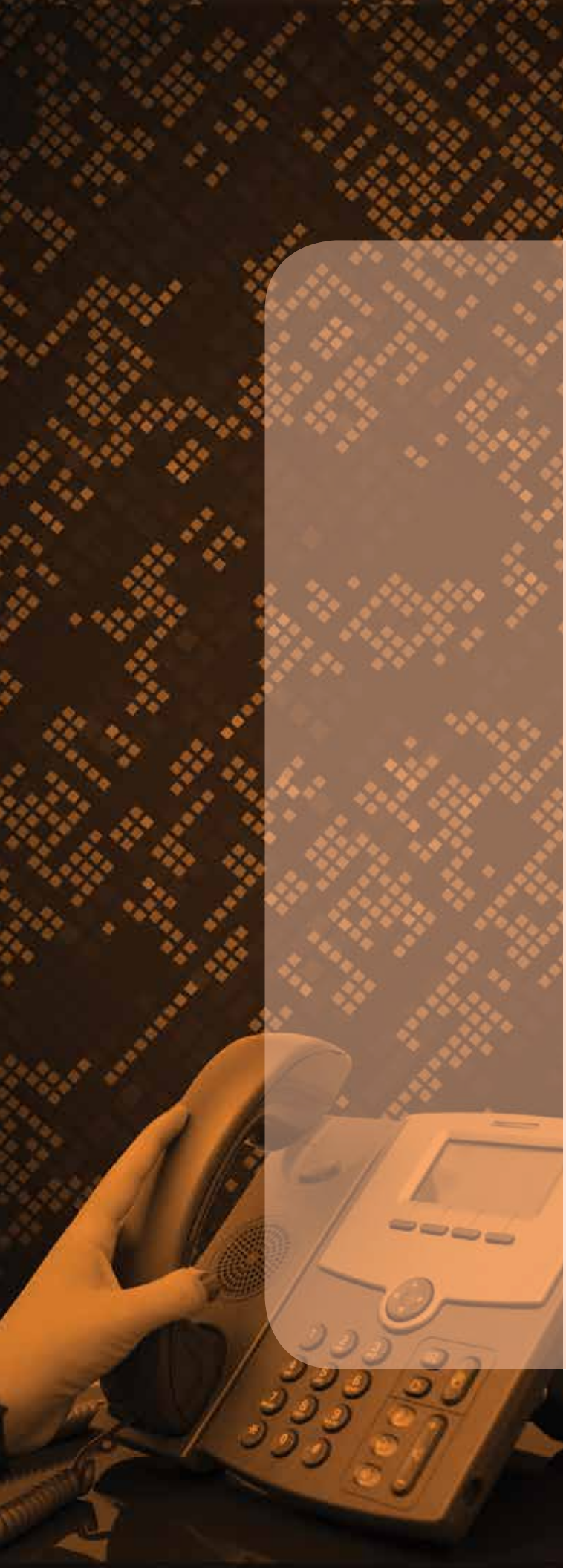
Table 9

Costa Rica: Summary of performance indicators for the Costa Rican telecommunications sector

Indicator	2011	2012	2013	2014	2015	2016
Aggregated sector data						
Total income (million colones)[1/]	437 672	501 648	576 742	718 491	752 164	774 850
Total income/GDP (percentage)	2,31 %	2,42 %	2,57 %	2,95 %	2,93 %	3,02 %
Total investment/GDP (percentage)	1,91 %	2,19 %	0,91 %	0,93 %	0,90 %	0,67 %
Total human resources employed	9618	9900	10 442	11 017	11 426	11 885
Total human resources employed/Total economically active population	0,45 %	0,45 %	0,47 %	0,48 %	0,50 %	0,54 %
Fixed telephony						
Total subscriptions	1 031 719	995 089	968 459	881 217	859 857	849 826
Total subscriptions/100 inhabitants	22 %	21 %	21 %	18 %	18 %	17 %
Total subscriptions/100 households	80 %	75 %	72 %	63 %	60 %	58 %
Total subscriptions of traditional basic fixed telephony	1 027 847	976 824	936 035	839 968	804 468	779 972
Total subscriptions of traditional basic fixed telephony/100 inhabitants	22 %	21 %	20 %	18 %	17 %	16 %
Total subscriptions of traditional basic fixed telephony/100 households	79 %	74 %	69 %	60 %	56 %	53 %
Total subscriptions of VoIP	3872	18 265	32 424	41 249	55 389	69 854
Total number of public telephones	18 960	16 348	13 145	8188	5726	4731
Mobile telephony						
Total subscriptions	4 135 185	5 348 881	7 059 471	7 020 412	7 535 599	8 330 664
Pre-paid subscriptions	2 872 496	4 211 766	5 831 878	5 598 911	5 951 337	6 468 693
Post-paid subscriptions	1 262 689	1 137 115	1 227 593	1 421 501	1 584 262	1 861 971
Total subscriptions/100 inhabitants	90 %	115 %	150 %	147 %	156 %	170 %
Pre-paid subscriptions/Total subscriptions	69 %	79 %	83 %	80 %	79 %	78 %
Post-paid subscriptions/Total subscriptions	31 %	21 %	17 %	20 %	21 %	22 %
Data transfer						
Total subscriptions to Internet access	2 008 763	3 118 155	4 028 302	4 806 217	5 420 554	5 884 320
Total subscriptions to fixed Internet access	419 782	447 947	484 883	515 840	558 656	636 087
Total subscriptions to fixed – wired Internet access	414 384	439 043	474 433	503 347	545 813	625 466
Total subscriptions to fixed – wireless Internet access	5398	8904	10 450	12 493	12 843	10 621
Total subscriptions to mobile Internet access	1 588 981	2 670 208	3 543 419	4 290 377	4 861 898	5 248 233
Total subscriptions to fixed Internet access/100 inhabitants	9 %	10 %	10 %	11 %	12 %	13 %
Total subscriptions to fixed Internet access/100 households	32 %	34 %	36 %	37 %	39 %	43 %

Indicator	2011	2012	2013	2014	2015	2016
Total subscriptions to mobile Internet access/100 inhabitants	35 %	57 %	75 %	90 %	101 %	107 %
Total subscriptions to mobile Internet access/ Total subscriptions to mobile telephony	38 %	50 %	50 %	61 %	65 %	63 %
Total number of dedicated lines connections	10 273	11 993	16 375	16 286	14 093	16 032
Paid television						
Total subscriptions	498 137	540 693	641 042	732 546	797 230	821 575
Total subscriptions/100 inhabitants	11 %	12 %	14 %	15 %	16 %	17 %
Total subscriptions/100 households	38 %	41 %	48 %	52 %	56 %	56 %
Reference indicators						
Total population	4 592 149	4 652 459	4 713 168	4 773 130	4 832 234	4 890 379
Gross Domestic Product at current market prices (million current colones)	20 852 225	22 781 773	24 606 875	26 675 006	28 098 969	30 048 726
Total households	1 297 522	1 326 805	1 348 036	1 399 271	1 436 120	1 465 259

Notes:
[1]/These figures do not include the income associated to the paid television service
Source: SUTEL, Market Management Division, INEC and BCCR.



2

Fixed Telephony

In virtue of the availability of other telecommunications service, associated to the new technologies, Costa Ricans are using less fixed telephony services, particularly traditional basic telephony.

Notwithstanding the number of users in the fixed VoIP service and the corresponding telephone traffic, these items have not stopped growing during the last four years.

Fixed Telephony

Subscribers

As it has been the case in previous years, the fixed telephony service (traditional basic and VoIP) presented, in 2016, a reduction in the number of subscribers. The 995.089 customers the service had in late 2012 decreased to 849.826 by the end of 2016, as presented in Table 44 of the statistical Annex. However, although this last year presented a reduction (10.031 subscribers, equivalent to 1.2%), this contraction is less than the average contraction of the previous three years (45.077 subscribers; that is, 4.8% per year).

Considering that fixed telephony includes both the traditional basic telephony service and the service of voice over Internet protocol (VoIP), such chart evidences the difference in the behavior of the number of subscribers associated to each technology. In fact, while traditional basic telephony shows a reduction in subscribers (the number of subscribers decreased from 976.824 in 2012 to 779.972 in 2016), in the VoIP service the number of customers increased during that same period from 18.265 to 69.854 clients (-20% vs. 282%, respectively). In 2016, while the VoIP service increased in number of subscribers with 14.465 new clients, traditional basic telephony decreased in 24.496 clients (26% of increase vs. a reduction of 3%). See chart 11.

If, for comparative purposes we consider the number of subscribers registered every quarter in the fixed telephony service, during 2015 and 2016 in general, the reduction in the total number of subscribers to such service has been persistent during the eight quarters analyzed. Since the reduction of customers is associated to the traditional basic telephony, different from the behavior shown by fixed telephony as a whole, regarding specifically to the VoIP service, the figures show that, except for the second quarter in 2015, there is a continuous growth in the number of subscribers during this last two years which is equivalent in average to 6.8% per quarter. The corresponding data are included in Table 45 of the Statistical Annex.

As a result of this imbalanced behavior in the number of subscribers per service, the participation percentages in both services, among the total number of customers, have varied, which, in the annual perspective can be seen both in Table 46 of the Statistical Annex and in chart 12. It is important to mention that by the end of 2016, the number of subscribers to VoIP represents 8% of the total subscribers of fixed telephony, which contrasts with the information from 2012, when it was less than 2%. It is also important to mention that in one year, this service increased its share in 1.8%.

When analyzing the quarterly figures of the last two years, it shows that while in the first quarter of 2015 basic telephony had 94.5% of the fixed telephony and VoIP had the remaining 5.5%, in the fourth quarter of 2016, such percentages had varied to 91.8% and 8.2%, respectively. Such variations are evidenced in Table 47 of the Statistical Annex and in Chart 13.

The penetration of the traditional basic telephony in the country, in turn, measured as a percentage of the total users with regards to the total population of the country, shows a descending trend, going from 21.0% in 2012 to 15.9% in 2016. This means that the service went from 210 traditional basic lines for every thousand inhabitants, to 159 lines for every thousand inhabitants. The corresponding figures can be seen in Table 48 of the Statistical Annex and in chart 14. Regarding the penetration of the voice over Internet protocol (VoIP) service, it reached, in 2016, 14.3 lines for every thousand inhabitants. The details of the corresponding evolution are presented in table 49 of the Statistical Annex and in Chart 15.

In terms of the evolution of distribution per operator among the subscribers to the VoIP service subscribers, Charts 16 and 17 show that although Tigo is still the operator with the largest number of subscribers (36.0% in 2015 and 29.4% in 2016), the share reached by Cabletica (28.7% in 2016) and Telefónica (which moved from 17.4% in 2015 to 23.5% in 2016) is also notorious. Telecable moved from 12.6% to 12.4%.

Since the public telephony service should be considered also within fixed telephony services, it is relevant to analyze the number of public payphones available and their evolution through time. The corresponding information indicates that there is a descending trend in the number of such terminals, going from 16.348 in late 2012 to 4.731 in 2016 in all the national territory. The reduction, which was dramatic in 2013 and 2014, implies that the number of public payphones available in 2016 represent only 28.9% of the telephones that were available in 2012. It can be assumed that such reduction in the number of public telephones is related to the decrease in demand for such service, since there are other options available, particularly mobile telephony. The corresponding evolution can be seen in Table 50 of the Statistical Annex and in Chart 18.

Income

Contrary to the descending trend in the data related to telephone subscribers and traffic, which is further analyzed later, the income derived from the provision of fixed telephony as a whole, have evolved in a variable way during the period under study (2012-2016). While in 2012 fixed telephony generated 85.334 million colones, in 2013 the income for this item decreased to 80.531 million colones; that is, a reduction of 2.8%. In 2014, there was an increase (14.6%) due to the adjustment of rates approved by SUTEL through resolution RCS-268-2013 from September 18th, 2013, applied by the main fixed telephony service supplier (Instituto Costarricense de Electricidad) in late 2013. Thus, in 2014, the corresponding income reached a total of 92.311 million colones. Despite that increase, in 2015 there was another decrease of 6.4% compared to 2014. By 2016, such income (87.501 million colones) exceeded

by 1.3% the income from the previous year. The details of the corresponding amounts and the descending behavior mentioned can be seen in Table 51 of the Statistical Annex and in Chart 19.

Just as it was the case with the number of subscribers and telephone traffic (analyzed later), in VoIP, contrary to the behavior shown by the income of fixed telephony in general and in traditional basic telephony, the income has increased through time, going from 1.539 million colones in 2012 to 5.435 million colones in 2016. This increase has been sustained during the five years under analysis (2012-2016), the annual average growth reached 37.1%. The details hereby stated can be seen in Table 52 of the Statistical Annex and in Chart 20.

Considering the past two years, the income from fixed telephony show a relative stability that is consistent with the behavior shown by the corresponding annual figures. Most of the income recorded correspond to the first quarter in 2016 (22.445 million colones), and they exceed by 7.1% the lowest quarterly figure reported for those two years (20.959 million colones, corresponding to the third quarter of 2015). In average, fixed telephony generated 21.733 million colones per quarter during 2015 and 2016. This figure, however, exceeds the values recorded in the last two quarters analyzed; and this behavior, evidences a descending trend by the end of 2016. When comparing quarterly average growth rates per year, there are negative values for the two years under analysis: -1.3% in 2015 and -0.4% in 2016. Nevertheless, considering monthly data, the average income in 2015 (7.196 million colones) was lower than the income for the following year: 7.292 million colones. That is because, during the first quarter of 2016, the corresponding growth rate was 4.6%. The details can be seen in Table 53 of the Statistical Annex and in Chart 21.

Regarding the VoIP service, the income from the eight quarters in 2015 and 2016 show a different behavior from that of fixed telephony. In fact, during the last two years, the growth experienced by the VoIP service, both regarding the number of subscribers and traffic, has resulted in a sustained increase in the corresponding quarterly income, with the exception of the third quarter in 2015 which shows a decrease in comparison to the previous quarter. The income generated in the fourth quarter of 2016 (1.400 million colones) exceeds in 15.0% the amount registered for the first quarter of 2015 (1.218 million colones), which represents an average incremental quarterly increase of 2.2%. While in the first quarter of 2015 the average monthly income was 406 million colones, the fourth quarter of 2016 the average monthly income reached 467 million colones. Despite these results, there is a reduction in the average quarterly growth rate, from 2.7% in 2015 to 1.8% in 2016. The corresponding details are included in Table 54 of the Statistical Annex and in Chart 22.

The information available, on income and number of subscribers, allows for the calculation of the average revenue per user (ARPU) generated by such operators. Obviously, the average income per subscriber mentioned before can be calculated for all the services included in fixed telephony, and for each of the different modalities of connection in the service; that is, traditional basic telephony and VoIP.

When considering both fixed telephony in general and traditional basic telephony, the corresponding calculations show an average annual revenue per subscriber very similar for the first two years in analysis (2012-2013). The corresponding value varied within a range of 83.000 and 86.000 colones during that period. Because of the rate adjustment mentioned before, such average income increased over 104.000 colones in 2014 (26%), it decreased in the following year and went back up in 2016. The figures for this last year reached 105.217 colones in traditional basic telephony (8.768 colones per month) and 102.963 colones for fixed telephony (8.580 colones per month). The corresponding details can be seen in Table 55 of the Statistical Annex, which also includes the figures for VoIP.

For VoIP, in turn, the average revenue per user has shown a variable behavior, with a significant increase from 2013 to 2014 and reductions in the following two years. Average annual income increased from 77.274 colones in 2013 (6.439 colones per month) to 104.368 colones in 2014 (8.697 colones per month) as a result of the increase in the corresponding rates, already mentioned above, which also applied to this modality. In 2016, the corresponding amount (77.805 colones, equivalent to 6.483 colones per month) was 25.5% lower than the amount registered in 2014. For further detail, see Chart 23.

The data compiled also provide information on the average income per minute both for traditional basic telephony services and for VoIP. The resulting figures, included in Table 56 of the Statistical Annex, evidence a sustained reduction in the average price paid by the users of the VoIP service, which seems to be explained by the fact that, since these are customers with access to Internet service, they have the option of making international calls via Over the Top platforms, which reduced the expenses in this line and, the average expenditure incurred in the fixed telephony service. Additionally, as will be seen later , the increase in the number of customers in the VoIP service is associated, in turn, with less telephone traffic per user, at least in the last two years.

In the case of traditional basic telephony, the average prices show an increase as of 2014, which resulted, as indicated in the paragraphs above, from the rate increase implemented by ICE in late 2013. This behavior can be seen in Chart 24.

Traffic

The reduction in telephone traffic through fixed networks observed through time continued in 2016; thus, while in 2012 there were 4.909 million minutes, the traffic had decreased in this last year to 2.909 million minutes, which is equivalent to an average annual reduction of 12.3%. It should be stated, however, that the reduction experienced in traffic in 2016 (301 million minutes, equivalent to 9.4%) although greater than the decrease in 2015 (7.6%) is less than the reductions in 2013 and 2014 and, to the average reduction mentioned above. The corresponding details can be seen in Table 57 of the Statistical Annex and in Chart 25.

Contrary to the behavior shown by fixed telephony in general, mainly due to what happened with traditional basic telephony, in terms of the VoIP telephony the traffic has been increasing

through time and, the consolidation of the service, as shown in Table 58 of the Statistical Annex which is associated to Chart 26. In this sense, the minutes in traffic through VoIP went from 39.498 thousand minutes in 2012 to 279.027 thousand minutes in 2016. The average annual growth of 84.6% is notorious in the period 2013-2015 compared to the VoIP traffic in 2012. Considering the period under study (2012-2016), such average annual growth is 68.5%.

The evaluation of quarterly information, specifically in the last eight quarters, evidences the decreasing behavior shown by telephone traffic for fixed telephony in general which, except for both fourth quarters (2015 and 2016), it has been decreasing reiteratively in each of the quarters considered since the reduction experienced through time in traffic of the traditional basic telephony network. The corresponding information provides that while in the first quarter of 2015 the traffic of minutes through fixed telephony was 859 million, in the fourth quarter of 2016, such traffic had been reduced to 712 million minutes, a reduction equivalent to an average quarterly reduction of 2.6%. Regarding specifically to the fourth quarter of 2015, the traffic increased in 5.4% compared to the figure from the third quarter of that same year (751 million minutes). If both annual periods are considered separately, in 2015 the average quarterly decrease was -1.3% and in 2016 it was -2.6%. For further details, see Table 59 of the Statistical Annex and Chart 27.

Regarding the VoIP service, the quarterly figures for 2015-2016 show a sustained growth that was only interrupted in the first quarter of 2016, so the telephone traffic went from 50 million minutes recorded in the first quarter of 2015 to 80 million minutes in the fourth quarter of 2016, which means that in average such traffic increased in 6.9% quarterly (Table 60 of the Statistical Annex and Chart 28). For each of the two years involved, the average quarterly growth went from 8.9% in 2015 to 6.1% in 2016..

In VoIP, the information available allows the estimation of the percentage distribution of telephone traffic per operator. In this sense, the distribution for 2015 showed that the three operators with most traffic concentrated 70.9% of the minutes. The data for 2016, in turn, evidenced a reduction in the proportion for those three operators, reaching 63.3%. That does not mean that those operators experienced a reduction of traffic; the total traffic shows a 20.1% increase from 2015 to 2016.

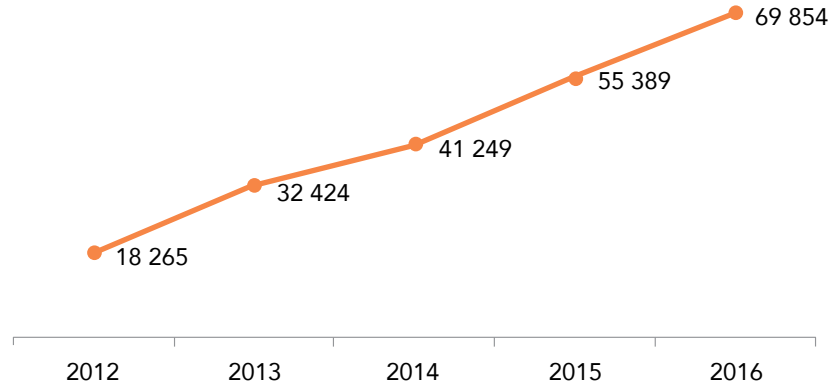
Within that traffic increase, it is evident that other operators have gained share at the expense of those operators with most of the traffic. The distributions are presented in Charts 29 and 30.

Finally, in terms of fixed telephony traffic in general, an important figure that can be calculated is the average traffic per subscriber. The figures indicate that, while in 2012 traditional basic telephony presented an average traffic per subscriber of 4.985 minutes, such average decreased to 3.371 minutes in 2016, and this is equivalent to an average annual reduction of 9.3%. The opposite is seen in VoIP, which average traffic per user increased at least until 2015. By 2016, there was a decrease in comparison to the previous year; therefore, in the

period under analysis (2012-2016), the average annual increase reached 16.6% due to the variation of the values of 2.162 minutes in 2012 to 3.994 minutes in 2016. In this sense, in the last three years of the period under analysis, the average traffic of VoIP telephony exceeded the average traffic of the traditional basic service. Please refer to Chart 31 for further details.

Chart 11

Costa Rica: Subscribers to VoIP Telephony, 2012-2016
(Figures at the end of each year)



Source: SUTEL, Market Management Division.

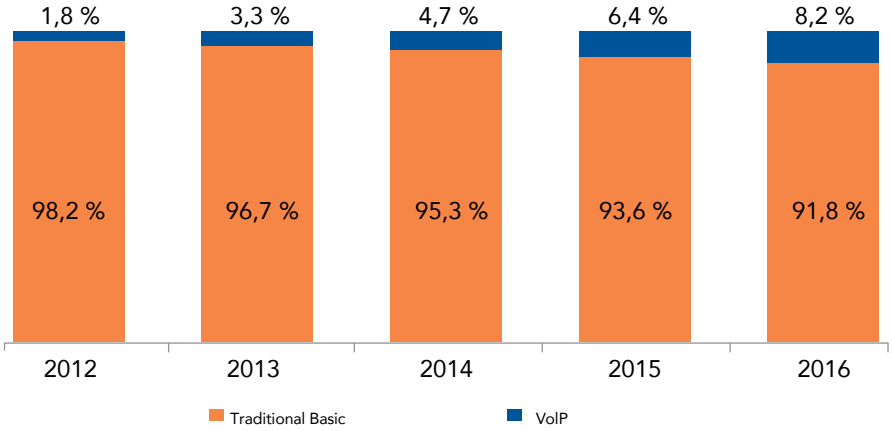
Chart 12

Costa Rica: Percentage distribution of traditional basic telephony and VoIP telephony subscriptions, 2012-2016
(Figures at the closing of each year)

The users of VoIP service currently represent more than

8 %

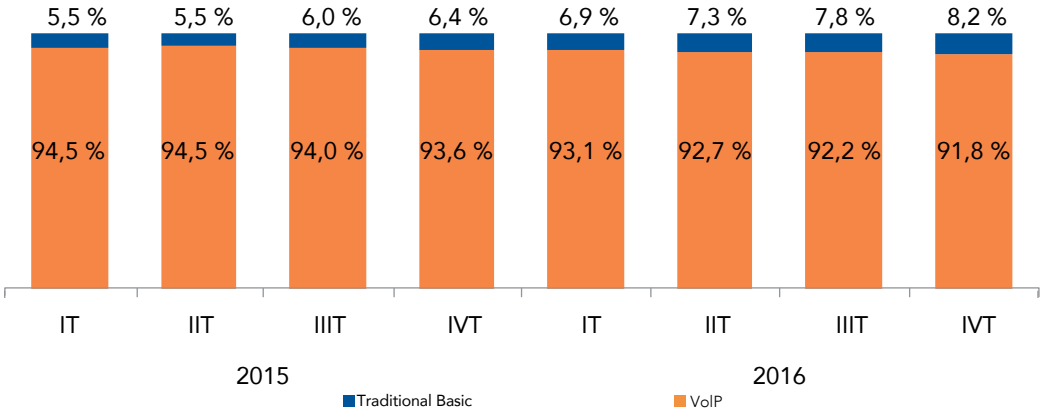
of the total customers of the fixed telephony service.



Source: SUTEL, Market Management Division.

Chart 13

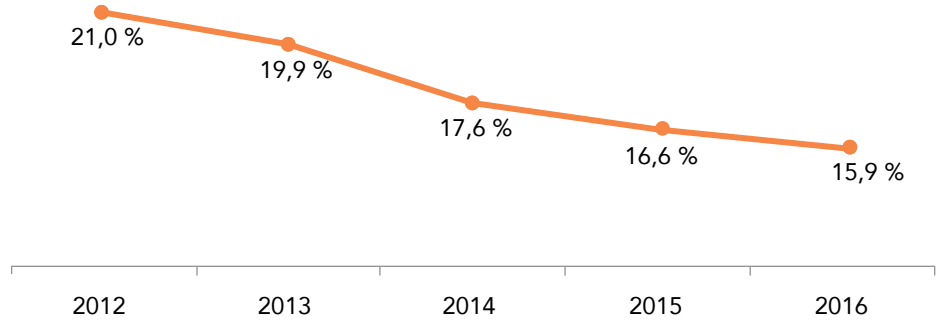
Costa Rica: Percentage distribution of traditional basic telephony and VoIP telephony subscriptions, 2015-2016
(Figures at the closing of each quarter)



Source: SUTEL, Market Management Division.

Chart 14

Costa Rica: Traditional basic telephony penetration, 2012-2016
(Connections regarding the total population and in percentages)



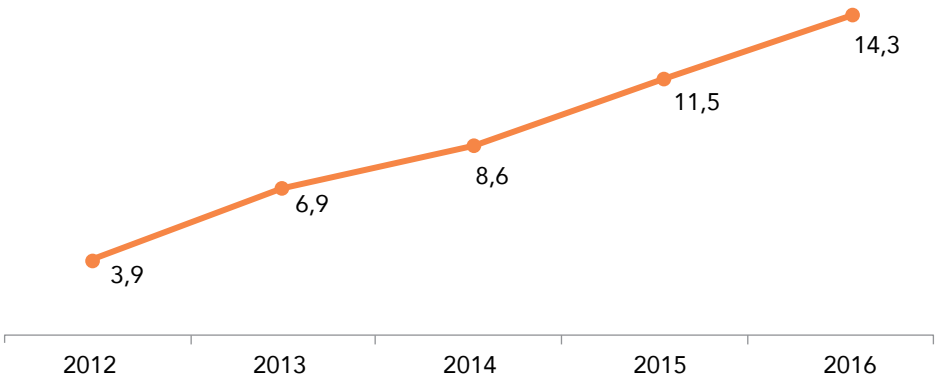
Source: SUTEL, Market Management Division.

The penetration of traditional basic telephony continues with its descending trend, and by the end of 2016, it reached

15,9 %

Chart 15

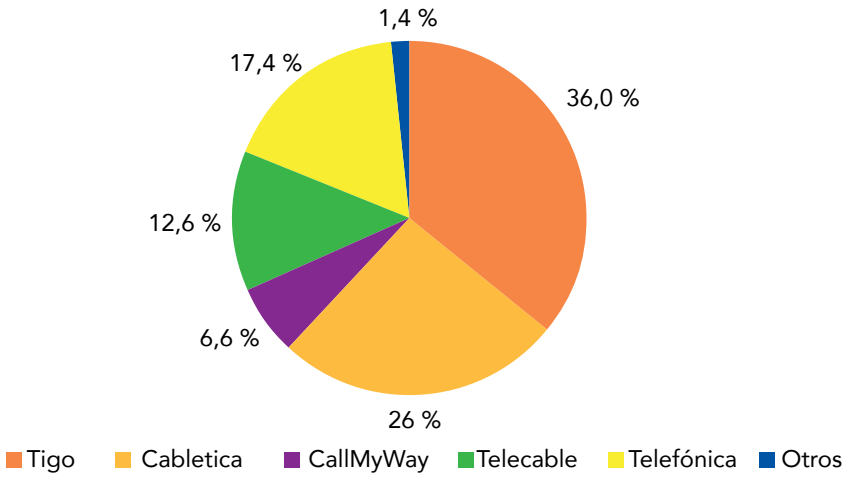
Costa Rica: Penetration of VoIP telephony service, 2012-2016
(Connections for every one thousand inhabitants)



Source: SUTEL, Market Management Division.

Chart 16

Costa Rica: Distribution by operator of VoIP telephony subscribers, December 2015
(Figures in percentages)



Source: SUTEL, Market Management Division.

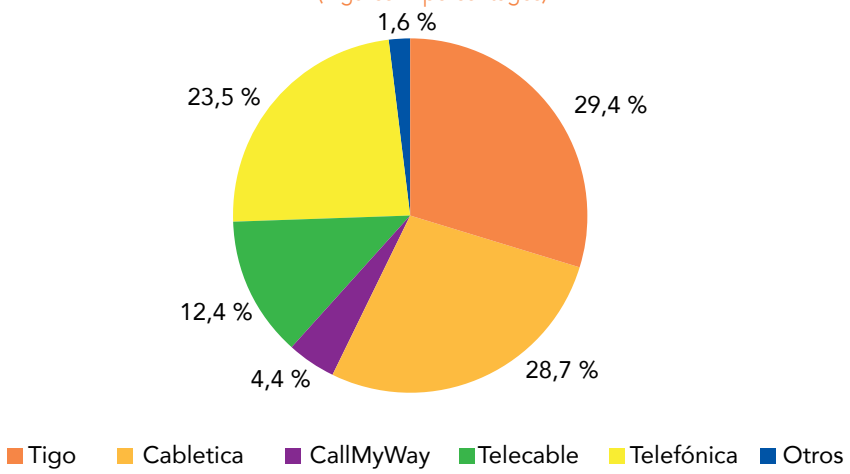
Measured by the number of subscribers, the market for VoIP telephony service is dominated by

4

operators

Chart 17

Costa Rica: Distribution by operator of VoIP telephony subscribers, December 2016
(Figures in percentages)



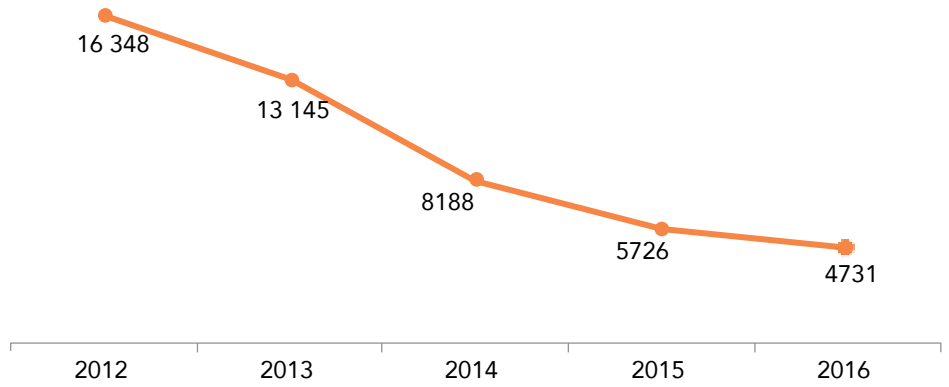
Source: SUTEL, Market Management Division.

Chart 18

Costa Rica: Public terminals of traditional basic telephony, 2012-2016
(Figures by the end of each year)

The availability of public telephones is

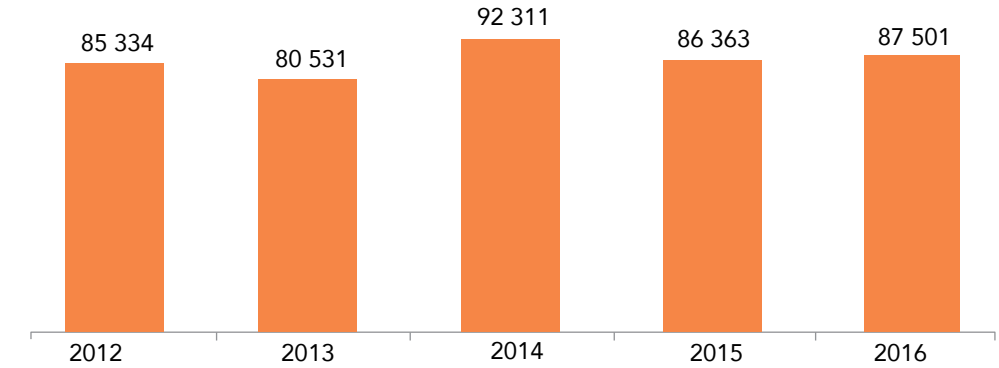
decreasing



Source: SUTEL, Market Management Division.

Chart 19

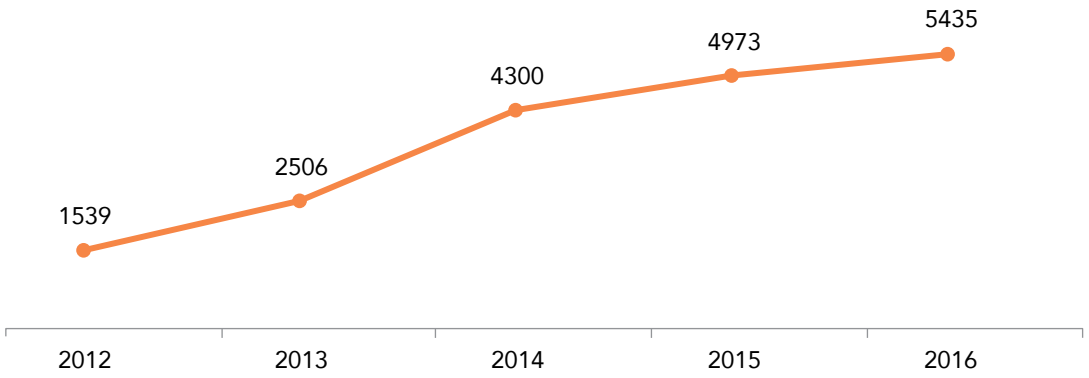
Costa Rica: Fixed telephony income, 2012-2016
(Figures in million colones)



Source: SUTEL, Market Management Division.

Chart 20

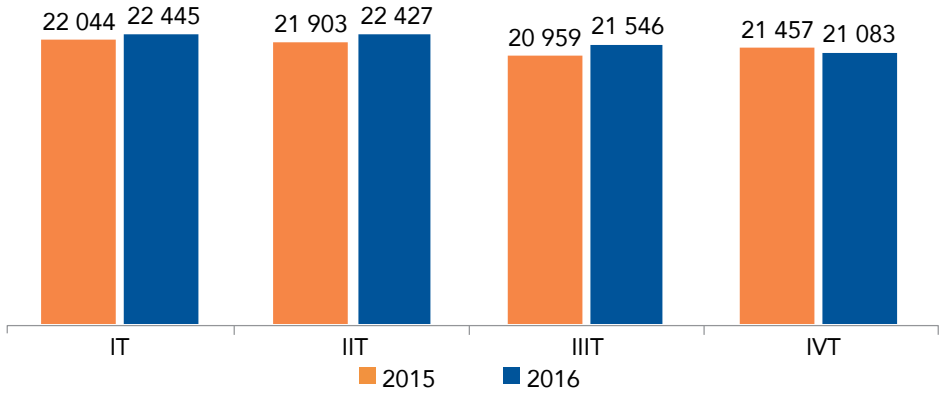
Costa Rica: VoIP telephony income, 2012-2016
(Figures in million colones)



Source: SUTEL, Market Management Division.

Chart 21

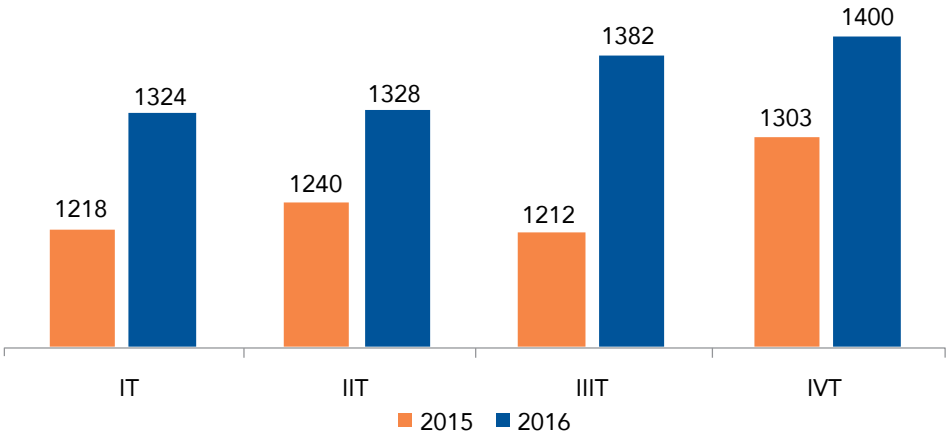
Costa Rica: Fixed telephony income, 2015-2016
(Quarterly figures in million colones)



Source: SUTEL, Market Management Division.

Chart 22

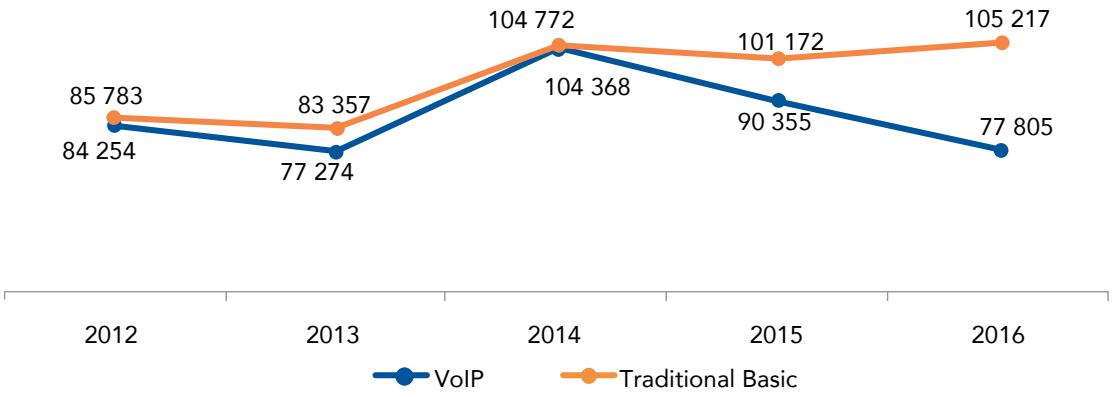
Costa Rica: VoIP telephony income, 2015-2016
(Quarterly figures in million colones)



Source: SUTEL, Market Management Division.

Chart 23

Costa Rica: Average revenue per user of fixed telephony, according to the type of connection: traditional basic and VoIP, 2012-2016 (Annual figures in colones)

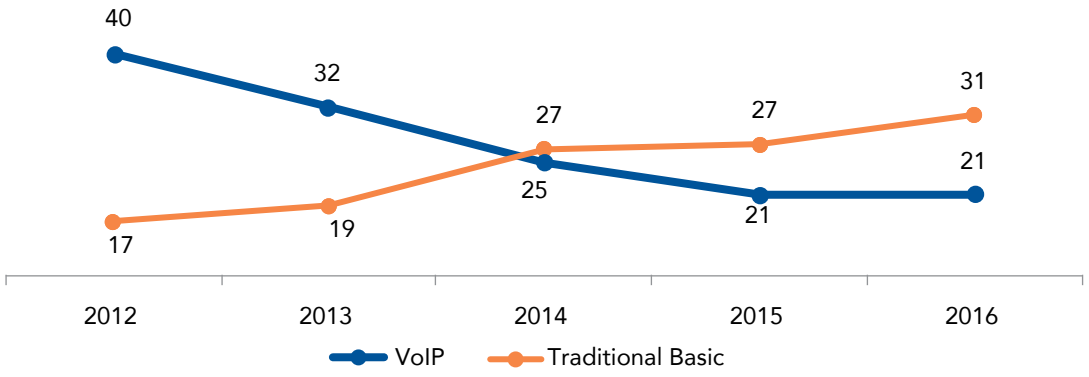


Source: SUTEL, Market Management Division.

Chart 24

Costa Rica: Average income per minute in fixed telephony traffic according to the type of connection: traditional basic and VoIP, 2012-2016
(Figures in colones)

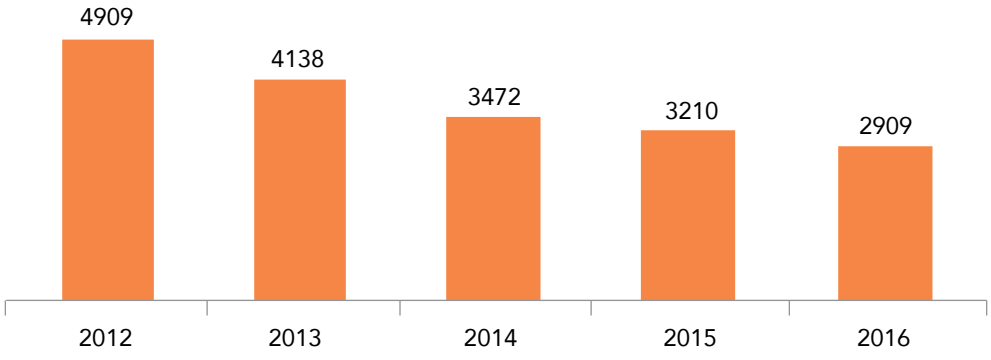
The average income per minute generated by users of the traditional basic telephony **has exceeded** that of VoIP customers in the last three years.



Source: SUTEL, Market Management Division.

Chart 25

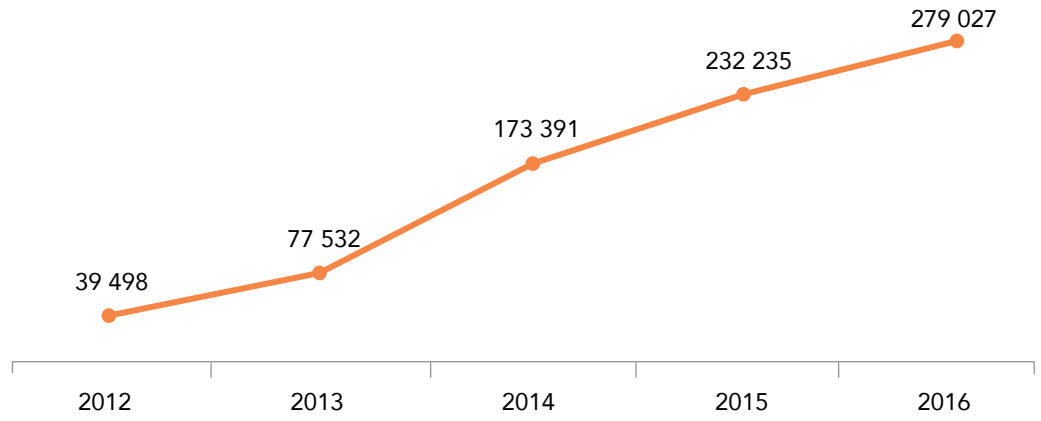
Costa Rica: Fixed telephony traffic, 2012-2016
(Millions of minutes per year)



Source: SUTEL, Market Management Division.

Chart 26

Costa Rica: VoIP telephony traffic, 2912-2016
(Thousands of minutes per year)



Source: SUTEL, Market Management Division.

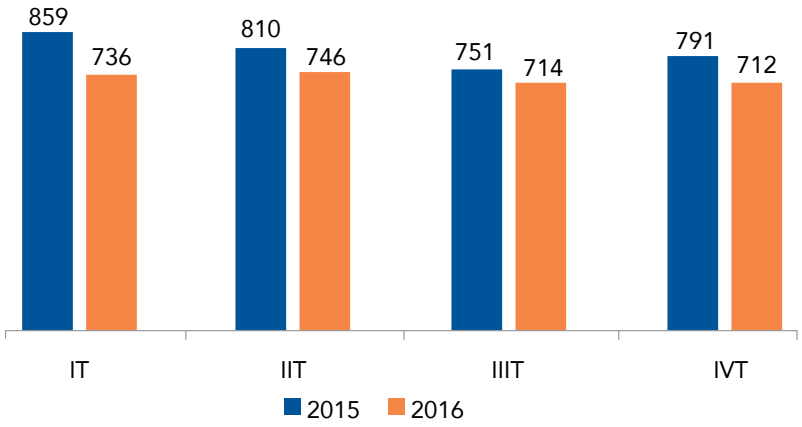
While the telephone traffic for fixed telephony decreased, the traffic of VoIP increased

20 %

in the last year

Chart 27

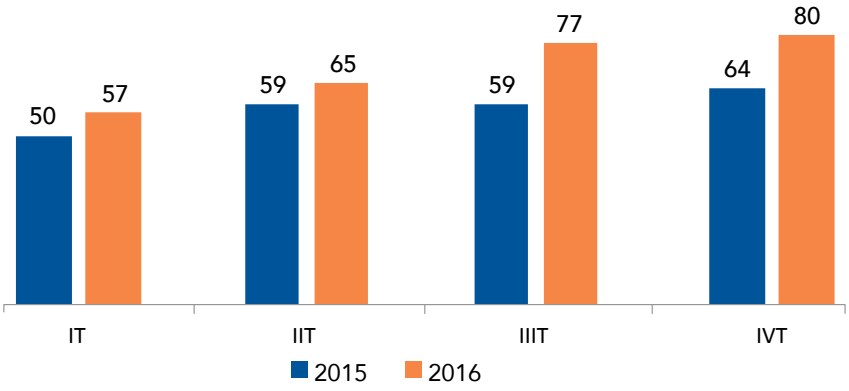
Costa Rica: Fixed telephony traffic, 2015-2016
(Quarterly figures in millions of minutes)



Source: SUTEL, Market Management Division.

Chart 28

Costa Rica VoIP telephony traffic, 2015-2016
(Quarterly figures in millions of minutes)



Source: SUTEL, Market Management Division.

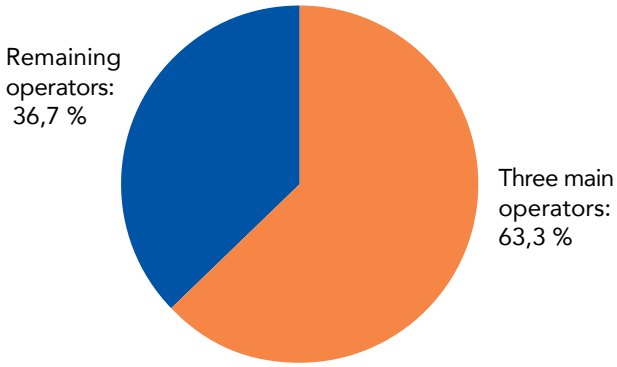
In 2016, the three main VoIP operators concentrate

63, 3%

of the corresponding traffic.

Chart 29

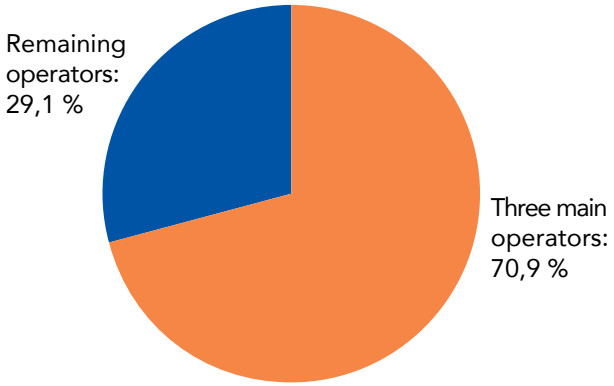
Costa Rica: Percentage distribution of VoIP telephony traffic according to the supplier, year 2016



Source: SUTEL, Market Management Division.

Chart 30

Costa Rica: Percentage distribution of VoIP telephony traffic according to the supplier, year 2015



Source: SUTEL, Market Management Division.

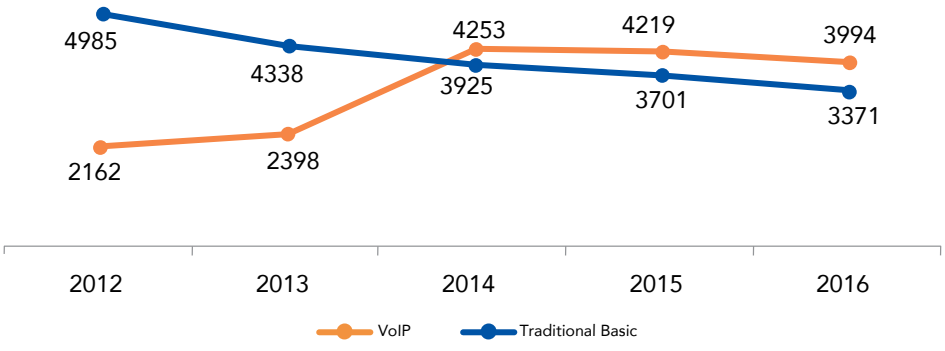
The average traffic per user of the traditional basic service has been

lower

than the VoIP service during the last three years.

Chart 31

Costa Rica: Average traffic by fixed telephony subscriber according to the type of connection: traditional basic and VoIP, 2012-2016
(Figures in minutes)



Source: SUTEL, Market Management Division.

3

MOBILE telephony

In 2016, mobile penetration in Costa Rica was 170%, thus exceeding the global average of the previous year.

Mobile Telephony

Costa Rica is part of a group of countries that liberalized the mobile telephony service in the last ten years. There are currently three mobile network operators and two virtual mobile operators.

Some enterprises are just starting their activities, others have been active for years and even decades or are part of multi-national entities.

Since 1963, ICE started working in telephone, radio-telegraphic and radio-telephonic communications in the national territory; however, it was not until 1994 that it got involved in analogue cellular technology, and it currently has its own brand: KÖLBI. The remaining enterprises started activities in cellular telephony three years after the opening of the telecommunications market in 2011: RACSA through Fullmóvil, Telefónica using its commercial brand Movistar, Televisora de Costa Rica with Tuyo Móvil and finally Claro.

Both Claro and Telefónica are subsidiaries of multi-national enterprises, while ICE and RACSA are state enterprises that belong to Grupo ICE; and finally, Televisora de Costa Rica is an enterprise with Costa Rican equity. It should be noted that both RACSA and Televisora de Costa Rica, due to a commercial agreement with ICE, operate under the modality of virtual mobile operator (VMO), the other enterprises have spectrum concession.

The characteristics of the enterprises have set the market dynamic for mobile telephony in Costa Rica and, although this section presents updated data to 2016, the evolution evidences a slow transformation in the indicators for subscriptions, income, traffic and number portability of the sector in the country.

Subscriptions

With the opening of the market in 2010, the mobile telephony service had a penetration level of 69%, in 2012, it increased to 115% and by 2016 there was an important increase of 170% (see Chart xx6). During the last two years the rate has increased in 9 and 14 percentage points, respectively; thus, the initial figure of the decade was exceeded and the current penetration levels exceed those of countries that were more advanced than Costa Rica in the past.

These last five years, 2012-2016, the mobile market has experienced a 56% growth in subscriptions, reaching over 8 million subscribers. Although most operators increased the number of subscribers, the information shows a slower growth, even in 2014 when the number of subscribers decreased. See Chart 32.

In turn, the information shows that the market share by operator, per the number of subscriptions, has been recomposed.

ICE is still the operator with the greatest number of subscribers, more than 4 million, although in five years its market share decreased from 73% to 53%; but it currently has over half a million additional customers because the market has grown. Regarding the rest of the operators, their market share also changed. Telefónica gained share because in 2012 it started with 8% of the market share and it is currently over 25% of market share therefore, at this moment it is the second largest enterprise in terms of cellular telephony services. Claro gained subscribers and has kept its share in the last years in about 20%; therefore, it is in the third pace. The VMOs are the smallest of the market, RACSA is fourth and Televisiora is fifth, with values below 1% of share. See Chart 33 and Chart 34.

Thus, although market share is very different among the operators, there is a gradual transformation and the ascending trend of Telefónica and Claro is noticeable, although there is stabilization in terms of share variation.

Regarding the behavior of subscriptions per modality of payment, pre-paid presents a considerable growth in mobile telephony. Being the modality of preference by Costa Ricans, it has gained over two million subscribers in the last five years, and only in the last year there have been over half a million new lines of this type. Despite of the fact that in 2016 there were almost 6.5 million pre-paid lines, 78% of the total subscriptions, that percentage is the lowest figure of the last years, and in comparison with 2013, there has been a reduction of 5 percentage points. See Chart 38 and Table 62 of the Statistical Annex.

In turn, since 2012, the post-paid segment increased by 64%, equivalent to about 700 thousand additional lines, reaching 1.862 thousand subscribers; but this only represents 22% of the cellular telephony lines. See Charts 35 and 38.

The information shows that since 2014, the inter-annual variation of pre-paid subscriptions decreased, and even registered negative rates; on the contrary, post-paid lines have increased, since 2014, with rates over 10%, reaching 10% just in the last year. See Chart 36.

From this perspective, it can be stated that in the last three years, post-paid lines are the ones that present a greater growth, although in absolute terms, pre-paid lines are still more.

Income

The income for mobile telephony is integrated by the components of voice and messaging (SMS and MMS); the income for mobile network, in addition to those elements also consider mobile data. See Chart 41 and chart 56, respectively.

Regarding the income for mobile telephony, it presented a 3% reduction in 2016, which locates it in a figure close to 348.000 million colones. The reduction was in both, voice and SMS and MMS. See Chart 41 and Table 65 of the Statistical Annex.

In terms of income for mobile network (including voice and mobile data), contrary to the income for mobile telephony, it presented a 5% increase compared to 2015; this has been a sustained increase for five years and probable result of the use of Internet in mobile devices. See Chart 56. Post-paid lines are precisely the ones that contribute with more income, see Chart 42, even though they represent only 22% of the total subscriptions, see Chart 38.

In regards to the income for voice roaming, it presents, for the first time in four years, a 22% reduction compared to the previous year, which means 1.471 million less. See Chart 45.

With respect to the monthly average income by subscriber, there has been a reduction since 2014, and this is even more evident in the pre-paid modality that, for two consecutive years, has decreased. See Chart 46.

Finally, regarding previous publications, there is a difference in telephony and mobile network income because one operator made an extemporaneous correction in the historical series of income for minimal voice rate.

Traffic

The evolution of traffic seems to show a change of behavior in some of it components and a trend in other components.

First, there is a reduction in the number of voice minutes through cellular telephony for the second consecutive year. Only in the last year, the number of minutes decreased in 620 million, which means 18% less traffic (see Chart 48). In concordance with the reduction in the minutes in traffic, the subscribers consume less, in average, both in pre-paid and in post-paid lines. See Chart 55.

Likewise, although voice traffic on pre-paid lines is, in percentage terms, more important, it has decreased by 19% in five years; and, on the contrary, since 2012, the minutes in traffic in

post-paid lines have progressively increased by 26%. In this sense, a change is envisioned in the composition per payment modality; although the change in the growth rate of post-paid lines has been slower, reaching only 1% in the last year. See Chart 48 and Table 68 of the Statistical Annex.

Regarding the destination, although on net traffic is still more consumed by the subscribers, it has been decreasing since 2012, and it is the traffic between off net mobile networks that has presented a sustained increase. This situation is possibly a reflection of the diversification in market share and the greater number of subscribers disseminated between different operators. For this reason, Chart 49 presents a slow increase in off net mobile-mobile traffic share.

In turn, although some years ago the use and extension of SMS and MMS messages positioned them as preferred by the mobile telephony consumers, they are currently decreasing at a fast rate; in five years brief messaging dropped by 77% and multimedia dropped by 98% (see Chart 50 and Chart 52).

The same descending trend is seen with international traffic that, by the end of 2016, reached 469 million minutes, 7% less than the previous year. This is the reflection of a continuous reduction in inbound traffic that has decreased 46% since 2012 (see Chart 54). Despite of a sustained increase in outbound minutes, they do not offset the reduction of inbound minutes; and in proportional terms, the ratio between these was reverted (see chart 54). This information could eventually evidence a fundamental change in the patterns of international calls from mobile telephones.

Finally, roaming traffic is the only one of the modalities that present a growing trend; in five years, it has grown more than 200%. By 2016, the minutes reached 57 million, 36% more than the previous year (see Chart 53). The increase has occurred in both inbound and outbound minutes, although the weight falls into the calls made by users abroad to Costa Rica, which can be due to the presence of operators in the Latin American area.

Number portability

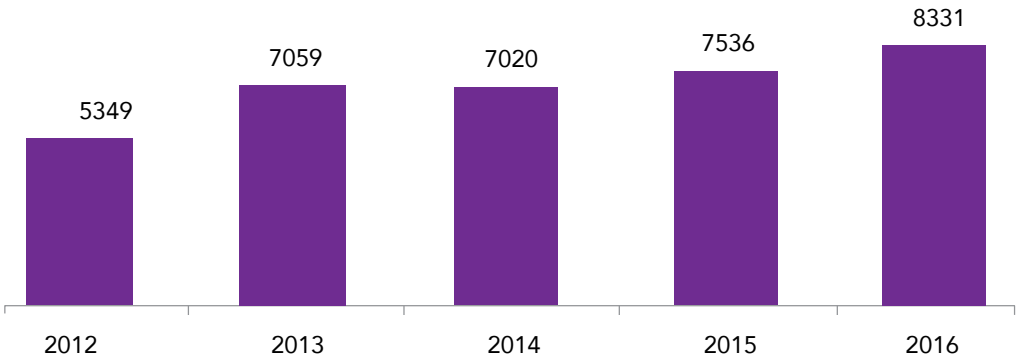
The implementation of number portability in cellular telephony presented an opportunity for the users, but it also presented a challenge for the operators since it facilitates the change in service supplier, which could generate new positions in terms of the commercial policies of the operators to attract customers or rather to preserve their customers.

In 2016, over 300 thousand subscribers changed supplier; this represents 12% compared to the previous year (see Chart 57). In total, almost 800 thousand subscribers have changed operator in the last three years, and Telefónica is the one that has received most of the users; on the contrary, ICE is the one that has lost more customers that have moved to other enterprises (see Chart 58). However, as already mentioned, this enterprise is still in the lead in terms of number of subscribers in the Costa Rican market.

In 2016, over 300 thousand subscribers changed supplier; this represents 12% compared to the previous year (see Chart 57). In total, almost 800 thousand subscribers have changed operator in the last three years, and Telefónica is the one that has received most of the users; on the contrary, ICE is the one that has lost more customers that have moved to other enterprises (see Chart 58). However, as already mentioned, this enterprise is still in the lead in terms of number of subscribers in the Costa Rican market.

Chart 32

Costa Rica: Subscriptions to mobile telephony service, 2012-2016
(Annual figures in thousands)



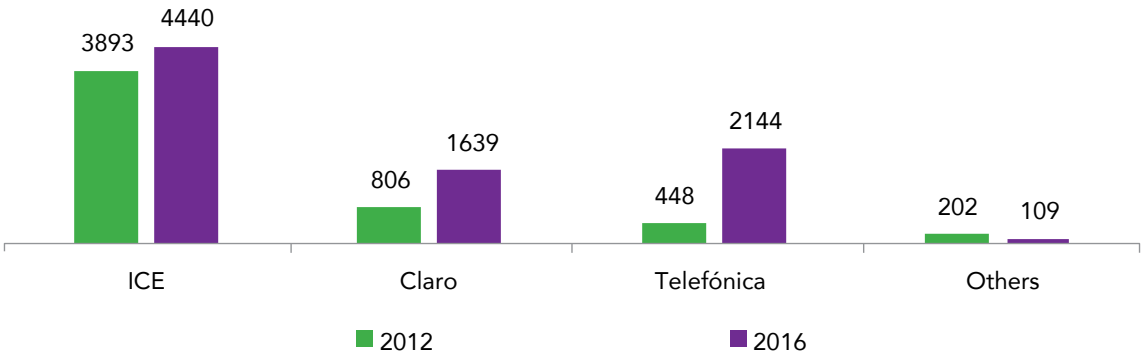
Source: SUTEL, Market Management Division.

In five years, subscriptions increased by

56%

Chart 33

Costa Rica: Subscriptions to mobile telephony service by operator, 2012 and 2016
(Annual figures in thousands)



Source: SUTEL, Market Management Division.

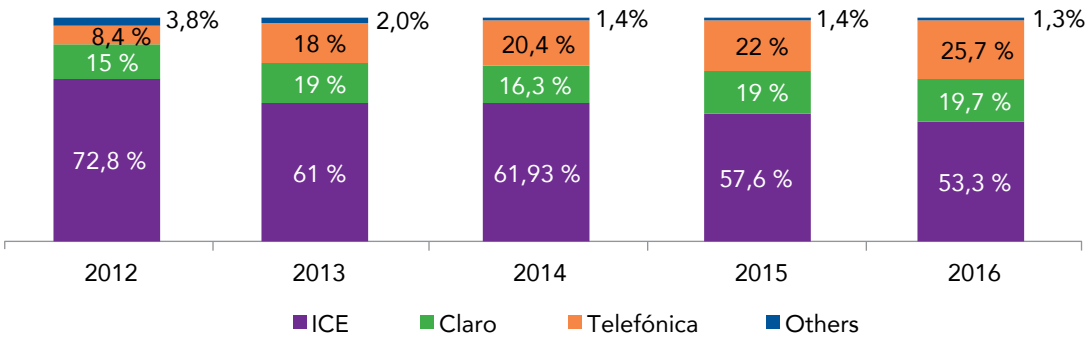
In five years, most operators have

increased

the number of subscribers.

Chart 34

Costa Rica: Percentage distribution of subscriptions to mobile telephony service by operator, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

ICE is still the operator with the

largest number

of subscribers

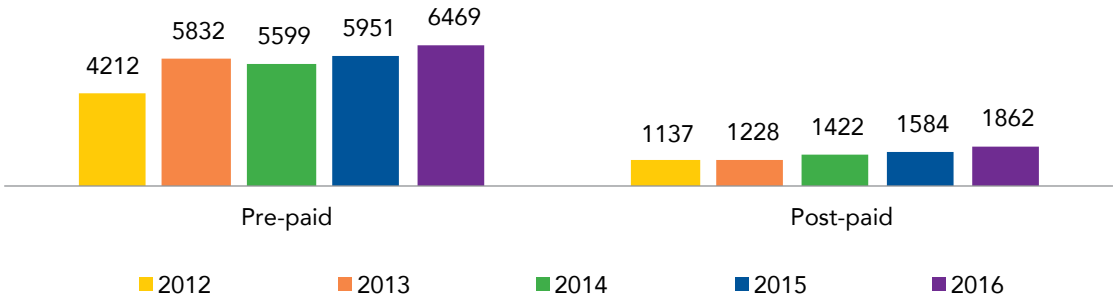
For each post-paid customer, there are about

3

pre-paid customers

Chart 35

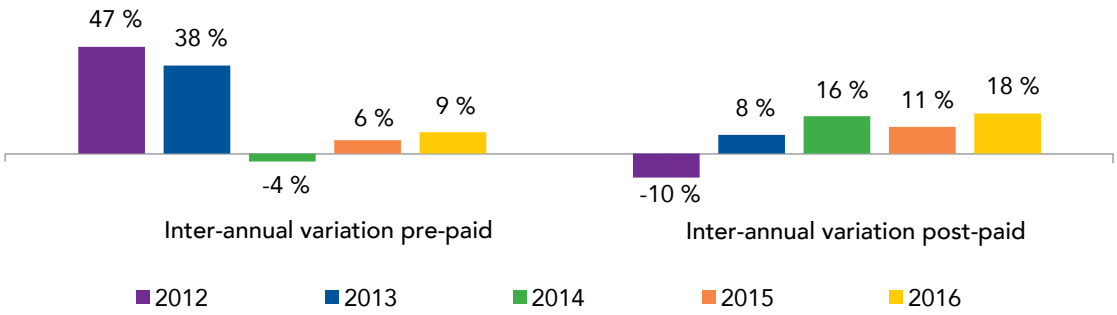
Costa Rica: Subscriptions to mobile telephony service, according to payment modality, 2012-2016
(Annual figures in thousands)



Source: SUTEL, Market Management Division.

Chart 36

Costa Rica: Inter-annual variation of mobile telephony service, according to payment modality, 2012-2016
(Annual figures in percentages)



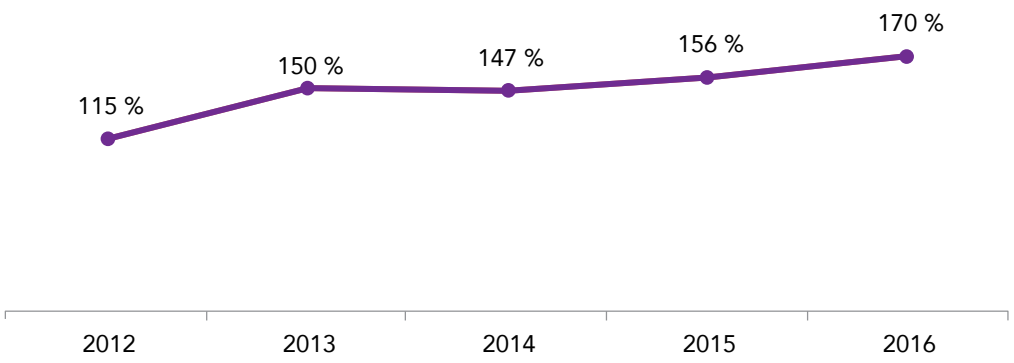
Source: SUTEL, Market Management Division.

Chart 37

Costa Rica: Subscriptions to mobile telephone service for every 100 inhabitants, 2012-2016
(Annual figures in percentages)

Mobile penetration reached in 2016 is the highest in the history of Costa Rica with

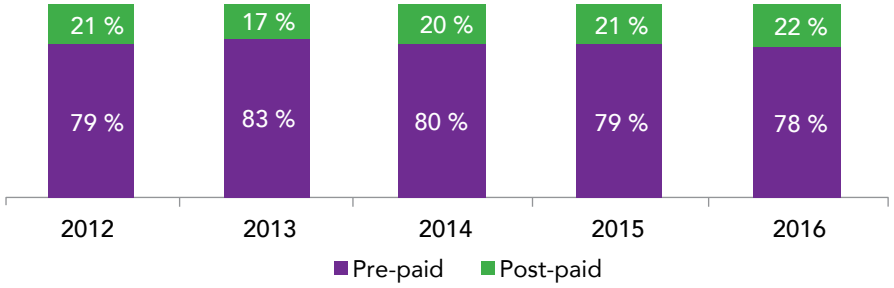
170 %



Source: SUTEL, Market Management Division.

Chart 38

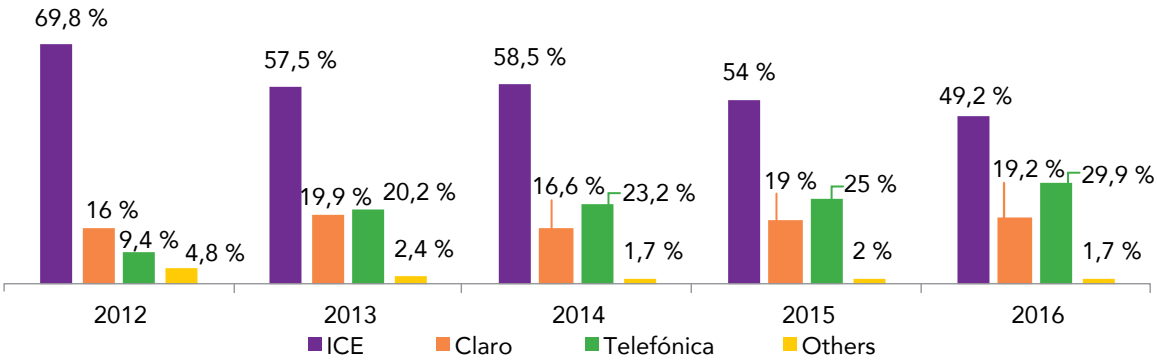
Costa Rica: Percentage distribution of subscriptions by payment modality of the mobile telephony service, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

Chart 39

Costa Rica: Percentage distribution of subscriptions to pre-paid mobile telephony service per year per operator, 2012-2016
(Annual figures in percentages)

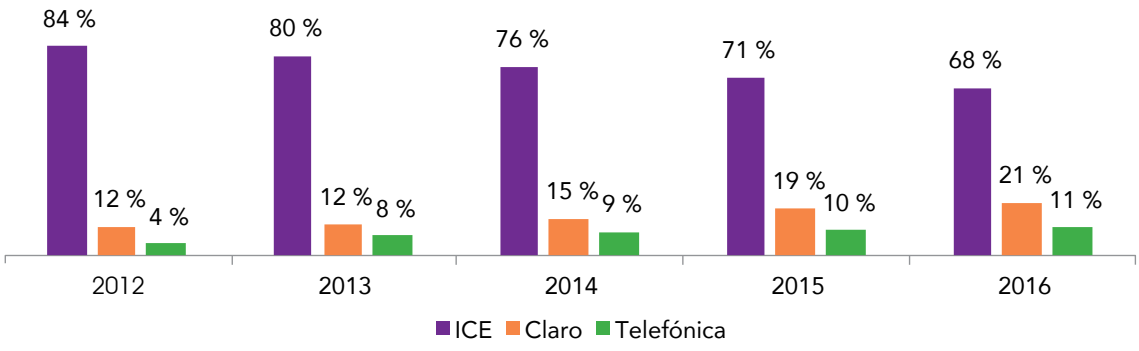


Source: SUTEL, Market Management Division.

In five years, Telefónica is the operator that has gained more customers in the pre-paid modality, going from **9%** to a total of **30%**

Chart 40

Costa Rica: Percentage distribution of subscriptions to post-paid mobile telephony service per year per operator, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

Claro has made it in post-paid going from **12%** to **30%**

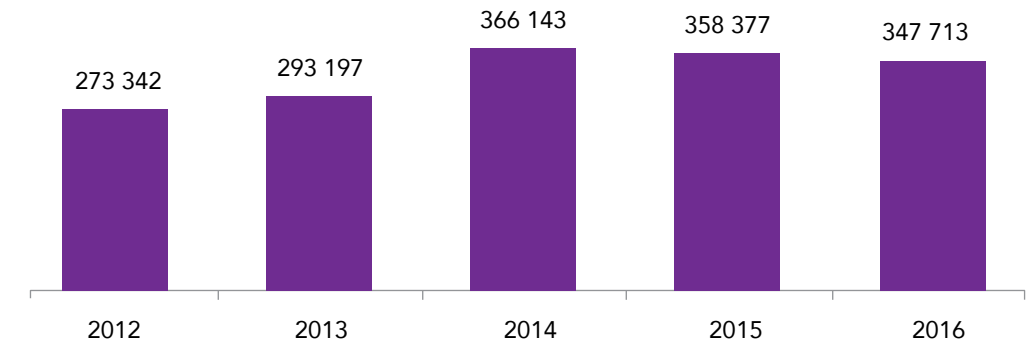
Mobile telephony income decreased by

3 %

compared to 2015, which means a decrease for the second consecutive year.

Chart 41

Costa Rica: Total income from mobile telephony service[1], 2012-2016
(Annual figures in million colones)



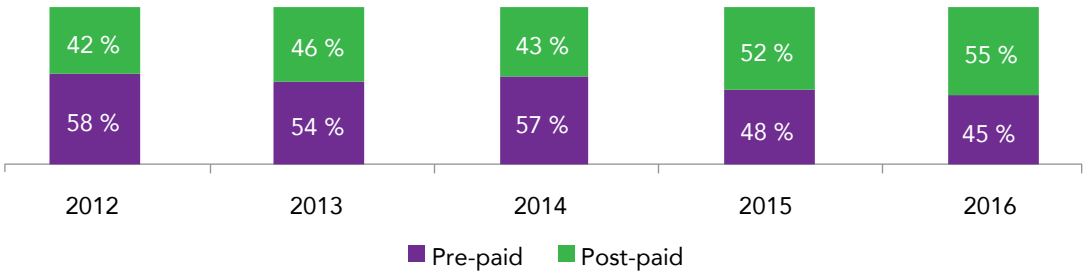
[1] it does not include mobile data
Source: SUTEL, Market Management Division.

55 %

of mobile network comes from post-paid modality

Chart 42

Costa Rica: Distribution of the total income associated to the mobile network1 according to payment modality, 2012-2016
(Annual figures in percentages)



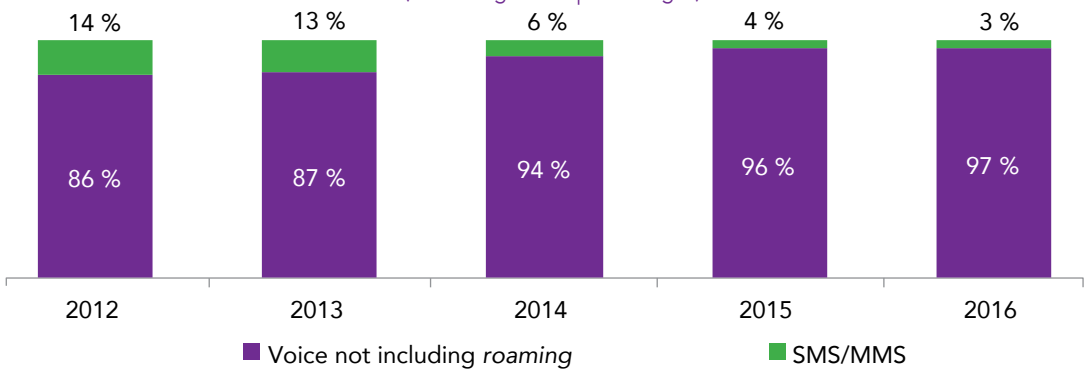
[1] Incluye ingreso por voz móvil, mensajería y datos móviles, no incluye *roaming*.
Source: SUTEL, Market Management Division.

Voice income is the largest component of mobile telephony with

97 %

Chart 43

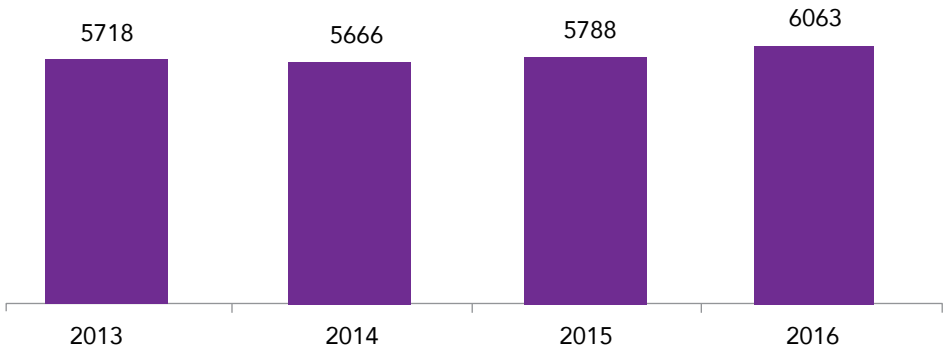
Costa Rica: Distribution of the total income associated to the mobile telephony service according to the component, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

Chart 44

Costa Rica: Total income from roaming, SMS/MMS and data, 2013-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division.

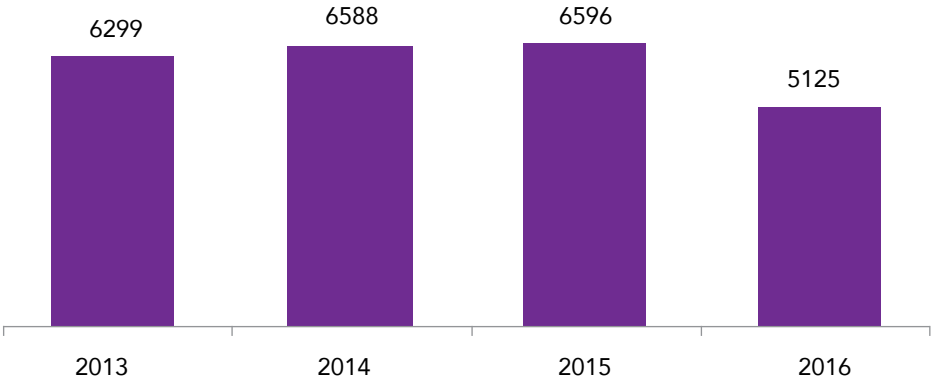
Income for roaming, SMS/MMS and Internet presented a

5 %

increase compared to 2015

Chart 45

Costa Rica: Total income from voice roaming, 2013-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division.

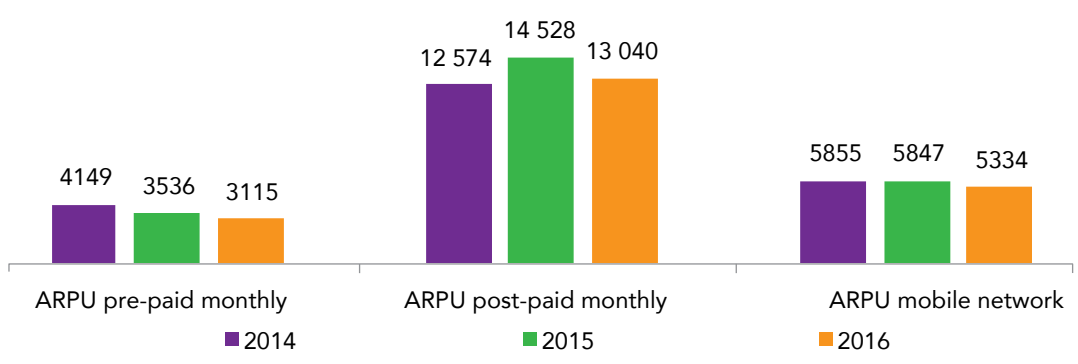
Income for voice roaming presented a reduction of

22 %

compared to the previous year.

Chart 46

Costa Rica: Average monthly income per subscriber[1] according to payment modality, 2014-2016
(Figures in colones)



Source: SUTEL, Market Management Division.

[1] The average revenue per user (ARPU) included income from outbound and inbound mobile voice at the national and international level, SMS/MMS and mobile data.

The income per subscriber presents a

reduction

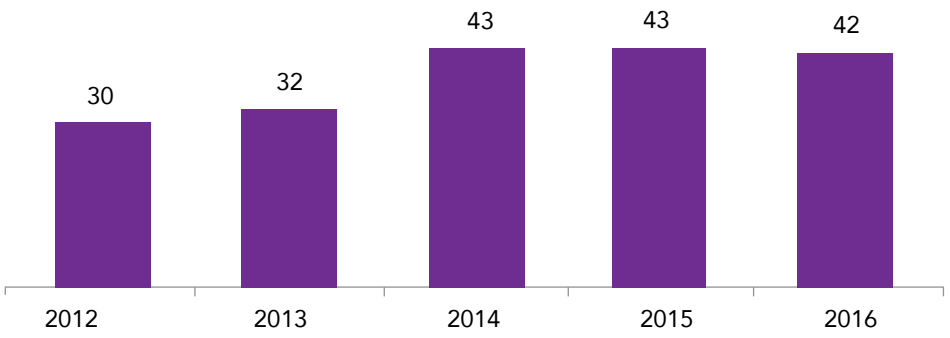
in all the different modalities

In the last three years, the average income per minute remains practically

invariable

Chart 47

Costa Rica: Average income per minute in voice[1], 2012-2016
(Annual figures in colones)



[1] It includes income for mobile voice
Source: SUTEL, Market Management Division.

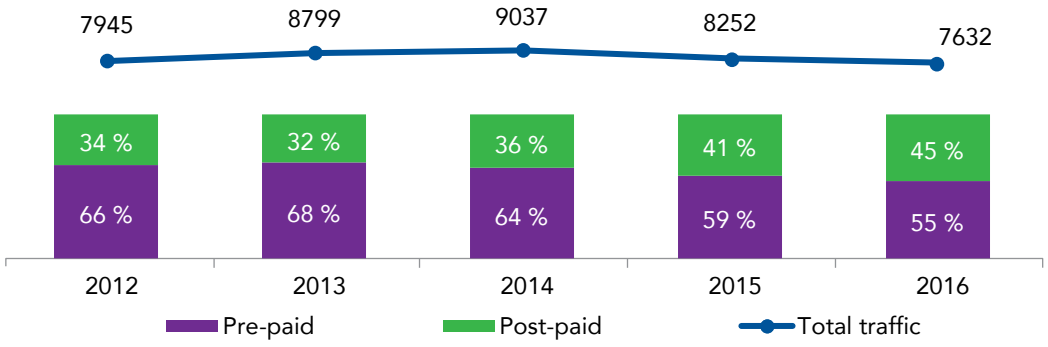
Total voice traffic decreased by

8 %

in the last year.

Chart 48

Costa Rica: Total traffic for mobile telephony service[1] and percentage distribution according to payment modality, 2012-2016
(Annual figures in millions of minutes and percentages)



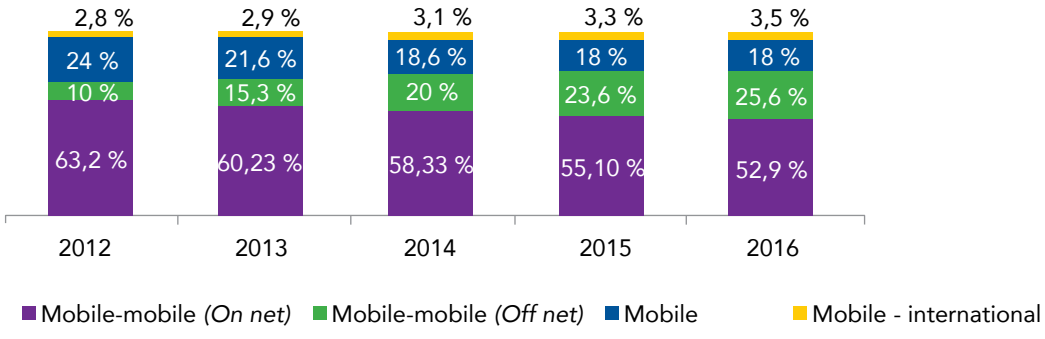
[1] It only includes voice minutes.
Source: SUTEL, Market Management Division.

53 %

of traffic is towards mobile network *On net*

Chart 49

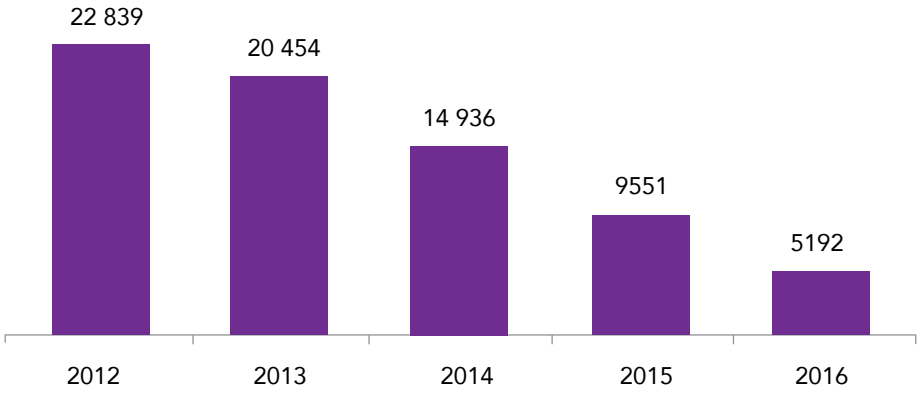
Costa Rica: Distribution of total traffic associated to mobile telephony service by destination, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

Chart 50

Costa Rica: Total SMS traffic, 2012-2016
(Annual figures in millions of messages)



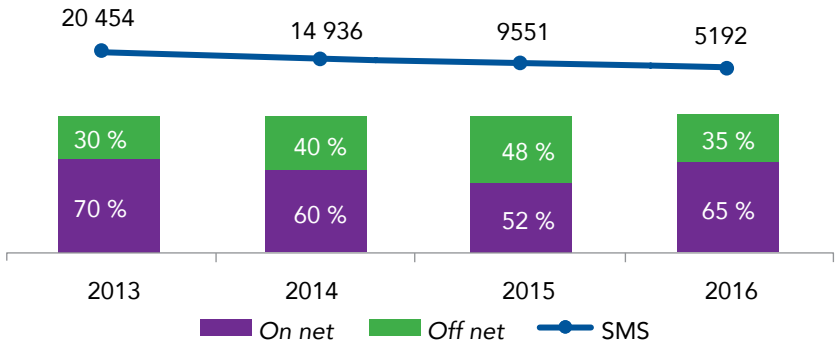
Source: SUTEL, Market Management Division.

In the last five years, SMS traffic reduction has reached

77 %

Chart 51

Costa Rica: Total traffic and percent distribution of SMS associated to the mobile telephony service, 2013-2016
(Annual figures in millions of messages and percentages)



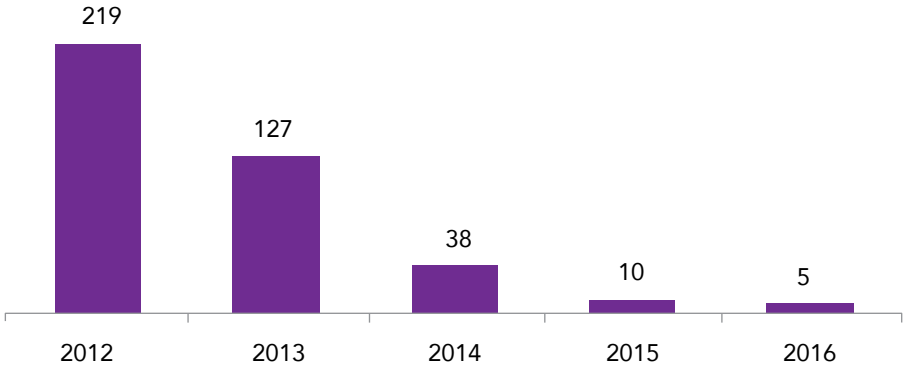
Source: SUTEL, Market Management Division.

Most SMS traffic is *On net*,

65 %

Chart 52

Costa Rica: Total MMS traffic, 2012-2016
(Annual figures in millions of messages)



Source: SUTEL, Market Management Division.

In five years, MMS traffic has decreased in

98 %

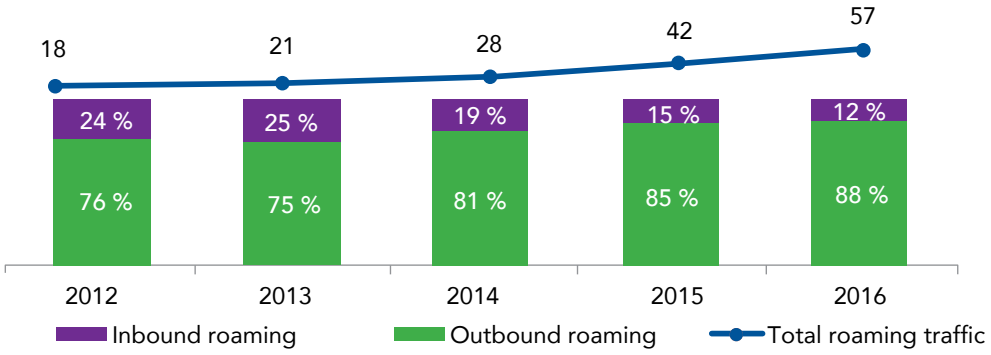
Voice roaming traffic presented its highest level,

57

millions of minutes

Chart 53

Costa Rica: Total traffic and percentage distribution of voice roaming associated to mobile telephony service, 2012-2016
(Annual figures in millions of minutes and percentages)



Source: SUTEL, Market Management Division.

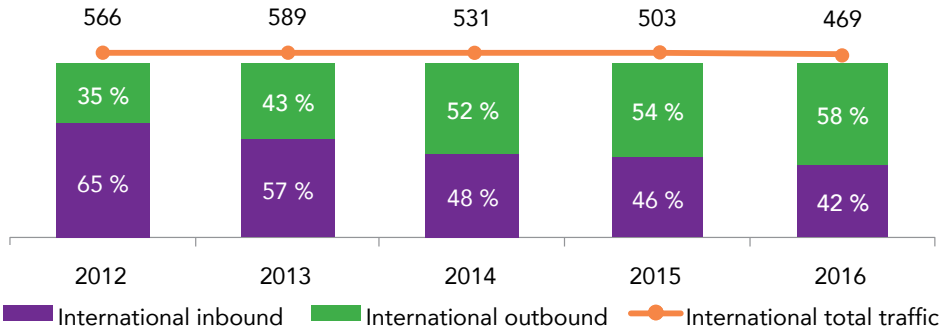
International traffic decreased by

17 %

since 2012.

Chart 54

Costa Rica: Total international traffic and percentage distribution associated to mobile telephony service, 2012-2016
(Annual figures in millions of minutes and percentages)



Source: SUTEL, Market Management Division.

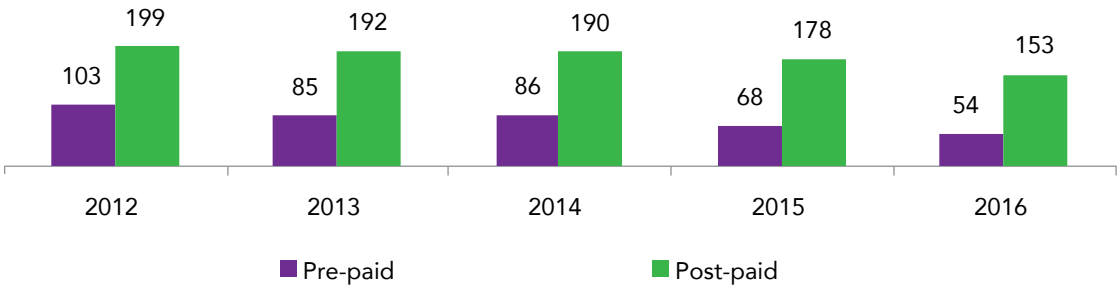
Pre-paid subscribers consume

three times less

voice minutes than post-paid subscribers

Chart 55

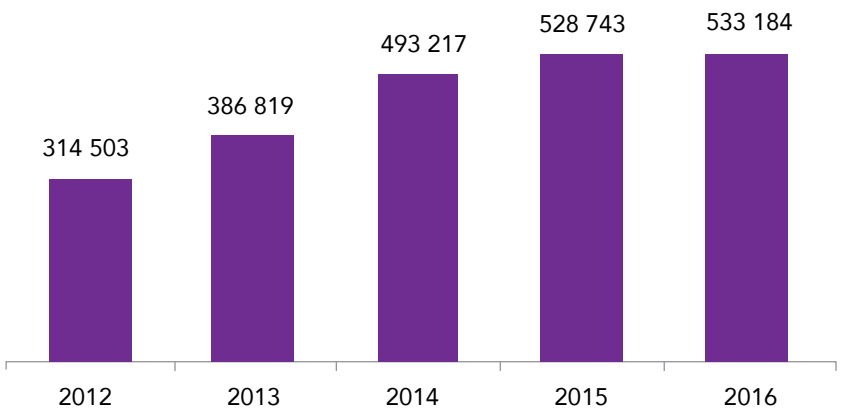
Costa Rica: Average monthly voice traffic by subscriber according to payment modality, 2012-2016
(Annual figures in minutes per month per subscriber)



Source: SUTEL, Market Management Division.

Chart 56

Costa Rica: Total income associated to the mobile network[1], 2012-2016
(Annual figures in million colones)



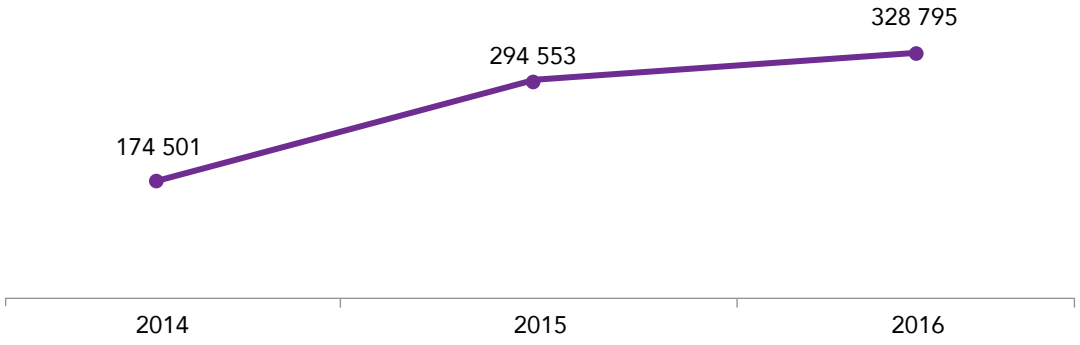
[1]It includes mobile voice, messaging and mobile data; it does not include roaming
Source: SUTEL, Market Management Division.

Income from mobile network presented a slight increase compared to 2015, less than

1 %

Chart 57

Costa Rica: Annual successful portability[1] events, 2014-2016
(Annual figures)



[1] Successful portability cases are those that were finally activated in the network of the new operator
Source: SUTEL, Market Management Division

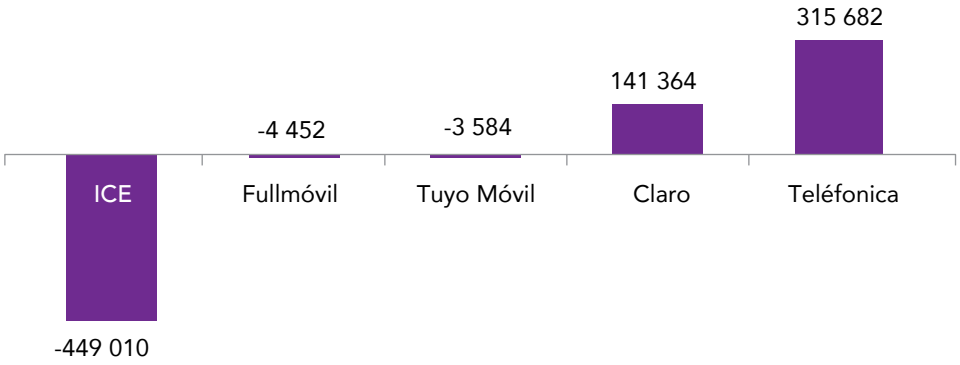
The figure of successful portability cases grew

12 %

in the last year

Chart 58

Costa Rica: Portability cases per operator[1], December 2013 – December 2016
(Accrued figures)



[1] Only successful portability cases were considered; that is, those that were activated in the network of the new operator.
Source: SUTEL, Market Management Division.

4

DATA Transfer

The data transfer service shows some growth signals for 2016. For example, the income in the service increased by 27% with respect to the previous year, where the total income of the mobile Internet service covers 57.3%, fixed Internet covers 32.6% and dedicated lines cover 10.1%. It should also be mentioned that the growth of the total traffic of data from 2015 to 2016 was 48%.

Internet

This section analyses the internet service and its evolution during 2015-2016. At the beginning of each section, there is an overview of each variable for all the years with information available; however, the focus is on the evolution for the period mentioned and emphasis is made in aspects of interest for 2016.

This section studies the services related to mobile Internet access, retail fixed Internet access, wholesale fixed internet access and dedicated lines. The analysis contemplates the number of subscriptions and the level of income in each service, as well as data traffic for retail fixed internet and mobile internet. Additionally, for 2016, these variables are broken down according to the connection technology and the speed ranges.

Internet access on Mobile Networks

For this analysis, we compiled information from the three mobile operators with spectrum concession and from the authorized virtual mobile operators. The study of this service does not distinguish between second, third or fourth generation technology; however, it considers relevant aspects such as payment modality, speed ranges and access devices.

Subscriptions

Chart 59 shows the evolution of the service regarding the number of users. From 2012 to 2016, there has been a sustained increase, going from 2.670.208 subscribers in 2012 to 5.248.233 subscribers at the closing of 2016. This represents 97% growth for the period studied. With this sustained increase since 2012, according to Table 9 in the general section, the penetration per inhabitant moved from 57% to 107% at the end of 2016. Chart 60 shows the total subscriptions at the closing of each quarter for the period 2015-2016. As can be seen, each quarter presents a sustained growth in the number of customers, where the quarterly average variation rate for 2015 is 3%, greater than the quarterly average variation rate for 2016, which is 2%.

Below is a detailed review of the composition of subscriptions based on the access devices used to access the mobile network, payment modality and speed ranges leased by the users.

About the distribution by access device, Chart 61 shows that the number of subscribers that use a mobile telephone represents 98.1% at the closing of the last quarter in 2016, while USB devices represent 1.9%. This figure is different to that of the closing of 2015, when the percentages were 98% and 2%, respectively.

Analyzing the subscriptions through telephone devices (mobile telephones), the detail is broken down by payment modality.

As can be seen in Chart 62, at the end of 2016, the percentage of post-paid customers was 27.9% and of pre-paid customers was 72.1%. By the end of 2015, these values were 26.1% in post-paid and 73.9% in pre-paid, which reflects an increase in the number of post-paid subscriptions. According to Chart 63, which presents the absolute values of subscriptions for the period 2013-2016, between 2015 and 2016, the increase was of 182.466 subscriptions in pre-paid and 190.788 subscriptions in post-paid.

The same Chart 63 shows that the increase is sustained in pre-paid, and the number of post-paid subscribers show some recovery after 2014. For this period 2013-2016, a percentage growth is estimated in the pre-paid modality by 37% and 29% for the post-paid modality. Regarding the variation in the last year, it represents 5% for pre-paid and 15% for post-paid.

Chart 65 presents the distribution of subscriptions per payment modality and per speed ranges. It includes three speed ranges; namely: less than 512 kbps, equal or greater than 512 kbps but less than 2Mbps, and the speed greater or equal to 2Mbps. This Chart shows the composition for each payment modality; for example, 72.1% of pre-paid subscriptions is made up by 43.9% subscribers in the range of 2Mbps or more, 26.9% in the range of speed below 512 kbps and only 1.3% in speeds between 512 kbps and 2Mbps. It is important to note that the 43.9% in speeds greater than 2 Mbps represents over two million subscriptions.

Regarding the 27.9% in post-paid, it can be seen how it is distributed between 14.9% for the range between 512 kbps and 2 Mbps and 11.8% for the range of 2 Mbps and over, and only 1.2% for speeds below 512 kbps.

Income

Chart 66 shows the total income per year for the period 2013-2016, presenting an increase of 107% throughout the period, equivalent to an additional 100.496 million colones generated from the internet service in 2016, compared to 2013.

However, it is important to mention that in the last year, the growth rate in this variable was only 14% versus 34% in 2015.

Chart 67 shows the total income for each quarter in the period 2015-2016; the quarterly average variation was 6% in 2015 and 4% in 2016.

To supplement this analysis, a review was made for the distribution of income between the access devises, the modality of payment and the ranges of speed. Chart 68 shows the distribution of income between USB devices and cellular telephones, where the latter represent 95.7% of the total at the end of 2016, consistent with what is provided in Chart 61, where the greatest proportion of subscribers to this system correspond to users of cellular mobile devices.

Analyzing the subscriptions through cellular devices, Chart 69 present the details according to payment modality. It shows the variation of income in pre-paid and post-paid at the end of 2016, with 52% and 48%, respectively.

To complement the analysis according to payment modality, Chart 70 shows the total income per year for the period 2013-2016. The income in both modalities present a sustained increase, with a growth percentage for the whole period of 97% in pre-paid and 109% in post-paid. Additionally, the annual variation rate between 2015 and 2016 was 13% for pre-paid and 14% for post-paid, closing 2016 with over 98.246 million colones in pre-paid and 88.071 million colones in post-paid.

Chart 71 shows a quarterly comparison of how much is represented by the income in post-paid and the income in pre-paid with respect to the total, where contrary to the 3 to 1 ration in subscriptions, the ratio in income is approximately 1 to 1. At the end of 2016, the income in post-paid represented 48% of the total and in pre-paid it was 52%.

Finally, Chart 72 shows the distribution by modality of payment and speed ranges. There are three speed ranges; less than 512 kbps, 512 kbps to 2 Mbps, and 2 Mbps or over 2 Mbps. A 48% of the income in post-paid correspond to 30% in less than 512 kbps, 5% in 512 kbps to 2 Mbps, and finally 12% of income for speed ranges over 2 Mbps. It is also possible to see that for the pre-paid modality, 30% of income is from speeds of less than 512 kbps, 1% is between 512 kbps and 2 Mbps and 22% of the income falls in the range of speed over 2 Mbps.

Traffic

This is a brief analysis of the traffic of data in the mobile network. Chart 73 shows how data consumption went from 24.270 TB reported in 2013 to 122.189 TB at the closing of 2016, thus representing a variation of 403% for the whole period. It can additionally be verified for the period 2015-2016, the variation was 63%.

Chart 74 elaborates on this aspect, showing the quarterly figures for the period 2015-2016. There is a sustained increase for the whole period with an average quarterly variation in 2015 of 31% and in 2016 of 26%.

Access to internet over fixed networks

The service of internet access over fixed networks is characterized by the fact that the user has different technological platforms that provide access; either wired means or fixed wireless means. Below is the analysis of the service considering the different technologies and the speed ranges leased by users.

Subscriptions

Regarding the total subscriptions for the year, Chart 75 shows the evolution between 2012 and 2016, where the variation for the period was 42%, closing 2016 with 636.087 subscriptions. This represents a penetration per inhabitant of 13%, as can be seen in Table 9 of the general section. As a complement to this topic, Chart 76 presents the evolution per quarter for the period 2015-2016, where the average quarterly variation for 2015 was 2% and for 2016 it reached 3%, slightly greater than the previous year.

To elaborate on the details of this service, the analysis is divided according to the number of subscriptions per means of access. Chart 77 shows that wireless subscriptions accounted for 1.7% of the total, leaving 98.3% of the service for wired technologies, also showing that wireless means decreased almost by half versus 2015, when the percentage was 3%.

For each means of access there is an analysis based on the connection technology and the speed range. Chart 78 shows the details for each technology using wired means, including the most widely adopted technologies: HFC and xDSL. The figure shows how HFC networks have an average share, for the four quarters of 2016, of 54.3%, exceeding the share of copper networks that remain with an average of 44% for the four quarters of the year. Compared to 2015, HFC networks increased their share by 1.5% and xDSL networks decreased their share by 2.3%.

Similarly, Chart 79 shows the percentages of participation of the wireless technologies, where connections over WiMax represent an average for the four quarters of 86.2% of the total subscriptions, a similar value to the 86.4% in 2015.

Finally there is a percentage distribution of subscriptions by speed range. Chart 80 presents the wired technologies, where most of the subscribers lease speeds in the speed rage of 2 Mbps and 10 Mbps, with an average for the four quarters of 55.34% of the total, followed by the range of 512 kbps to 2 Mbps, which represents an average of 38.54% of the connections for the four quarters. Comparing data from 2015, the speed range from 2 Mbps to 10 Mbps increased from 44.8% the previous year to 55.34%, while the range from 512 kbps to 2 Mbps decreased, going from 50.97% in 2015 to 38.54 in 2016.

Sequentially, Chart 81 shows the case of wireless technologies, where the range between 512 kbps and 2 Mbps has most of the subscriptions, with an average for the four quarters of 55.1%, greater than the 33.27% of 2015. Then, in order of participation, we have the range of connections with speed between 2 Mbps and 10 Mbps, which has an average for the four quarters of 41.9%, greater than the average of 32.4% in 2015.

Income

Regarding the income from fixed internet services, Chart 82 shows the 2013-2016 evolution, where the variation of the period is 63%, reflecting an important growth for the period.

Specifically for the period 2015-2016, the percentage of variation is 14%. This behavior is more positive than the year before, when the annual increase was 5%. However, it is still not so encouraging as the increase in 2013 and 2014, when the income associated to this service grew by 36%. Chart 83 shows the variation per quarter between 2015 and 2016, where 2015 was fluctuating with an average quarterly variation of 3% and 2016 had a sustained growth with an average quarterly variation rate of 4%.

Below, Chart 84 shows how the income is divided according to means of access, where wireless means represent 3.5% of the total, and 96.5% of the subscriptions are in wired means. That is consistent with the number of users leasing this service through wired means. The analysis per means of access for 2016 is detailed below, and it includes the distribution of subscriptions according to speed ranges and type of technology

Chart 85 presents the percentage distribution of the income for wired technologies; here we see how in networks over copper the percentage of income is greater than in the other technologies, accounting an average for the four quarters of 44.9%, just slightly over the 44.6% of 2016.

In terms of wireless technologies, Chart 86 shows how microwave connections represent most of the income, with an average of 57.3% for the four quarters, a figure that exceeds the average of 50% from 2015.

To conclude, another element analyzed was the percentage distribution of the income for wired and for wireless means of access. Chart 87 shows that in wired means, the range between 2 Mbps and 10 Mbps, in average for the four quarters, represents 45% of the income, less than the 54.8% from 2015. This speed range is followed by the range between 512 kbps and 2 Mbps, with 21.7%, a value that decreased in comparison to the average of 2015 which was 30.5%. It is important to highlight that the range of speed between 10 Mbps and 100 Mbps presented an increase from 2015 to 2016, going from a quarterly average of 10.7% to 14%.

In the case of wireless technologies, the situation is similar, as seen in Chart 88. The range between 2 Mbps and 10 Mbps covers most of the income, with an average for the four quarters of 53.4%, less than the 55.1% from 2015. Then, the range between 512 kbps and 2 Mbps averages 31.3% for the four quarters of 2016, less than the average of 34.5% from 2015. It is important to mention that the speed range between 10 Mbps and 100 Mbps presented a growth from 2015 to 2016, going from a quarterly average of 8.2% to 14%.

Traffic

Analyzing the behavior of data traffic service in fixed networks, the consumption of users has had a sustained increase since 2014. Chart 89 clearly shows this growth, and by the end of 2016, it shows a total of 387.519 TB, which reflects a variation for the period 2014-2016 of 180%, and 43% for the last year; yet, it does not exceed the growth rate in traffic between 2014 and 2015, which reached 95%.

This is explained in Chart 90, which shows the details per quarter for the period 2015-2016, with sustained quarter-by-quarter growth at an average quarterly variation rate of 15% for 2015 and 11% for 2016. Finally, Chart 91 presents the percentage distribution of traffic according to access technology. In this case, HFC networks cover most of the traffic in all the quarters in 2016, with a quarterly average of 74.7%, showing a considerable increase with respect to the 64.4% from 2015. Then, the copper networks appear in second place in traffic amount with an average for the four quarters of 20.7%, decreasing from the average of 32.4% from 2015.

Wholesale access to fixed internet

Below is a review of the wholesale segment for internet access. For this year, the sample of network operators that provided information in this particular area only had 8 entities, one more than the previous year, representing 20% of the total operators that report actively. However, it is interesting to show how this service evolved from 2015 to 2016. In order to show this, the information compiled related to income and subscriptions, both with a certain level of detail regarding connection technologies and speed ranges.

Subscriptions

The first element analyzed was the number of subscriptions for the period 2015-2016, where, according to Chart 92, there is a 97% increase, demonstrating a greater dynamic in the sale of these services. To add to this information, Chart 93 shows the number of subscriptions at the closing of each quarter. As can be seen, in some quarters, the number of subscriptions had decreased, however, the average quarterly variation rate for 2016 was 19%.

Next, it is important to mention that this information was compiled related to connection technologies, therefore, Chart 94 shows how the number of subscribers was distributed in percentage terms by technology in 2016, with passive fiber technologies as the ones that had more customers, with a total of 65.8% at the closing of the year. This figure decreased in comparison to the 74.3% from 2015.

Income

This section presents a summary of the information obtained on income for wholesale fixed internet service; this information is from the period 2015-2016. The information from 2015 was reviewed after the publication from last year, and the volume of income was corrected for certain operators. Because of this, the reader will find that the numbers hereby shown regarding 2015 are different from those in the previous publication. Now, Chart 96 shows the annual variation of the total income reported, in this case, evidencing a slight reduction of -12% in the period analyzed.

Additionally, Chart 97 presents the variation of income quarter-by-quarter for the period 2015-2016. Here we see that the average quarterly variation rate for 2016 is -1.8%.

Next, for the variable of income, information was also compiled according to connection technologies and speed range. Chart 98 presents the percentage distribution of the income per technology, highlighting that the income for connections over fiber and in DWDM share over 95% of the income in each quarter of 2016, a figure that increased with respect to 2015 where the share between both technologies was 84%.

Finally, Chart 99 shows the information of income from the wholesale fixed Internet service according to speed ranges. It can be seen that in spite of the fact that the range from 2 Mbps to 10 Mbps is the one that has more connections, the range between 600 Mbps and 1 Gbps is the one that generates more income, with an average for the four quarters of 32.3% of the total, different from 2015, when the range from 2 Mbps to 10 Mbps was the one that generated more income, with an average of 39.2%.

Leased Lines

This is a summary of the evolution of the leased lines service during the period 2015-2016. It should be clear that for this review, there are variables of connection and entrance, which are classified by type of market, geographical location of the customer and finally, connection technology and speed of the service.

Connections

First of all, although it was indicated that the period of the analysis was 2015 to 2016, Chart 100 presents the evolution in number of connections in this service per year, showing data from 2012 to 2016, a year that closed with a total of 16.032 connections. As can be seen, the variation fluctuated; however, for the whole period, the variation is estimated in 34%. With respect to 2015, the variation was 13%, a significant recovery when compared to the period 2014-2015, where there was a -22% reduction.

Chart 101 shows the variation in the number of connections per quarter from 2015 to 2016. This also shows a fluctuating variation in the total number of connections. In 2015, the average quarterly variation rate was -3%, while in 2016, the variation was 3%.

Chart 102 shows that 99.3% of the connections reported are with customers in the national territory. Considering this, Chart 103 offers details regarding the number of connections in the national territory in each quarter of 2016, showing a total of 15.920 connections by the closing of the year. According to Chart 104, at the closing of 2016, 97.9% corresponded to customers in the retail segment. Therefore, having shown that almost all connections are distributed among retail customers within the country, they will be analyzed by making emphasis in the connection technologies used and the speed ranges hired.

Chart 105 presents details about the technologies, including virtual private networks, analogue lines, digital links, and, in one group, port renting, frames and dark fiber. The virtual private network service is, in each quarter of 2016, the one that covers most of the connections, with an average in the four quarters of 60.6%, followed by digital links with 23.3%. Both technologies show a greater average than the figure for 2015. Finally, reviewing the speed ranges in Chart 106, the connections with speed ranges between 512 kbps and 2 Mbps cover, in average for the four quarters of the year, 34.4% versus 37.3% in 2015, while the speed range between 2 Mbps and 10 Mbps covers, in average, 27.6%, a figure that increased with respect to the average of 26.5% in 2015.

Income

As previously shown for the number of connections, Chart 107 shows the evolution of the income generated from this service per year from 2012 to 2016. 2016 closed with a total of 34.433 million colones reported, close to 1.769 million colones less than in 2015, with a variation of -5%. However, the total variation for the period 2012-2016 is calculated in 1.1%.

Next, Chart 108 presents the variation in the number of connections per quarter, from the first quarter in 2015 to the fourth quarter in 2016. This is a fluctuating variation through the period, calculating an average quarterly rate of -0.3% in 2015. By 2016, the average quarterly rate is positive, reaching 0.9%.

Chart 109 shows that 99% of the income comes from customers in the national territory. This being the case, Chart 110 shows the detail of the income from customers in the country for each quarter in 2016, where we can see that at the closing of the year, there was a figure of 8.964 million colones per quarter, out of which, according to Chart 111, 89% of the income corresponds to customers in the retail sector. Now, after showing that great part of the income comes from retail customers within the country, it was decided that such income should be analyzed by emphasizing on the connection technologies used and the speed ranges hired.

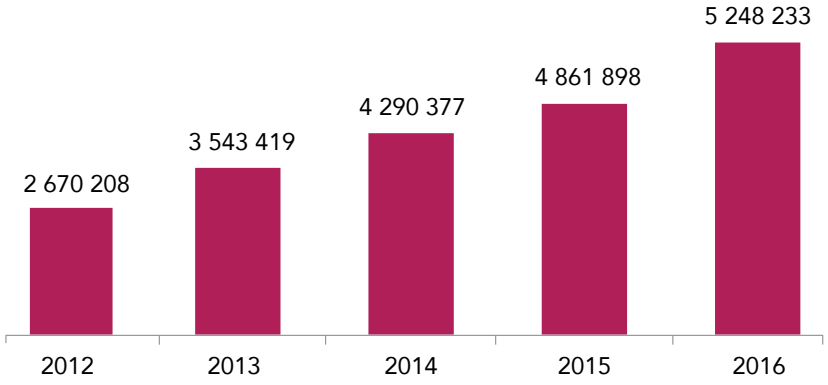
Chart 112 shows the percentage distribution by technologies, including virtual private networks, analogue lines, digital links and a group with port rentals, frames and dark fiber. It is clearly seen that the virtual private networks service, in each quarter in 2016, reported most of the income, closing the year with an average for the four quarters of 67.4%, greater than the 60.3% from the previous year. Then, income from digital links has an average of 27.8% for the four quarters, less from the 33.1% reported last year. Finally, reviewing the speed ranges shown in Chart 113, connections with speed ranges between 2 Mbps and 10 Mbps cover, in average for the four quarters of the year, 29%, more than the 25.8% from 2015; while the speed range between 512 kbps and 2 Mbps represents an average of 24.2%, less than the 25.5% from 2015.

The variation rate with respect to 2015 was

22 %

Chart 59

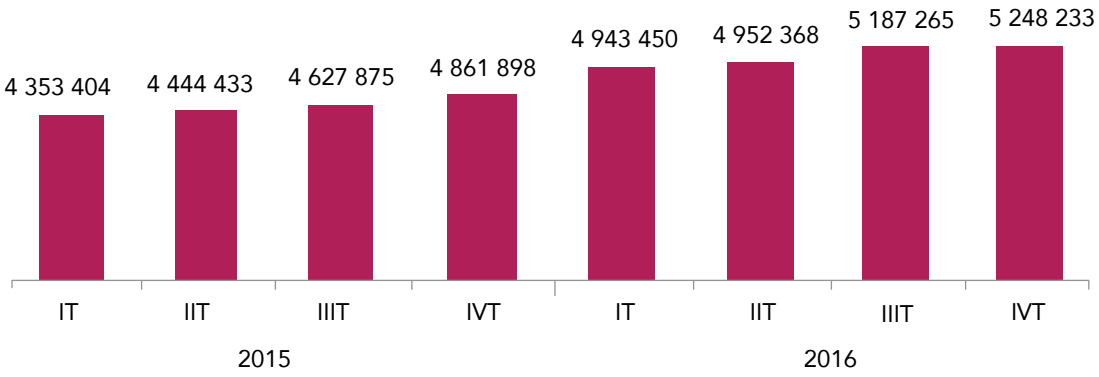
Costa Rica: Subscriptions, access to Internet on mobile network, 2012-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 60

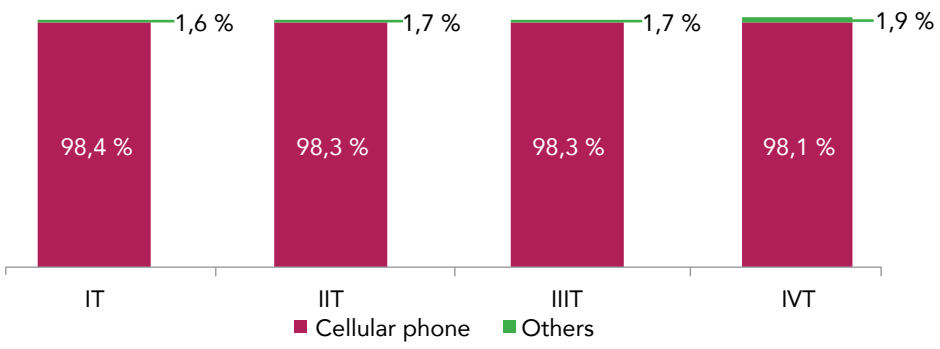
Costa Rica: Subscriptions, access to Internet on mobile network, 2015-2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 61

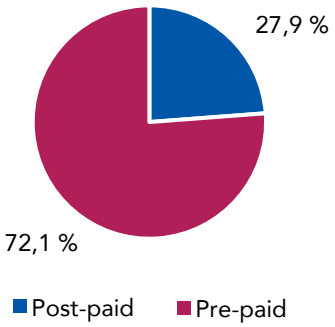
Costa Rica: Subscriptions, access to Internet on mobile network, distribution according to access device, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 62

Costa Rica: Subscriptions, access to mobile Internet, distribution according to payment modality, 2016
(Figures at the closing of the year)



Source: SUTEL, Market Management Division.

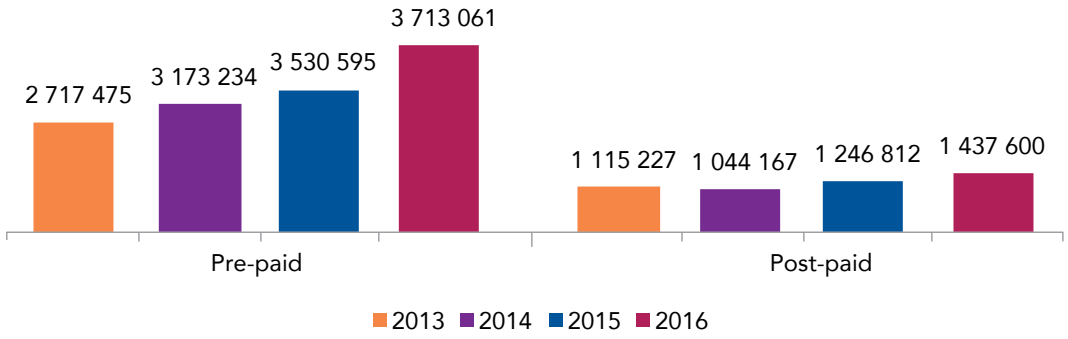
Chart 63

Costa Rica: Subscriptions, access to mobile Internet, comparison according to payment modality, 2013-2016
(Annual figures)

The variation in subscriptions with respect to 2015 was

5 %
in pre-paid and

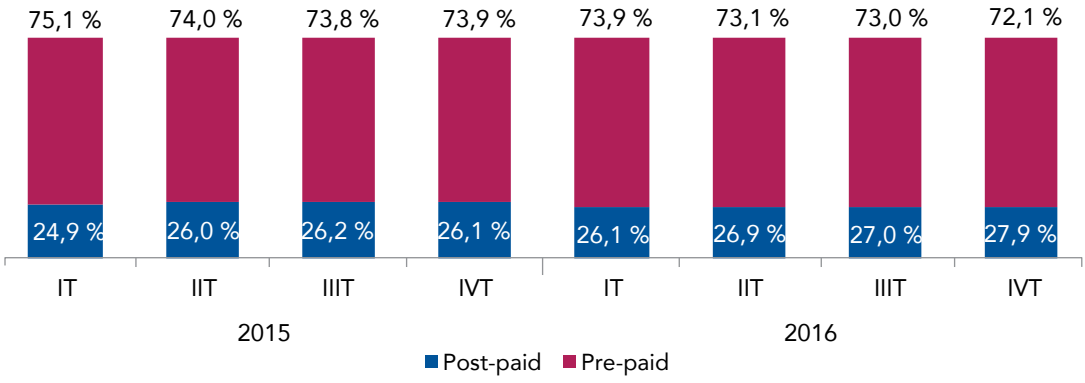
15 %
in post-paid



Source: SUTEL, Market Management Division.

Chart 64

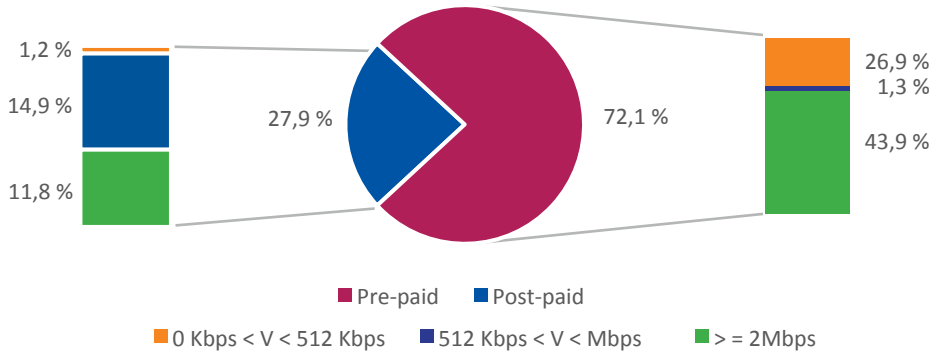
Costa Rica: Subscriptions, access to Internet on mobile network, percentage distribution according to payment modality, 2015-2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 65

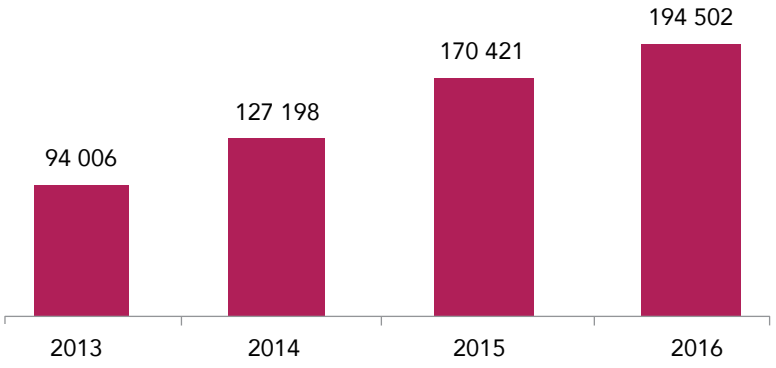
Costa Rica: Subscriptions, access to Internet on mobile network, percentage distribution according to payment modality per speed range
(Figures at the closing of 2016)



Source: SUTEL, Market Management Division.

Chart 66

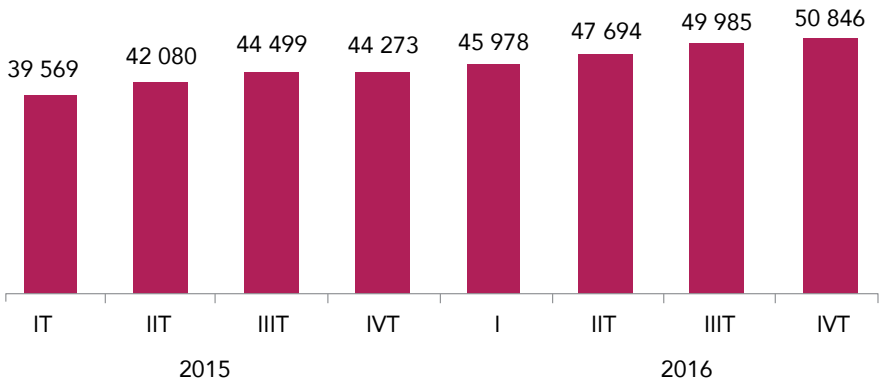
Costa Rica: Income, access to Internet on mobile network, 2013-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division.

Chart 67

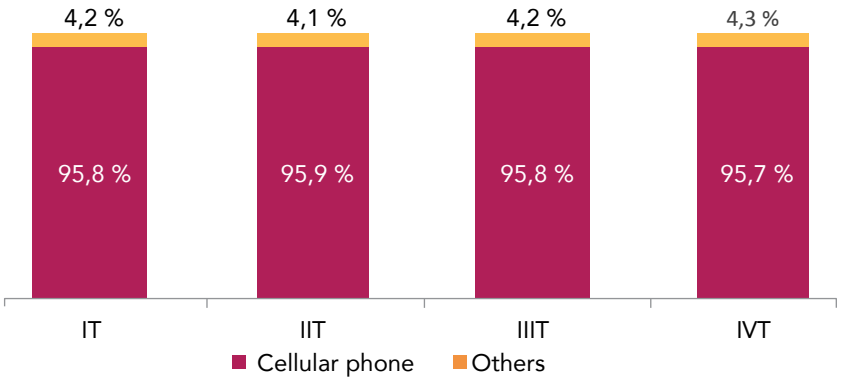
Costa Rica: Income, access to Internet on mobile network, 2015-2016
(Quarterly figures in million colones)



Source: SUTEL, Market Management Division.

Chart 68

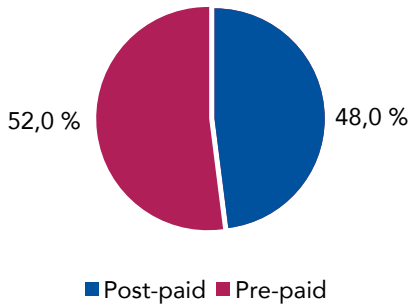
Costa Rica: Income, access to Internet on mobile network, distribution according to access device, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 69

Costa Rica: Income, access to Internet on mobile network, distribution according to payment modality, 2016
(Figures at the closing of the year)



Source: SUTEL, Market Management Division.

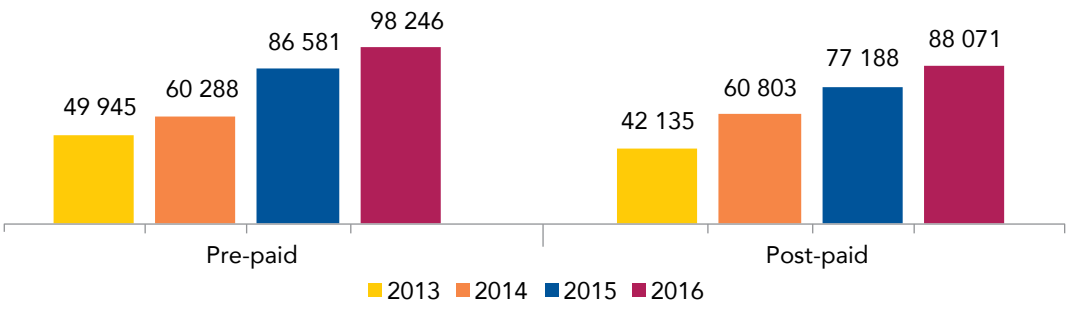
The variation rate in annual income with respect to 2015 was

13 %
for pre-paid and

14 %
for post-paid.

Chart 70

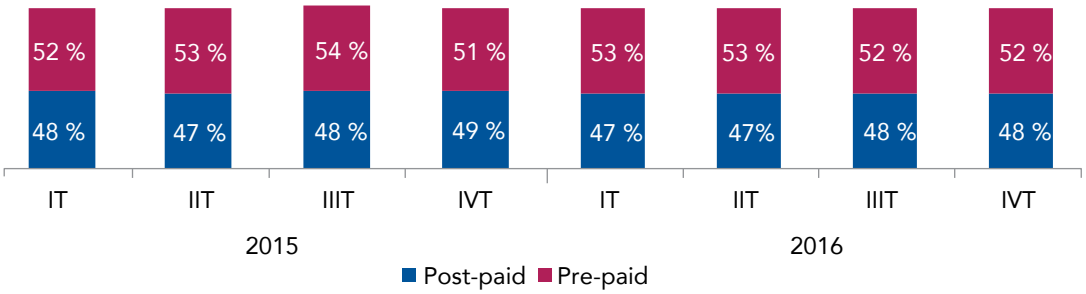
Costa Rica: access to Internet on mobile network, comparison according to payment modality, 2013-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division.

Chart 71

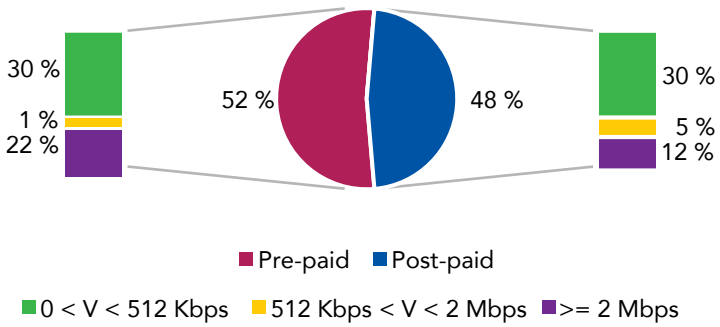
Costa Rica: Income, access to Internet on mobile network, distribution according to payment modality, 2015-2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 72

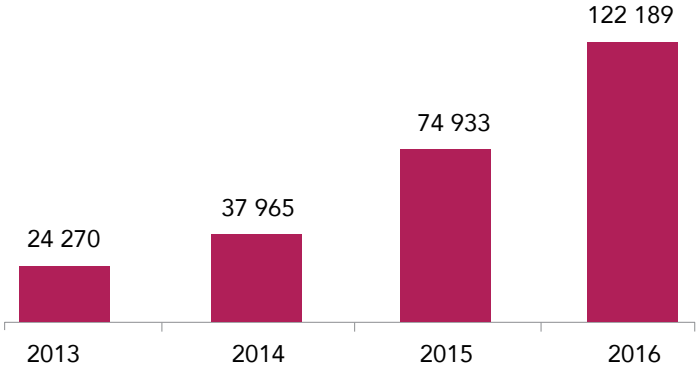
Costa Rica: Income, access to Internet on mobile network, percentage distribution according to payment modality per speed range at the closing of 2016



Source: SUTEL, Market Management Division.

Chart 73

Costa Rica: Data traffic, access to Internet on mobile network, 2013-2016
(Annual figures in TB)



Source: SUTEL, Market Management Division.

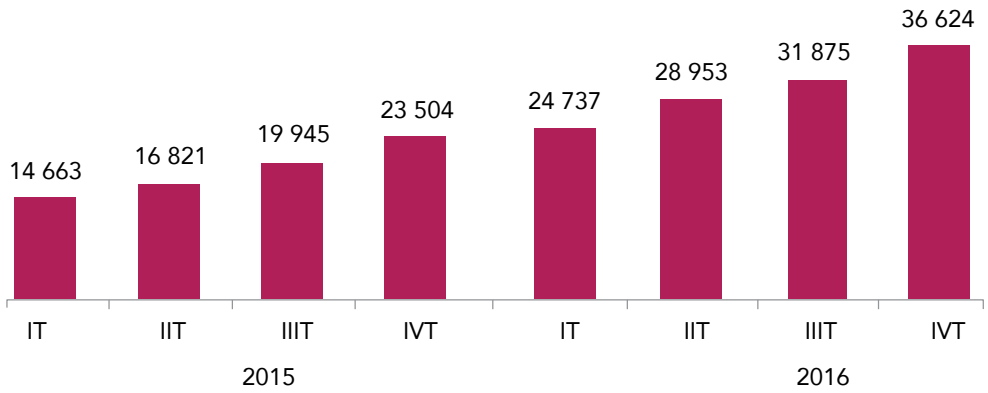
In 2016, there was an increase of over

47 thousand

TB with respect to 2015 in data traffic

Chart 74

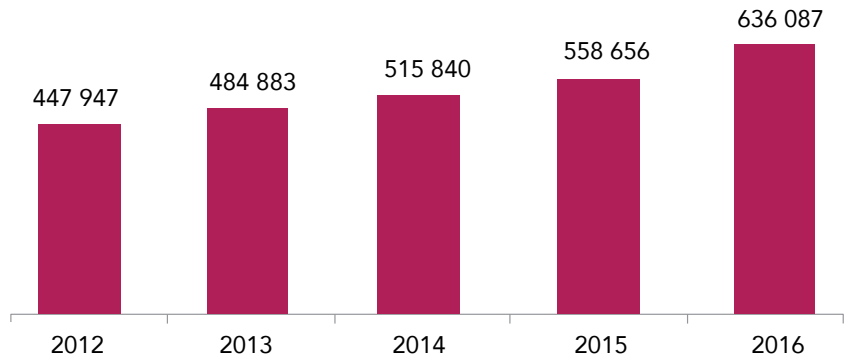
Costa Rica: Data traffic, access to Internet on mobile network, 2015-2016
(Quarterly figures in TB)



Source: SUTEL, Market Management Division.

Chart 75

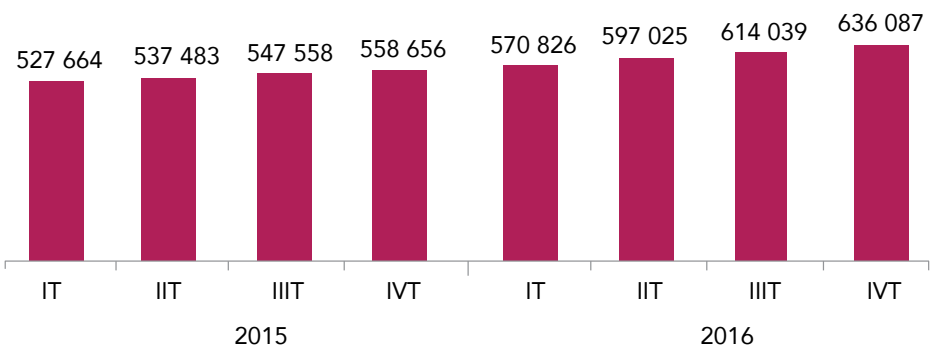
Costa Rica: Subscriptions, access to fixed Internet, 2012-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 76

Costa Rica: Subscriptions, access to fixed Internet, 2015-2016
(Quarterly figures)



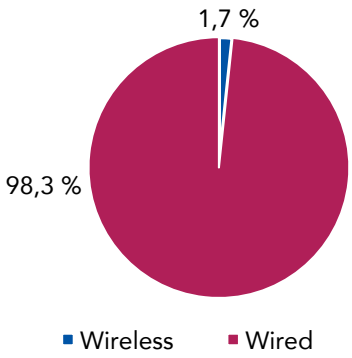
Source: SUTEL, Market Management Division.

The share of wired means was

98,3 %

Chart 77

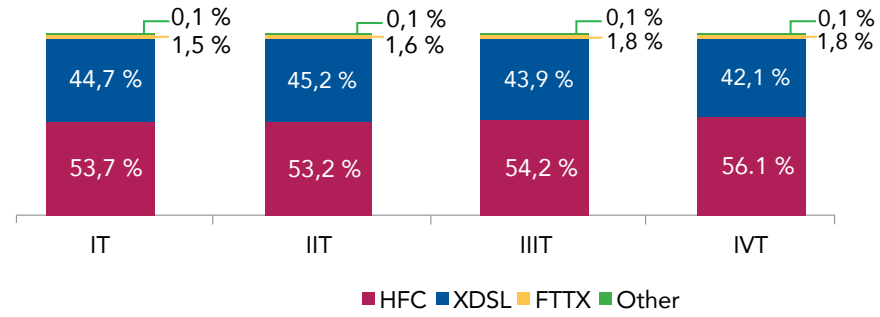
Costa Rica: Subscriptions, access to fixed Internet according to means of access, 2016
(Figures at the closing of the year)



Source: SUTEL, Market Management Division.

Chart 78

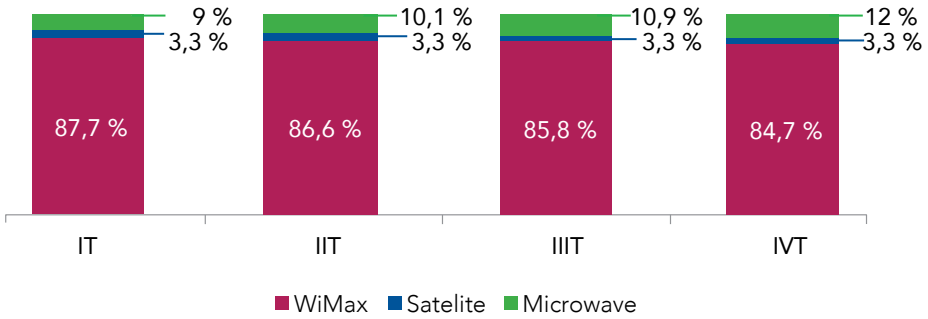
Costa Rica: Subscriptions, access to fixed Internet, distribution according to technology, wired means, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 79

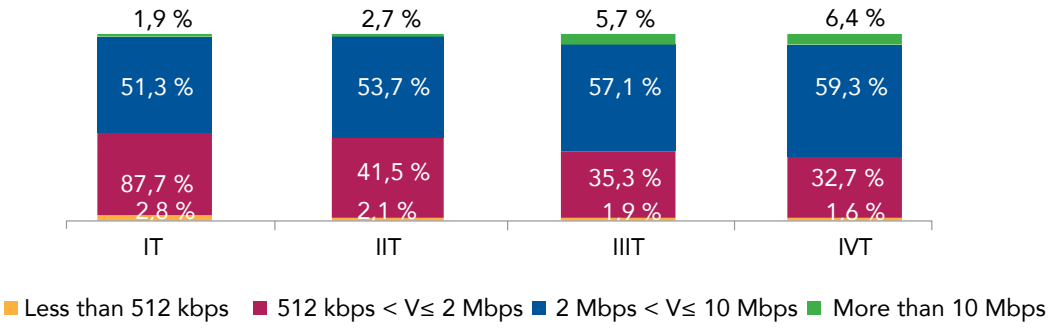
Costa Rica: Subscriptions, access to fixed Internet, distribution according to technology, wireless means, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 80

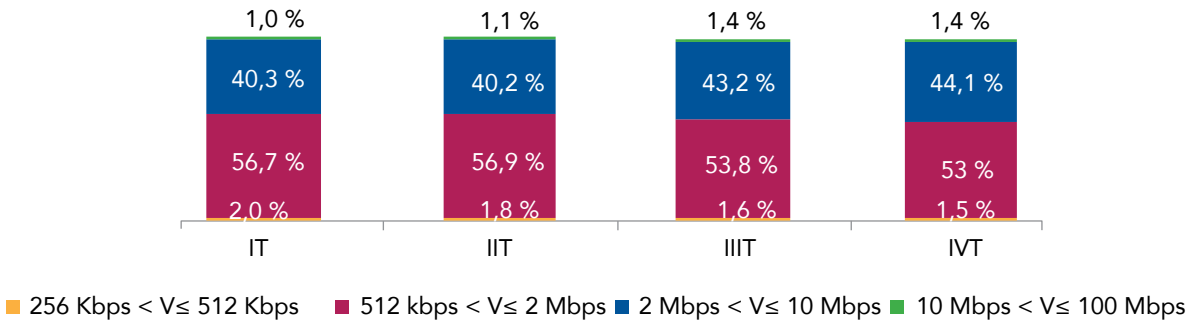
Costa Rica: Subscriptions, access to fixed Internet, distribution according to speed range, wired means, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 81

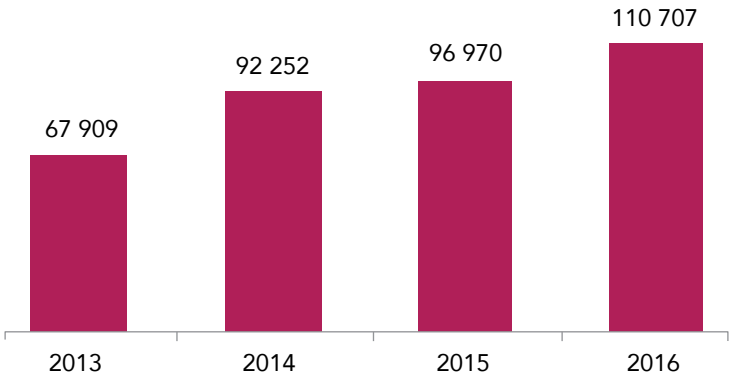
Costa Rica: Subscriptions, access to fixed Internet, distribution according to speed range, wireless means, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division..

Chart 82

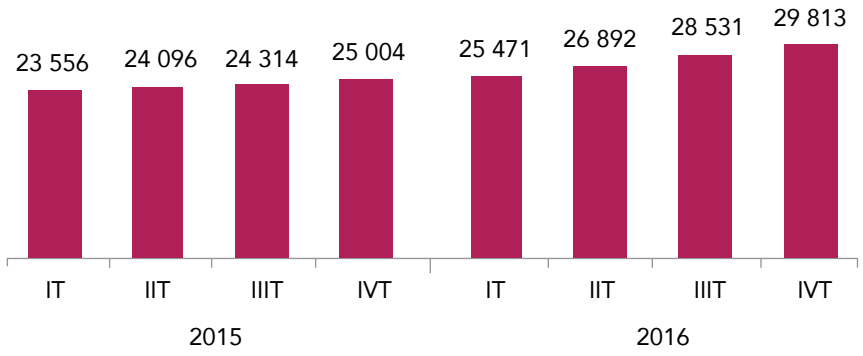
Costa Rica: Income, access to fixed Internet, 2013-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division.

Chart 83

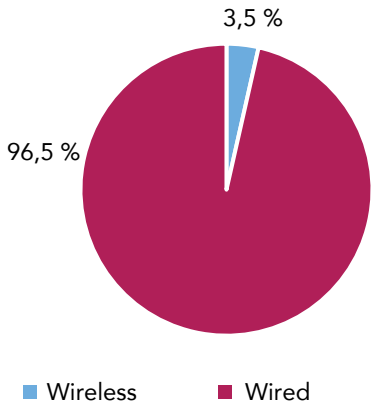
Costa Rica: Income, access to fixed Internet, 2015-2016
(Quarterly figures in million colones)



Source: SUTEL, Market Management Division.

Chart 84

Costa Rica: Income distribution from fixed Internet according to access, 2016
(Figures at the closing of the year)



Source: SUTEL, Market Management Division.

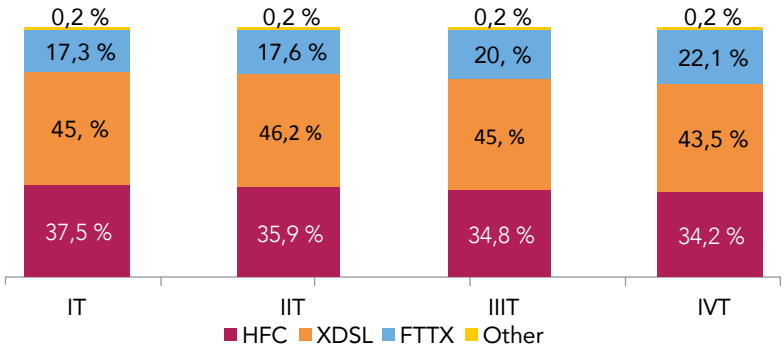
Subscriptions on wired means have a share of

96,5 %

of the income recorded at the end of 2016

Chart 85

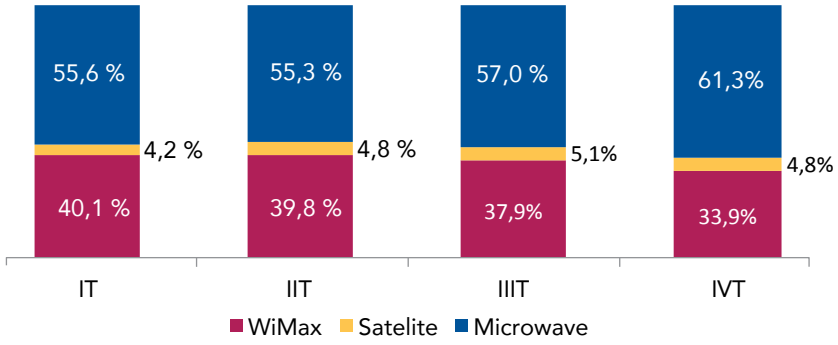
Costa Rica: Income, access to fixed Internet, distribution according to technology, wired means, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 86

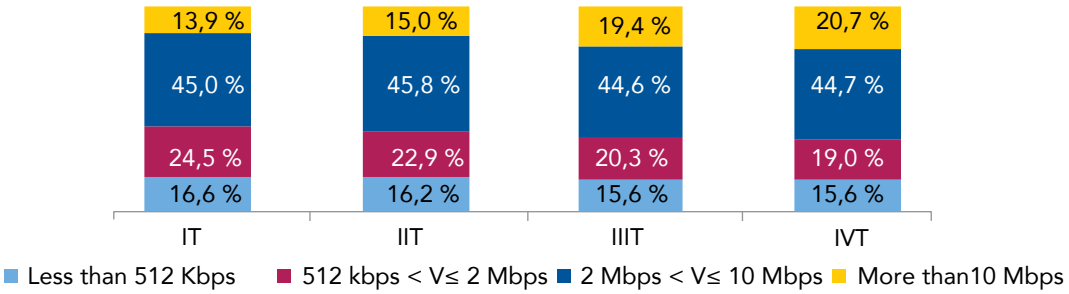
Costa Rica: Income, access to fixed Internet, distribution according to technology, wireless means, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 87

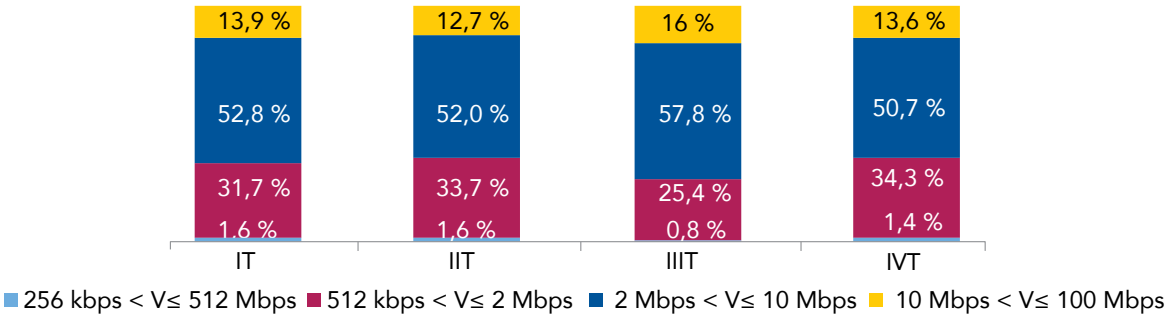
Costa Rica: Income, access to fixed Internet, distribution according to speed ranges, wired means, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 88

Costa Rica: Income, access to fixed Internet, distribution according to speed ranges, wireless means, 2016
(Quarterly figures)



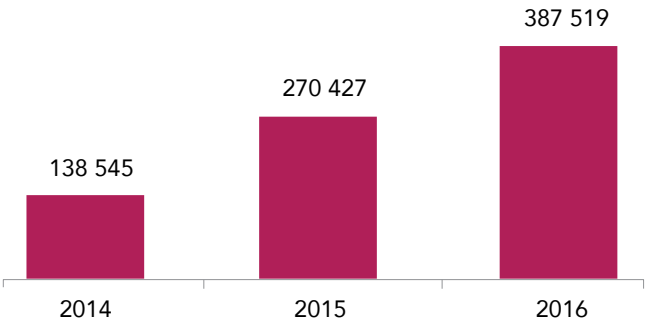
Source: SUTEL, Market Management Division.

The annual variation rate in 2016 was

55 %

Gráfico 89

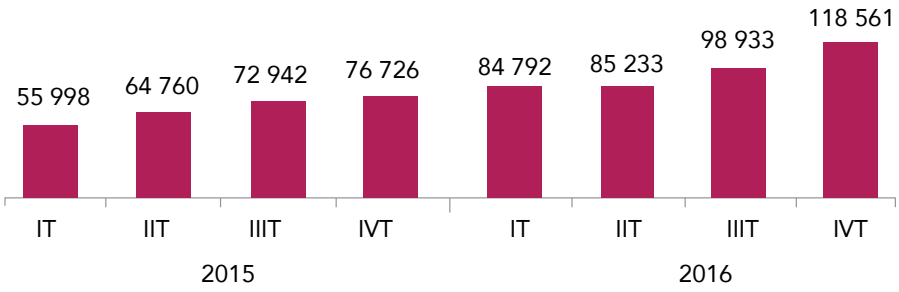
Costa Rica: Data traffic, access to fixed Internet, wired and wireless means, 2014-2016
(Annual figures in TB)



Source: SUTEL, Market Management Division.

Gráfico 90

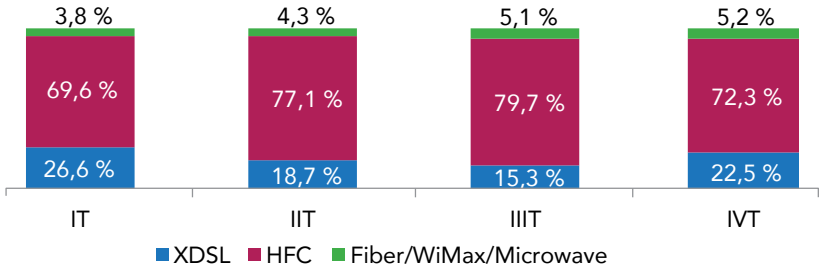
Costa Rica: Data traffic, access to fixed Internet, wired and wireless means, 2015-2016
(Quarterly figures in TB)



Source: SUTEL, Market Management Division.

Gráfico 91

Costa Rica: Data traffic, access to fixed Internet, distribution according to technology, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

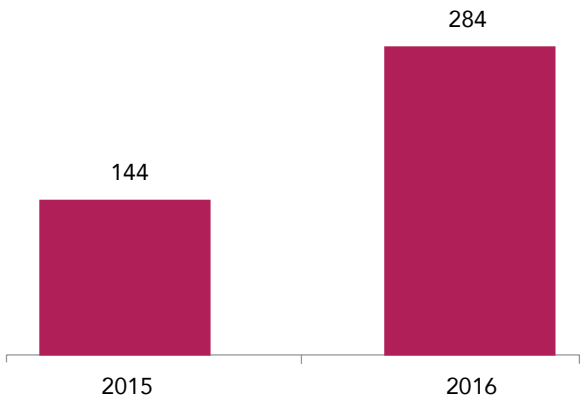
The wholesale fixed Internet access shows an increase towards the end of 2016, reporting

284

services

Chart 92

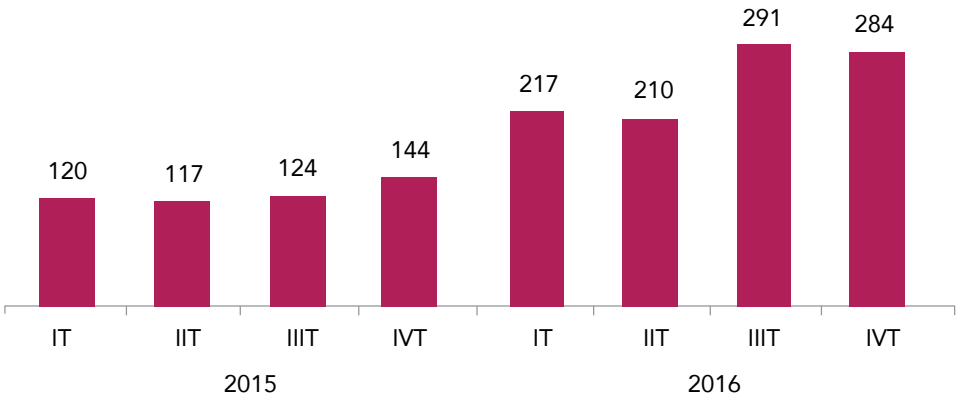
Costa Rica: Subscriptions, wholesale fixed Internet, 2015-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 93

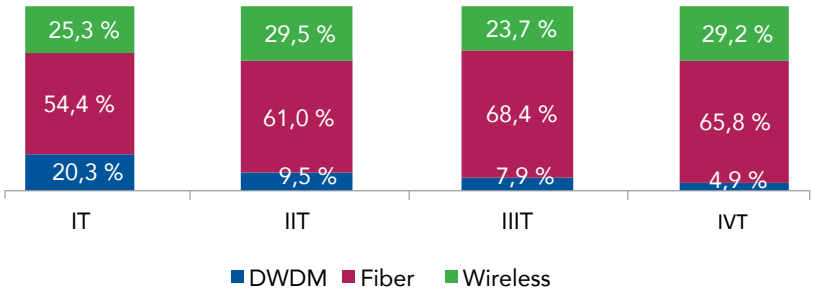
Costa Rica: Subscriptions, access to wholesale fixed Internet, 2015-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 94

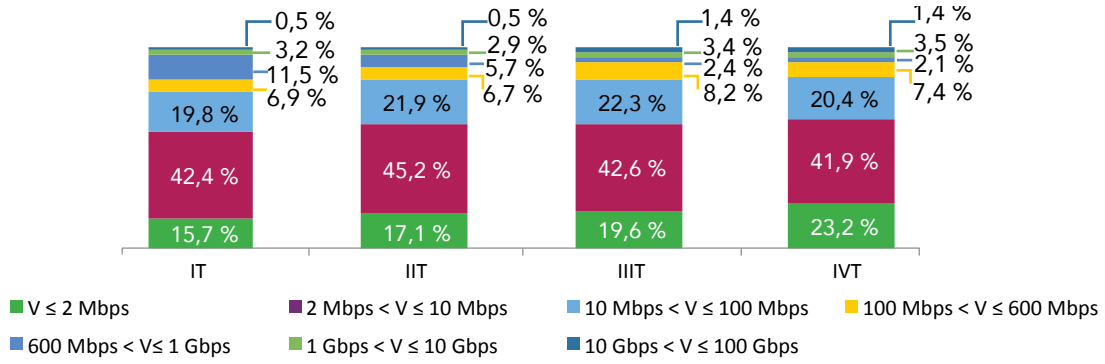
Costa Rica: Subscriptions, access to wholesale fixed Internet, distribution according to technology, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 95

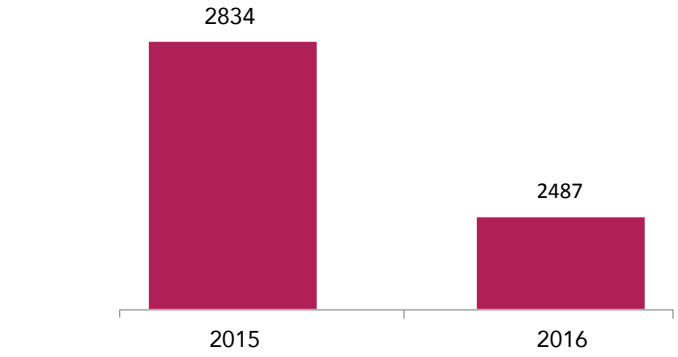
Costa Rica: Subscriptions, access to wholesale fixed Internet, percentage distribution according to speed range, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 96

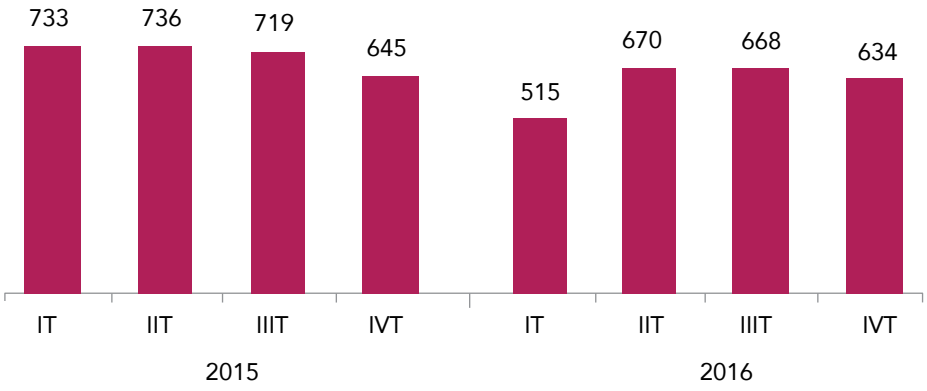
Costa Rica: Income, wholesale fixed Internet, 2015-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division.

Chart 97

Costa Rica: Income, access to wholesale fixed Internet, 2015-2016
(Quarterly figures in million colones)

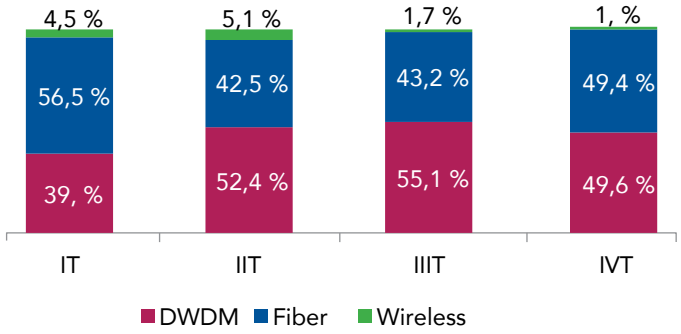


Source: SUTEL, Market Management Division.

Most of the income registered in the fixed **wholesale** service is from optic technologies

Chart 98

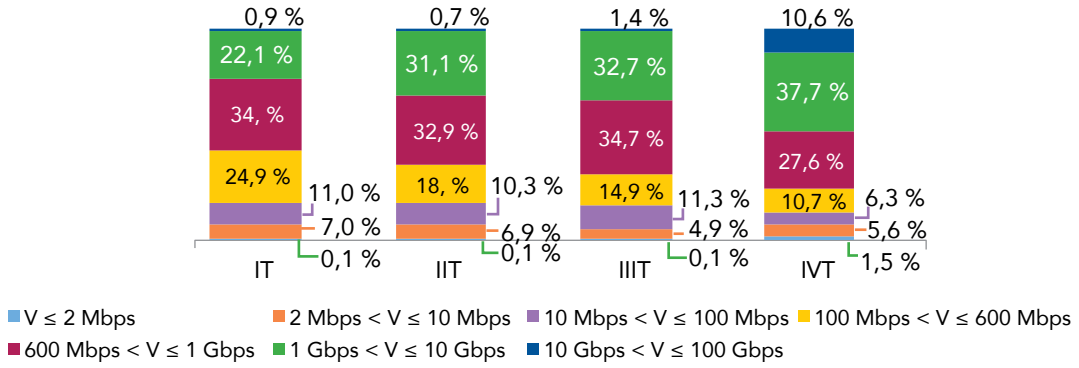
Costa Rica: Income, access to wholesale fixed Internet, distribution according to technology, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 99

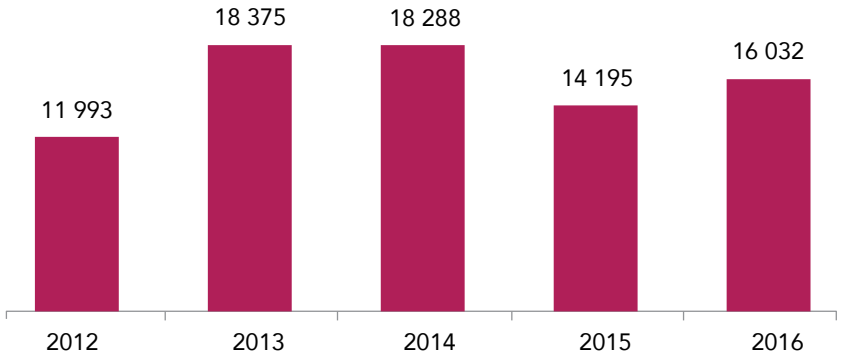
Costa Rica: Income, access to wholesale Internet, distribution according to speed ranges, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 100

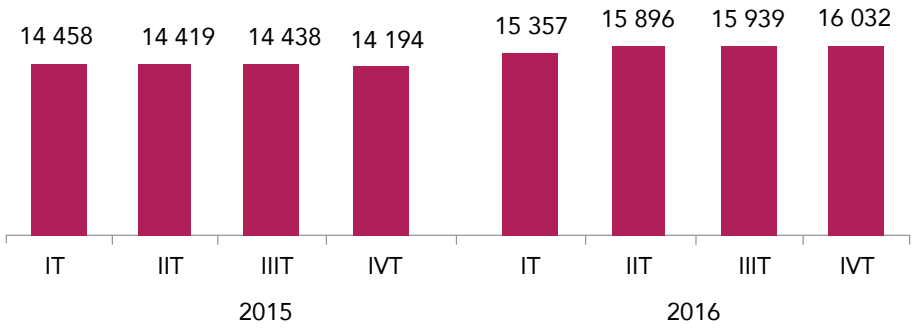
Costa Rica: Connections, dedicated lines service, 2012-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 101

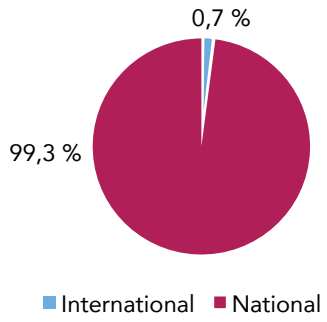
Costa Rica: Connections, dedicated lines service, 2015-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 102

Costa Rica: Connections, dedicated lines service according to geographical location, 2016
(Figures at the closing of the year)



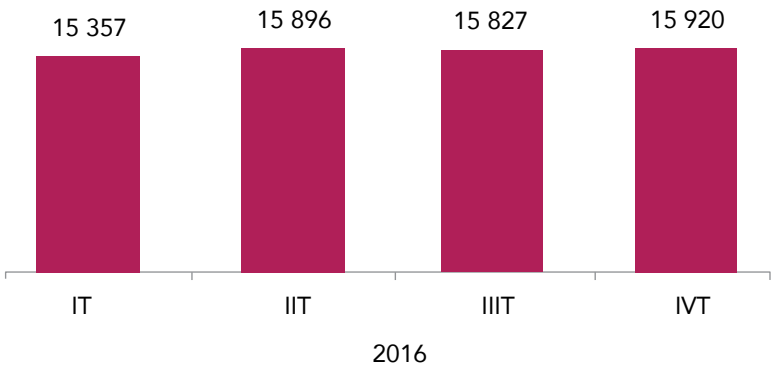
Source: SUTEL, Market Management Division.

99,3 %

of dedicated lines are commercialized in the national territory.

Chart 103

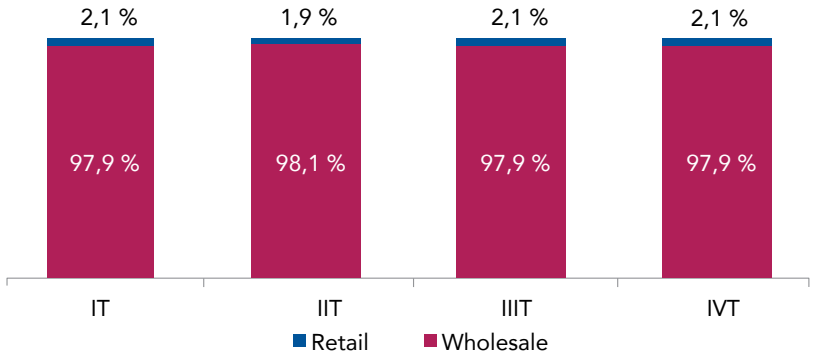
Costa Rica: Connections, dedicated lines service, customer in national territory, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 104

Costa Rica: Connections, dedicated lines service, distribution of national customers, retail and wholesale segments, 2016
(Quarterly figures)

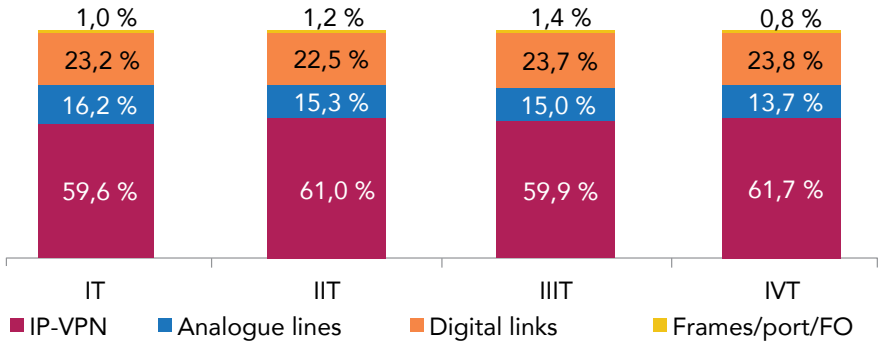


Source: SUTEL, Market Management Division.

Chart 105

Costa Rica: Connections, dedicated lines service, retail segment, distribution of national customers per technology, 2016
(Quarterly figures)

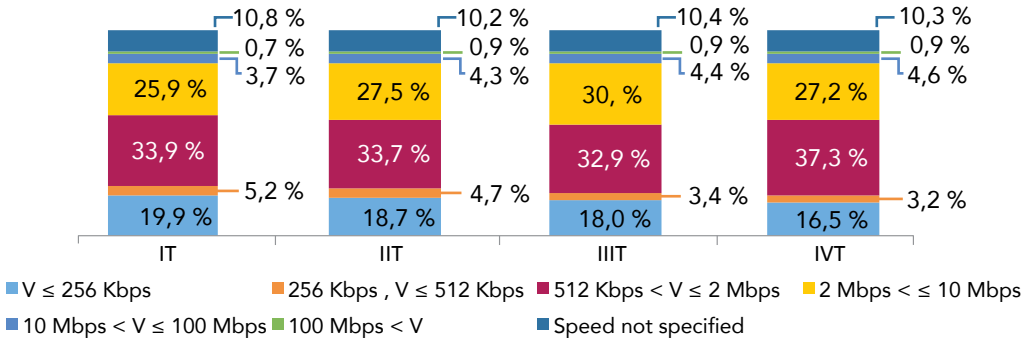
Connections over virtual private networks cover **62 %** of the total in each quarter



Source: SUTEL, Market Management Division.

Chart 106

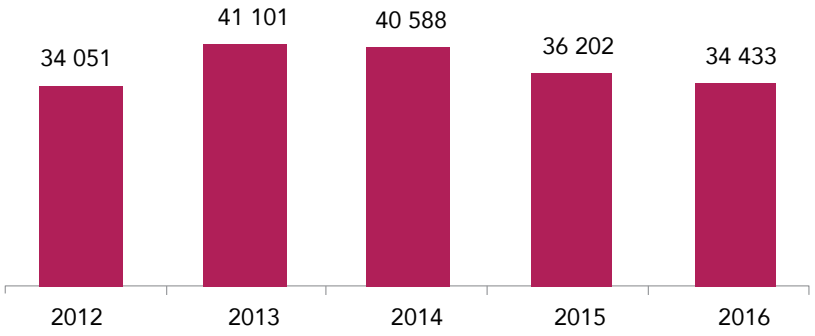
Costa Rica: Connections, dedicated lines service, retail segment, national customers by speed ranges, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 107

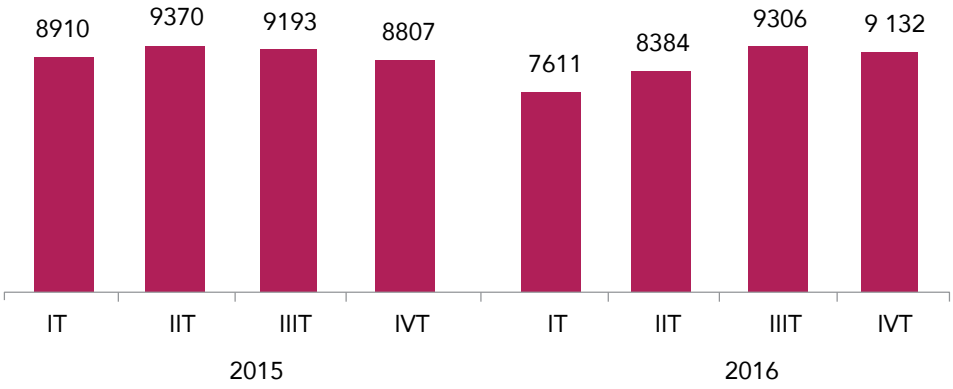
Costa Rica: Income, dedicated lines service, 2012-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division.

Chart 108

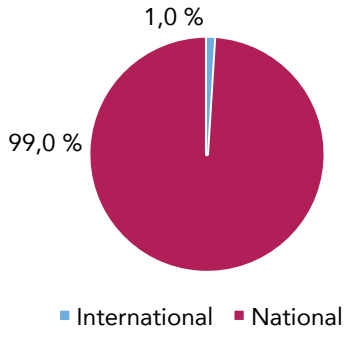
Costa Rica: Income, dedicated lines service, 2015-2016
(Quarterly figures in million colones)



Source: SUTEL, Market Management Division.

Chart 109

Costa Rica: Income, dedicated lines service according to geographical location, 2016
(Figures at the closing of the year)



Source: SUTEL, Market Management Division.

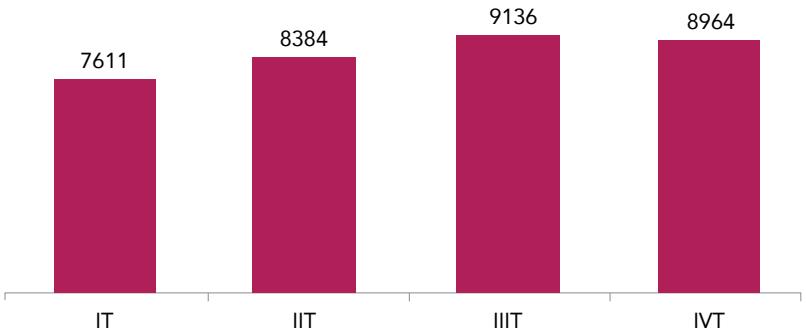
The income received from dedicated lines commercialized in the national territory reached, in 2016, a total of

8964

million colones.

Chart 110

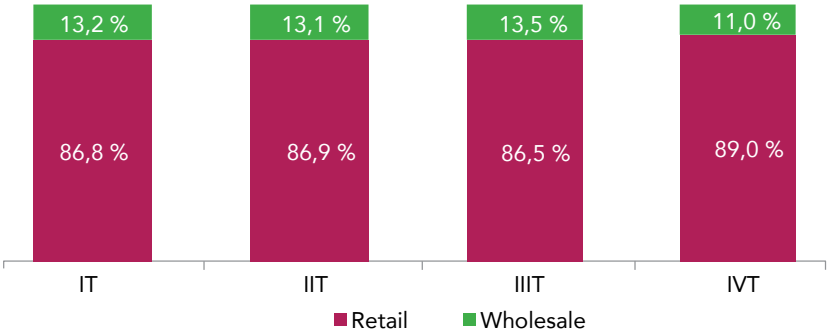
Costa Rica: Income, dedicated lines service, customers in national territory, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 111

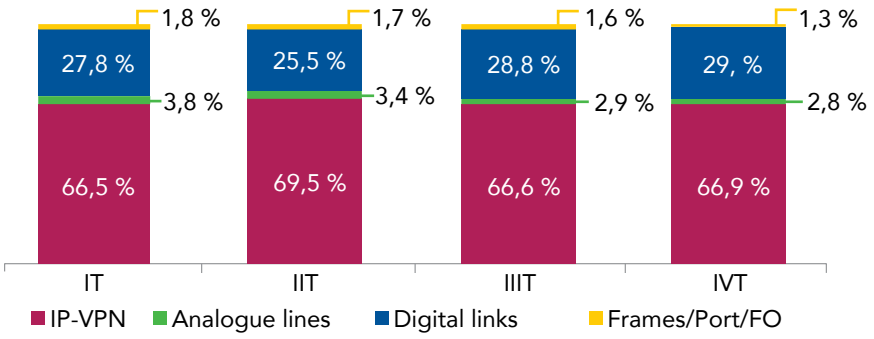
Costa Rica: Income, dedicated lines service, distribution of national customers, retail and wholesale segment, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 112

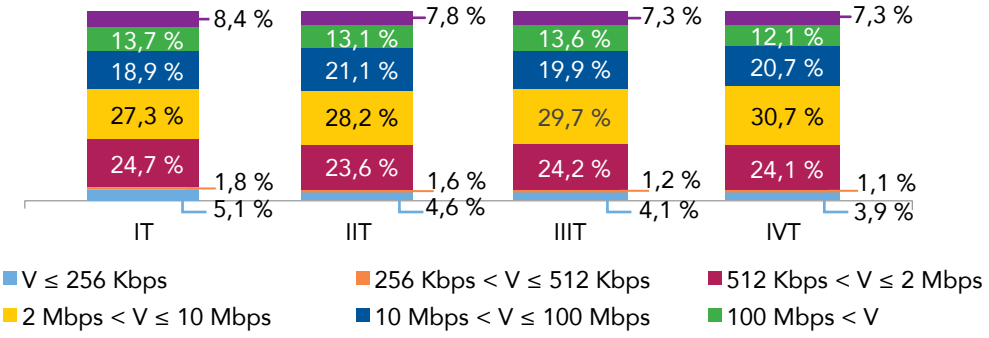
Costa Rica: Income, dedicated lines service, retail segment, distribution of national customers by technology, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

Chart 113

Costa Rica: Income, dedicated lines service, retail segment, national customers by speed ranges, 2016
(Quarterly figures)



Source: SUTEL, Market Management Division.

5

Paid Television

At the closing of 2016, there were 8.268 new subscriptions for paid television over IP, which represents an increase of 129%.

The subscriptions of this service went from 0.5% in 2013 to 1.8% in 2016.

Television

Subscriptions

Television services are those that transmit or re-transmit television and audio signals through means or configuration that differentiates them from free-reception means, and thus require a network made up by a Head End[1] for wired distribution or a satellite station for wireless distribution, in order to access the users[2], who subscribed to the service or services through a contract, providing a monetary compensation to the supplier. The main television services include: cable television, television over wireless means (satellite and microwave), and television over Internet (IPTV), which access depends on the means through which the subscriber receives Internet (wired or wireless).

Now, based on the analysis performed, it is determined that the penetration of paid television services in 2016 presents a growth by 24.345 subscriptions in comparison to the previous year, which means a 3% increased versus 2015. This contrasts with the 9% increase in subscriptions in 2015 versus 2014. In the period 2012-2016, the number of subscriptions increased in over 280.000; that is, over 52%. The details from these figures are shown in Chart 114.

When comparing the quarterly information from 2015 and 2016, subscriptions presented a stable growth. For the first two quarters of this year, there was a 7% growth versus the same periods in the previous year. During the third and fourth quarters, the growth rate was 3% with respect to 2015. This growth represents, in average, 36.000 new subscriptions per quarter in the period. In percentage terms, 2016 presented a reduction in the average quarterly variation rate of 1.1% compared to an average quarterly variation rate of 2.1% in 2015. In 2016, the average variation rate was 1%.

During 2016, the quarterly growth rate was 3%, equivalent to 23.834 subscriptions. This can be seen in Chart 115.

Regarding the subscriptions per type of access technology, subscriptions through wired technologies prevails in the market, with a share of 67%, followed by satellite television with 31% and the other technologies account for 2%, as shown in Chart 116. However, although the fact that the service through wired means has the largest market share, the percentage participation compared to previous periods has decreased. This is represented in Chart 117.

[1]Head End of the telecommunications network is the place where programming originates and the distribution network begins. Normally, the signal is received from satellites, broadcast stations, even Internet, and they are made available for distribution

[2]Users, subscribers or registered customers, either residential or commercial

Now, although the percentage participation remains the same for wired services, there has been an increase of 16.306 new subscriptions for 2016 with respect to the previous year, and this is equivalent to 3%. In the case of multi-point television, it increased by 271 subscriptions (27%) and satellite television decreased by 500 subscriptions versus 2015 (1% reduction). For 2016, there is an increase in the internet protocol television (IPTV) service of 8.268 new subscriptions with respect to 2015, which represents a growth of 129%. The details related to this are presented in Table 10.

Tables 11 and 12 show the penetration of the television service and in 2016, over half of the households in the country have some type of service appointed (56% in total), and this remains at the same level of the previous year. The penetration of the services increased by 29.139 new households, 2%, compared to 2015. When comparing the number of households in the period 2016 with the data from 2012, it is possible to see an increase of 15 percentage points. See Chart 118.

Income

Chart 119 shows the trend of total income generated from the television service, which is increasing and has reached 140.531 million colones in 2016, representing an increase of 5.681 million colones with respect to 2015, which represents a percentage growth of 4%.

Making the analysis with regards to the quarterly income in 2016, there is an average quarterly variation rate of 1%, indicating the same behavior from the previous year. In absolute terms, the average quarterly income in 2016 exceeded by 1.420 million colones the average of 2015. Such behavior is shown in Chart 120.

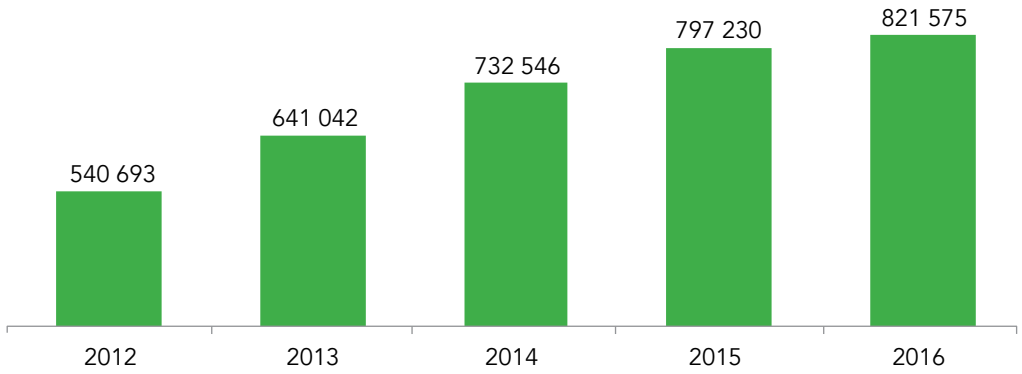
According to information provided by operators on this period, it is possible to identify the percentage participation of income by technology for 2016, regarding that cable (hybrid cable and fiber optic network) generates 74% of the total income associated to the service, followed by satellite technology with 24% and other technologies with 2%. Such information is presented in detail in Chart 121.

When comparing 2012 and 2016, the cable television service shows a percentage reduction from 84% in 2012 to 74% in 2016; this represents 10 percentage points less during the five year period. Satellite technology goes from 16% in 2012 to 24% in 2016; that is, 8 additional percentage points in share. Other technologies (IPTV and MMDS – multi-channel multi-point increased by 2 percentage points with respect to the income from previous years. Such information is presented in detail in chart 122.

Additionally, Table 123 shows that in 2016, the average income per subscriber and per access technology has had a different behavior. Regarding income in the cable service for 2016 versus 2015, there was an increase of 310 colones, and the Satellite system decreased by 92 colones. In turn, the services that present a reduction are multi-point television service, decreasing by 903 colones and television over IP with 4.500 colones less than in 2015 – all these are data by subscriber.

Chart 114

Costa Rica: Total subscriptions of paid television services, 2012-2016
(Annual figures)

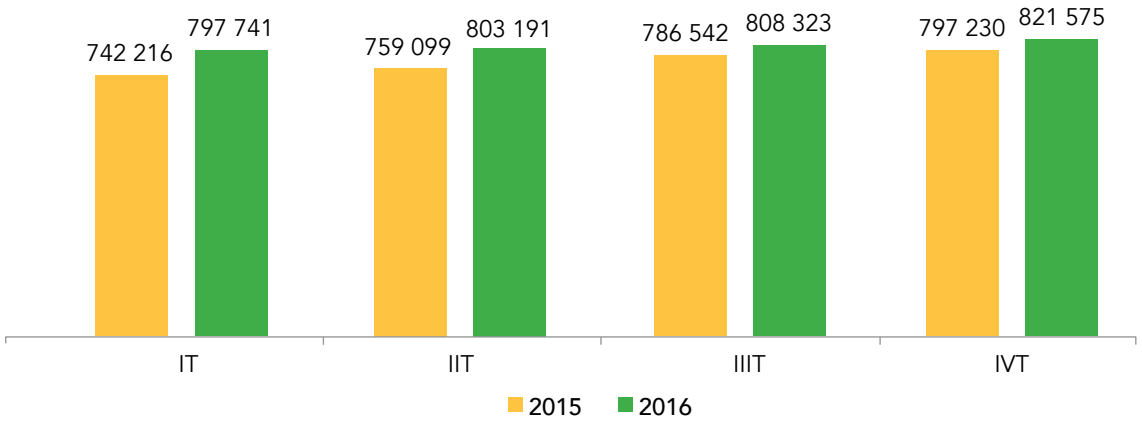


Source: SUTEL, Market Management Division.

There were
821 575
subscriptions of paid TV in 2016.

Chart 115

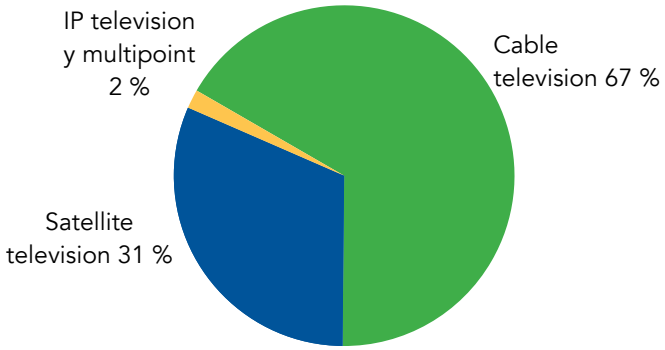
Costa Rica: Subscriptions to the paid television service by quarter, 2015-2016
(Annual figures)



Source: SUTEL, Market Management Division.

Chart 116

Costa Rica: Percentage distribution of the subscriptions to paid television services by type of access technology, 2016
(Figures in percentages)

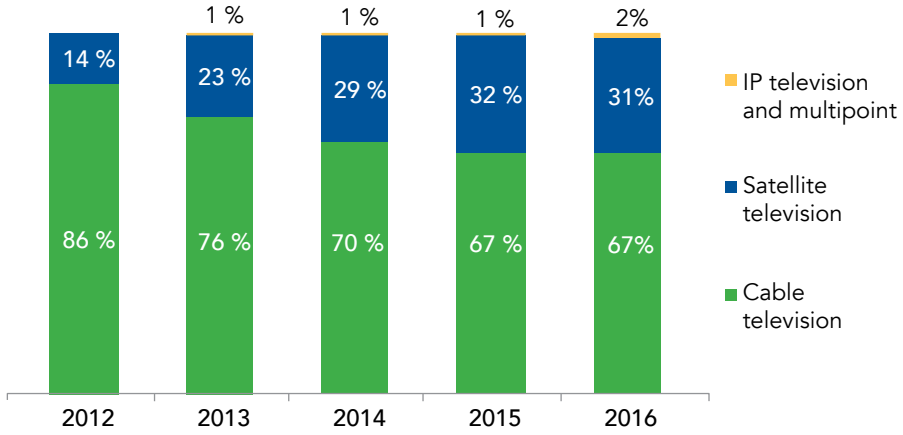


Source: SUTEL, Market Management Division.

67 %
of subscriptions are through cable television

Chart 117

Costa Rica: Evolution of percentage participation of the paid television service by type of technology, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

Table 10

Costa Rica: Total subscriptions to paid television services by access technology, 2012-2016
(Annual figures)

Technology	2012	2013	2014	2015	2016
Cable television	462 977	489 848	510 390	531 807	548 113
Satellite television	76 491	146 936	217 140	257 986	257 486
Television over IP	0	3071	4191	6434	14 702
Multi-point television	1225	1187	825	1003	1274
Total	**540 693**	**641 042**	**732 546**	**797 230**	**821 575**

Source: SUTEL, Market Development Divicion

Table 11

Costa Rica: Distribution of households with some type of paid television service, 2012-2016
(Annual figures)

Penetration TV subscription	2012	2013	2014	2015	2016
Subscriptions	540 693	641 042	732 546	797 230	821 575
Households	1 326 805	1 348 036	1 399 271	1 436 120	1 465 259
Penetration	41 %	48 %	52 %	56 %	56 %

Source: SUTEL, Market Development Divicion

While in 2012
41%
of the households had some type of paid television service, such proportion reached 56% in 2016

Table 12

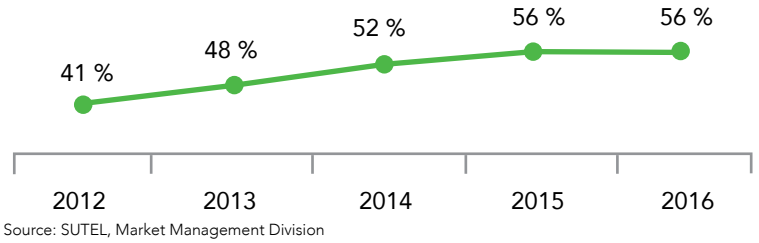
Costa Rica: distribution of households with some type of paid television service, 2012-2016
(Annual figures)

Technology	2012	2013	2014	2015	2016
Cable television	75 369	80 810	91 994	98 859	103 927
Satellite television	14 287	22 484	30 721	34 570	34 220
Television over IP	-	447	1618	1371	2335
Ground television with multi-point distribution	61	61	57	49	49
Total	**89 716**	**103 802**	**124 390**	**134 850**	**140 531**

Source: SUTEL, Market Management Division.

Chart 118

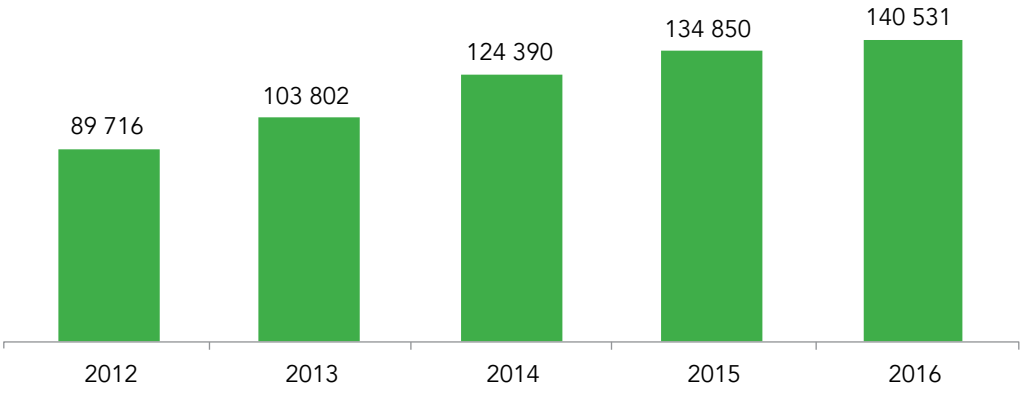
Costa Rica: Proportion of households with some type of paid television service, 2012.2016
(Annual figures)



Source: SUTEL, Market Management Division

Chart 119

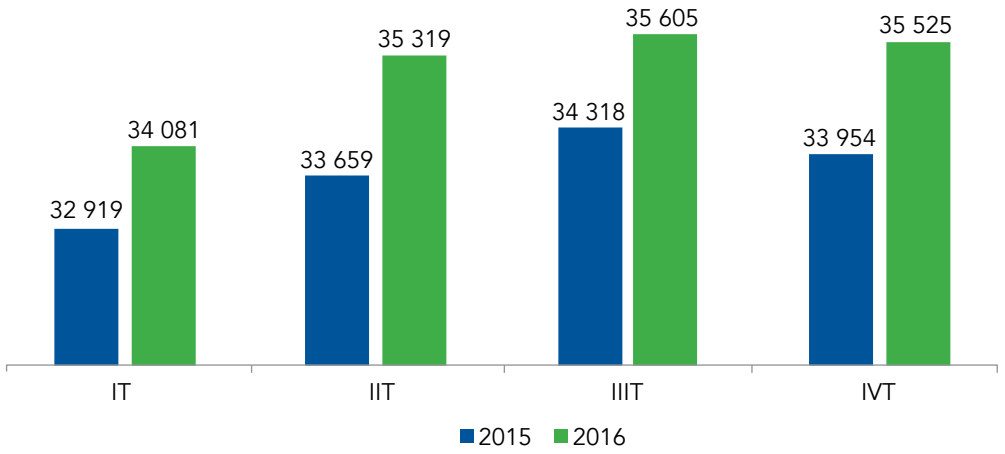
Costa Rica: Total income from paid television services, 2012-2016
(Annual figures in million colones)



Source: SUTEL, Market Management Division

Chart 120

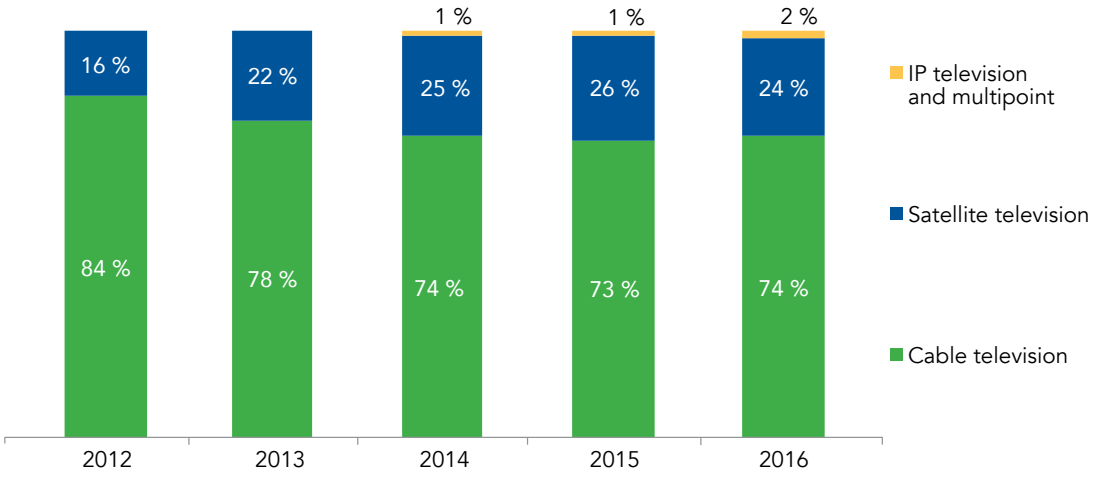
Costa Rica: Total income from paid television services, 2015-2016
(Figures in million colones per quarter)



Source: SUTEL, Market Management Division.

Chart 121

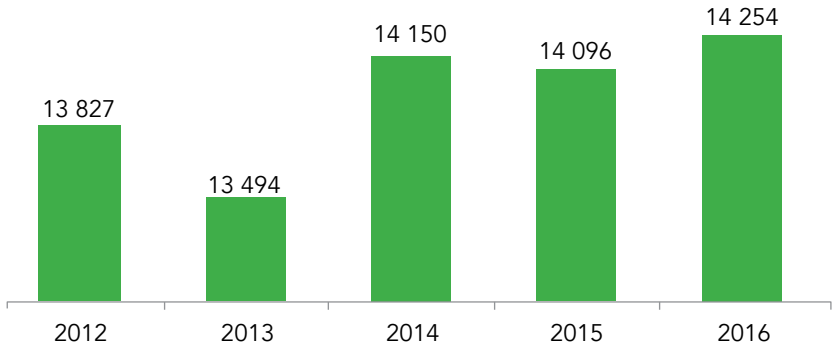
Costa Rica: Percentage distribution of income associated to paid television services by type of access technology, 2012-2016
(Annual figures in percentages)



Source: SUTEL, Market Management Division.

Chart 122

Costa Rica: Average monthly income per subscriber to the paid television service, 2012-2016
(Annual figures in colones)



Source: SUTEL, Market Management Division.

Table 123

Costa Rica: Average monthly income per subscriber to the paid television service according to access technology, 2012-2016
(Annual figures in colones)

Technology	2012	2013	2014	2015	2016
Cable television	13 566	13 747	15 020	15 491	15 801
Satellite television	15 565	12 752	11 790	11 167	11 075
Television over IP	-	12 138	32 169	17 760	13 234
Ground television with multi-point distribution	4117	4279	5758	4101	3198
Total	**13 827**	**13 494**	**14 150**	**14 096**	**14 254**

Source: SUTEL, Market Management Division

6

Prices and rates

2016 was characterized by being a year of stability in the prices of mobile telephony and fixed Internet services.

Prices and rates of telecommunications services

Mobile telephony

Pre-paid mobile telephony

Just as in previous years, in 2016, the operators used the maximum rate established to offer the pre-paid mobile telephony service (40 colones per minute)1, in contrast with the thirty-eight colones from 2013. The minimum price (24.40 colones per minute in 2016) calculated as the average of the lowest price per minute for the different options available to the users according to the time frame and the destination of the call (on net or off net) is lower than the one observed in the previous year, and similar to the one of 2013.

In average values, the minimum price decreased by 3.2 colones per minute from 2015 to 2016, as can be seen in Chart 123 and Table 14. However, when comparing the corresponding average prices, there is a 1.3% increase, similar to that from 2014 to 2015 (1.2%), but these percentages are still below the average increase registered from 2013 to 2014 (7%), period in which the operators presented less offers.

Alternatively, regarding pre-paid mobile telephony services, an average price per minute is calculated, taking into consideration the income and the corresponding traffic consigned in the section related to mobile telephony. Considering the last eight quarters (years 2015 and 2016), such average price ranges between 24 colones in the first quarter of 2016 and 28.6 colones for the third quarter of this same year. In general, it is possible to see an increase from 2015 (25.6 colones) to the price of 2016 (26.3 colones) as shown in Chart 124.

Regarding text messages, the price in 2016, in general, corresponds to the maximum rate fixed by the operators (3 colones per message), in virtue of the fact that this service is not regulated, since it is considered and information service, as derived from a provision of ARESEP's Board of Directors, contained in resolution RJD-019-2013 from April 4th, 2013.

[1] The prices considered for the mobile telephony services include the corresponding sales tax: 13%

Post-paid mobile telephony

In 2016, as well as in the two previous years, the operators offered a price that practically coincides with the maximum rate established (34 colones per minute), which contrasts with the almost 30 colones offered in 2013.

The minimum average price for 2016 (27.40 colones per minutes) calculated as the average between the lowest price per minute for the different options of time and destination (on net or off net), although lower than the lowest price from 2015, it is still higher than the amounts for 2013 and 2014. In the last years, the price had the following annual variations: 3.2%, 6.6% and -4.4%. Chart 125 and Table 15 present the corresponding details.

Considering the mobile telephony service in general, consistent with the provisions of the paragraph that corresponds to such service, the average annual income was calculated based on traffic; and the income associated to the service was also calculated. The resulting figures are shown in Table 16, evidencing that such averages have varied from 30 colones (minimum value) in 2012 to 43 colones (maximum value) in 2015.

Regarding maximum, minimum and average prices of text messages, contrary to the pre-paid modality, although the maximum rate remained within the cap of the 3 colones, the minimum rate decreased up to 1.30 colones in the cases of on net messages of the corresponding operators; therefore, the average price decreased 1% during the last year, a reduction lesser than 6% of the decrease from 2014 to 2015.

Mobile Internet

Post-paid mobile Internet

In the case of mobile Internet services offered as post-paid, just as in the case of wired Internet, the corresponding rates vary depending on the connection speed. Considering that this service is provided by only three network operators, any alteration in the corresponding supply from any of these operators will have an important effect in the resulting average prices.

Regarding 2016, the average prices varied between 2.623 colones, when the maximum connection speed is 256 kbps to 20.500 colones if the maximum speed is 5.120 kbps. Therefore, it should be indicated that, in general, those prices are similar, to the 2015 prices, and lower than the prices in 2014, except for the prices applied to the maximum connection speeds of 512 kbps, 1536 kbps, 2048 kbps and 4096 kbps. Table 17 and Chart 126 present the maximum, minimum and average prices.

Pre-paid mobile Internet

In the pre-paid modality, the fact that the operators are authorized to charge by data downloads, although the connection speed is one of the variables considered by the operators for the definition of the rate, the amount of information that can be downloaded by the users is determinant; thus, for this statistical report, we present the corresponding rates based on this variable. It is important to mention, however, that to differentiate their product, the commercial offers of the suppliers differ from one another; therefore, from the information compiled, in the case of some connection speeds, it was only feasible to identify a single supplier providing the corresponding service. Since there is no information from 2013 in the same format, the results obtained correspond exclusively to the period 2014-2016, and evidence that, except for a download of 3 GB, the prices for the three years considered in the analysis do not experience significant variations from one year to the next. The corresponding figures are presented in Table 18 and Chart 127, with the exception that this latter includes only data for downloads over 200 MB of information.

Based on the information related to mobile Internet traffic (pre-paid and post-paid modalities) and to the income generated from such traffic (included in the section related to Data Transfer), it is feasible to calculate the average income per MB of traffic in the mobile networks. The figures obtained for 2015 and 2016 show that the average quarterly value registers a decrease from 2.57 colones per MB in the first quarter of 2015 to 1.50 colones in the fourth quarter of 2016, as can be seen in Chart 128.

Fixed Internet service

Considering the data sent by the different operators that provide fixed Internet access services, this section makes a comparative analysis of the monthly rates charged in 2016. The analysis also considers the variations of the rates in 2016 with respect to the rates from the previous three years, as long as the corresponding information is available.

The information was requested by SUTEL based on the different modalities in which the Internet access service is offered. Basically, the determinant characteristics related to the type of connection (symmetric and asymmetric speed)[2] and maximum over-subscription[3] offered to the different users of the service, and those are the explicative variables considered in the analysis performed. In other words, the offers are classified based on what the service providers report and per the corresponding level of subscription[4]. In all cases, maximum and minimum prices are considered, in addition to the average price; the detail per operator is omitted. Additionally, the differences between one supplier and the other, in terms of the speed at which it is feasible to upload information, hinder, in some cases, the adequate comparison of the different rates at which each supplier offers the services.

[2] Symmetric speed is a connection speed for download speed equal to the upload speed for the customer. Asymmetric speed, in turn, considers different connection speeds, where download is faster than upload.
[3] Over-subscription refers to the number of connections to the Internet service by connection link.

Fixed Internet with over-subscription level of 1:20

Internet service with over-subscription level of 1:20 is offered by most operators, since it can be offered at a lower price; therefore, it constitutes the option with the largest number of users, particularly in the asymmetric modality. In this sense, this level of over-subscription is mainly offered in the residential sector and in small and medium enterprises. A detail of the prices associated to the service, in 2016, considering asymmetric speeds, is shown in Table 19.

Except for speed connections of 2048/768 and 5120/1024 kbps, the corresponding figures show a direct relationship between price and speed of connection; thus, the greater the speed, the higher the price registered in the market.

In 2016, the average price covers from 8.576 colones, for a connection speed of 256/128 kbps, to 25.425 colones for the speed of 10240/1024 kbps. Such range is narrower than any of the ranges from previous years, particularly when considering 2013, where the average price for the service at a speed of 10240/1024 kbps reached 45.999 colones. The lowest range observed in the last years is explained because the rate for the connection speed of 256/128 kbps shows an increase in the period 2014-2016 (75%) in comparison to the rate during 2013 (4.904 colones). The price variation ranges for the service can be seen for the different speeds consigned, both for 2016 and for the three previous years, in Table 20 and Chart 129.

Fixed Internet with a level of over-subscription of 1:5

Another over-subscription level with supply available that allows for the association of prices with the different connection speeds is that of five services per link; that is, with an over-subscription level of 1:5. In this case, considering the asymmetric connection modalities and the things that happened with over-subscription 1:20, the presence of a significant number of suppliers results in a direct relationship between connection speed and price, in most of the corresponding connection speeds. In fact, for 2016, with the exception of the connection speed of 4096/1024 kbps, which associated price is greater than the price of the following connection speed in ascending order (5120/1024 kbps), it can be seen that the greater the speed, the higher the price in which the service is offered. As expected, the prices observed, which in average vary from 39.031 colones for a connection speed of 1024/512 kbps to 234.512 colones for the speed of 10240/1024 kbps, are greater to the prices registered when the over-subscription is 1:20. The details of prices (minimum, maximum and average) applied by the suppliers for asymmetric connections speeds, with an over-subscription level of 1:5, are shown in Table 21.

[4] Contrary to previous reports, this report omits the analysis of Internet access services without any over subscription; that is, in an exclusive 1:1 agreement, since it is not feasible to deduce that such service is provided without over-subscription from all the information sent by the suppliers.

Table 22 and Chart 130 include the rate variation ranges for the asymmetric Internet service during the three-year period 2014-2016, considering an over-subscription level of 1:5. In this case in general, the prices in 2016, although significantly lower than the prices in 2014, exceed, in an average of 12.7%, the prices registered for the year 2015.

Regarding the symmetric Internet service that is provided at the over-subscription level 1:5, in 2016 (Table 23) there were growing prices, as the speed of connection increases, except for the connection speed of 9 Mbps. Such positive ratio occurs, with the exception mentioned[5], for each of the other three years analyzed; namely 2013 to 2015. However, in 2015, the behavior of prices with respect to the corresponding speeds is erratic. Thus, for some speed ranges, the prices associated are lower than the ones charged for the service at lower speed ranges. To explain such variability, we should consider the fact that the number of suppliers offering the service changes from one speed range to the other, and the greater the number of suppliers, the lower the corresponding price. In turn, such erratic behavior results, in higher prices for 2015 versus those observed in the other three years of the analysis. Regarding 2016, the corresponding values are lower than the rest; therefore, between 2013 and 2016, there is an average reduction of 14.8%. The information related to this can be seen in Table 24 and Chart 131 which only include information regarding the period 2014-2016.

Based on the information related to the total traffic associated to the fixed Internet service, regardless of speed and over-subscription levels and of the income consigned in the Data Transfer section, this report calculates an average income per MB of traffic from the users of such service. The resulting values indicate that during the eight quarters of the years 2015 and 2016, there has been a decreasing trend in the corresponding price, to such extent that from 40 cents per MB in the first quarter of 2015, the price has decreased to 24 cents in the fourth quarter of 2016. See Chart 132.

Comparative analysis 2009-2015

The information available regarding the prices for the fixed Internet service, particularly with respect to the offers related to the services provided with over-subscription level 1:20, allows for making a comparison of the prices applied in 2009 and the prices valid for 2016. This comparison is important when considering that the rates applied in 2009 were maximum rates set initially by ARESEP and later ratified by SUTEL through resolution RCS-615-2009. It can be seen that the opening of the sector and, the increase in the number of Internet suppliers, the prices assessed have decreased by 50% in average versus the pre-existing rates, as shown in Table 25.

[5] Contrary to 2016, in 2013 and 2015, the price of the 9 Mbps connection exceeded the price for the 10 Mbps connection

Such rate comparison can be seen in Chart 133, which shows that, in relative terms, the reduction has been greater as the relative connection speed increases, to such extent that, in the case of connection speed 4096/768 kbps, the reduction reaches 80%.

Television

In this service, the maximum, minimum and average prices for the basic packages[6] for the period 2013-2016 indicate that although the minimum price of the basic package is greater in 2016 than that of 2015 (11.3%), both values are lower than the value from 2014; therefore, the price in 2016 is 47% lower than the price of 2014. The opposite behavior was seen during 2014 in comparison with 2013, when such minimum price increased by 12.4%.

Regarding the maximum average price, the value from 2016 (21.944 colones) is similar to the prices from the previous years, except for 2013, which is 33.7% less. Additionally, in regards to 2015, there was a reduction of 2.5%. The corresponding details for this section are included both in Table 26 and in Chart 134.

[6] Basic package is the service with 75 analogue channels

Table 14

Costa Rica: Prices per minute[1] according to type of consumption for pre-paid telephony, 2013-2016
(Figures in colones)

Time of the call, pre-paid modality	2013	2014	2015	2016			Average variation 2013-2014	Average variation 2014-2015	Average variation 2015-2016
	Average prices			Maximum price	Minimum price	Average price			
Average price of a local 1 minute call (peak hours, on net) for mobile cellular telephony	31	31	34	40	27	35	2 %	10 %	2 %
Average price of a local 1 minute call (non-peak hours, on net) for mobile cellular telephony	28	31	33	40	27	36	9 %	6 %	9 %
Average price of a local 1 minute call (non-peak hours, off net) for mobile cellular telephony	32	35	35	40	26	36	8 %	-1 %	3 %
Average price of a local 1 minute call (peak hours, off net) for mobile cellular telephony	33	35	35	40	18	31	5 %	-1 %	-11 %
Average price of a local 1 minute call (non-peak hours, to fixed network) for mobile cellular telephony	30	35	33	40	17	31	17 %	-5 %	-7 %
Average price of a local call per minute (peak hours, to fixed network) for mobile cellular telephony	33	35	33	40	26	36	4 %	-5 %	7 %
Average price of a local call per minute (weekend/night time, on net) for mobile cellular telephony	31	32	34	40	27	36	4 %	8 %	4 %
Average price of a local call per minute (weekend/night time, off net) for mobile cellular telephony	33	35	35	40	26	36	4 %	-1 %	3 %
Average price of a local call per minute (weekend/night time, to fixed network) for mobile cellular telephony	32	35	35	40	26	36	9 %	-1	2 %
General average price per minute	32	34	34	40	24	35	7 %	1 %	1 %
Average price of SMS (on net) for mobile cellular telephony	2,6 %	2,9 %	3,0 %	3	3	3	11 %	2 %	2 %
Average price of SMS (off net) for mobile cellular telephony	2,7	2,9	3,0	3	3	3	8 %	3 %	2 %

[1] Prices include sales tax.
Source: SUTEL, Market Management Division.

In mobile telephony, pre-paid modality, the price per minute ranges between a minimum of

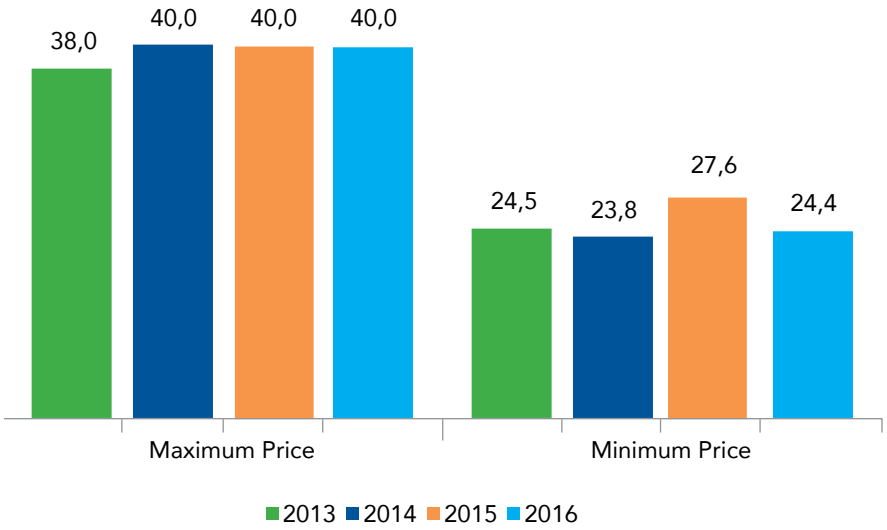
24 colones

and the maximum authorized rate of

40 colones

Chart 123

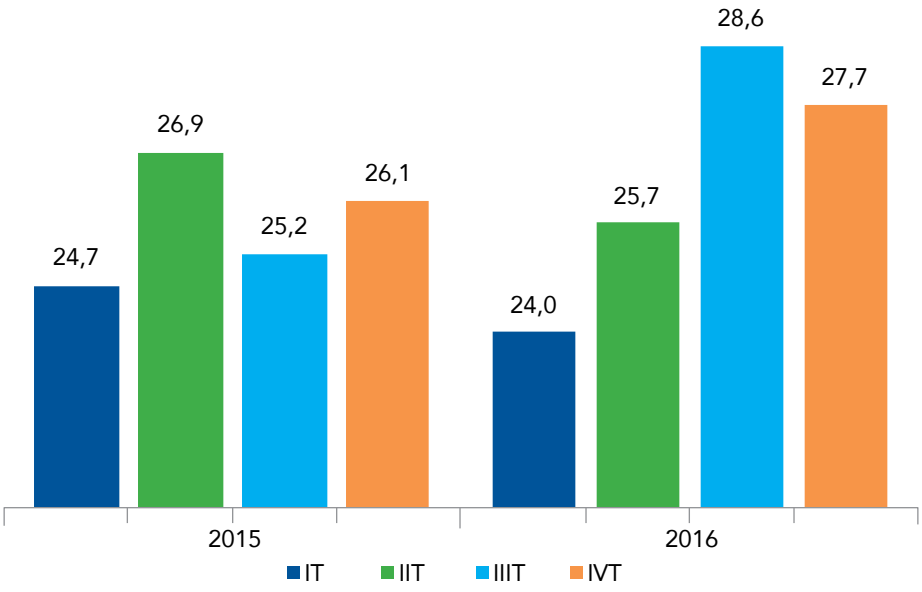
Costa Rica: Maximum and minimum prices per minute in pre-paid telephony, 2013-2016
(Figures in colones)



Source: SUTEL, Market Management Division.

Chart 124

Costa Rica: Average quarterly prices per minute in pre-paid telephony, 2015-2016
(Figures in Colones)



Source: SUTEL, Market Management Division.

Table 15

Costa Rica: Prices per minute[1] according to type of consumption for post-paid telephony, 2013-2016
(Figures in colones)

Time of the call, pre-paid modality	2013	2014	2015	2016			Average variation 2013-2014	Average variation 2014-2015	Average variation 2015-2016
	Average prices			Maximum price	Minimum price	Average price			
Average price of a local 1 minute call (peak hours, on net) for mobile cellular telephony	30	31	32	34	29	31	2 %	4 %	-4 %
Average price of a local 1 minute call (non-peak hours, on net) for mobile cellular telephony	27	28	32	34	29	31	4 %	16 %	-4 %
Average price of a local 1 minute call (non-peak hours, off net) for mobile cellular telephony	29	31	32	34	30	32	7 %	3 %	-1 %
Average price of a local 1 minute call (peak hours, off net) for mobile cellular telephony	29	31	32	34	23	29	7 %	3 %	-8 %
Average price of a local 1 minute call (non-peak hours, to fixed network) for mobile cellular telephony	27	29	32	34	30	32	5 %	11 %	-1 %
Average price of a local call per minute (peak hours, to fixed network) for mobile cellular telephony	29	29	32	34	23	29	-1 %	11 %	-8 %
Average price of a local call per minute (weekend/night time, on net) for mobile cellular telephony	30	31	32	34	23	29	2 %	4 %	-11 %
Average price of a local call per minute (weekend/night time, off net) for mobile cellular telephony	31	31	32	34	30	32	1 %	3 %	-1 %
Average price of a local call per minute (weekend/night time, to fixed network) for mobile cellular telephony	30	31	32	34	30	32	1 %	3 %	-1 %
General average price per minute	29	30	32	34	27	31	3 %	7 %	-4 %
Average price of SMS (on net) for mobile cellular telephony	2,3	2,6	2,5	3	1,3	2,4	16 %	-6 %	-1 %
Average price of SMS (off net) for mobile cellular telephony	2,5	2,7	2,5	3	1,5	2,5	8 %	-4 %	-1 %

[1] Prices include sales tax.
Source: SUTEL, Market Management Division.

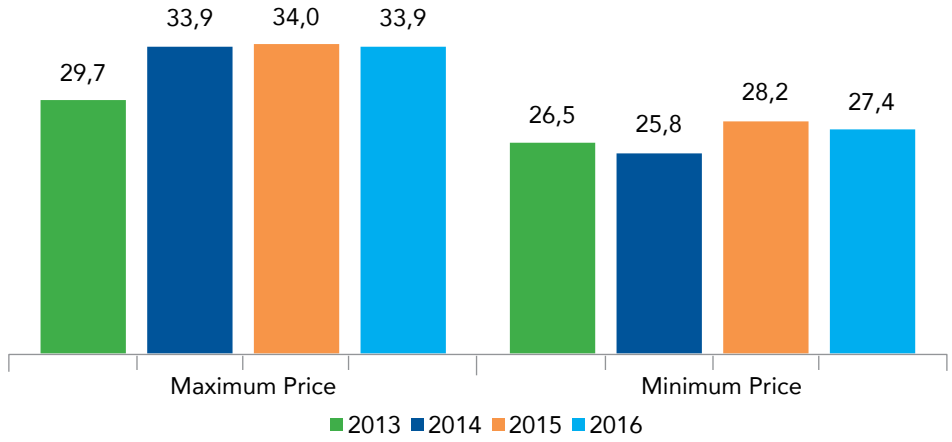
In the post-paid modality, the range of prices of mobile telephony go from

27 to 34

colones per minute

Chart 125

Costa Rica: Maximum and minimum prices per minute in post-paid telephony, 2013-2016
(Figures in colones)



Source: SUTEL, Market Management Division.

Table 16

Costa Rica: Average income per minute (ARPM)[1], 2012-2016
(Figures in colones)

Año:	2012	2013	2014	2015	2016
Voice income	234 567 473 720	254 526 761 626	342 580 304 459	344 057 278 461	337 130 465 127
Total traffic	7 944 965 963	8 798 921 561	9 037 291 821	8 252 296 345	7 631 673 792
ARPM	30	29	38	42	44

[1] It only includes voice traffic and income
Source: SUTEL, Market Management Division.

Table 17

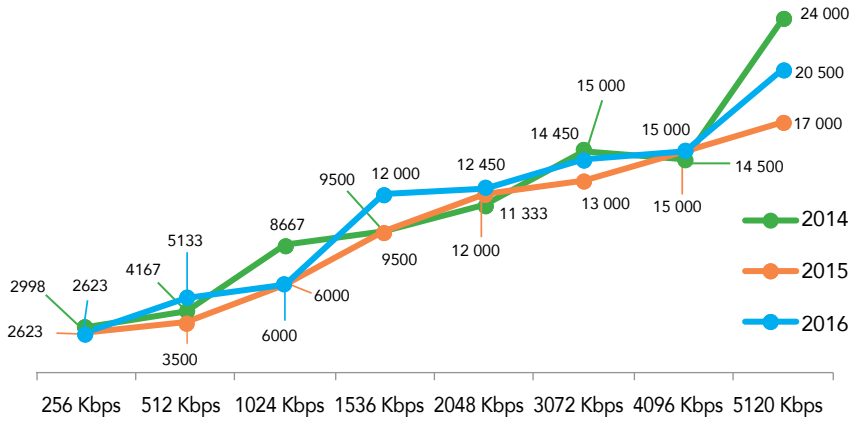
Costa Rica: Prices of mobile Internet access service, post-paid modality, 2013-2016
(Figures in colones per month)

Maximum downloand and upload speeds	Maximum price 2016	Minimum price 2016	Average price 2016	Average price 2015	Average price 2014	Average price 2013
256 Kbps	3995	1250	2623	2623	2998	2623
512 Kbps	6900	2000	5133	3500	4167	3500
1024 Kbps	10 000	4000	6000	6000	8667	6000
1536 Kbps	12 000	12 000	12 000	9500	9500	9500
2048 Kbps	12 900	12 000	12 450	12 000	11 333	12 000
3072 Kbps	15 900	13 000	14 450	13 000	15 000	13 000
4096 Kbps	15 000	15 000	15 000	15 000	14 500	15 000
5120 Kbps	24 000	17 000	20 500	17 000	24 000	20 500

Source: SUTEL, Market Management Division.

Chart 126

Costa Rica: Prices of the mobile Internet access service, post-paid modality, 2014-2016
(Figures in colones per month)



Source: SUTEL, Market Management Division.

Table 18

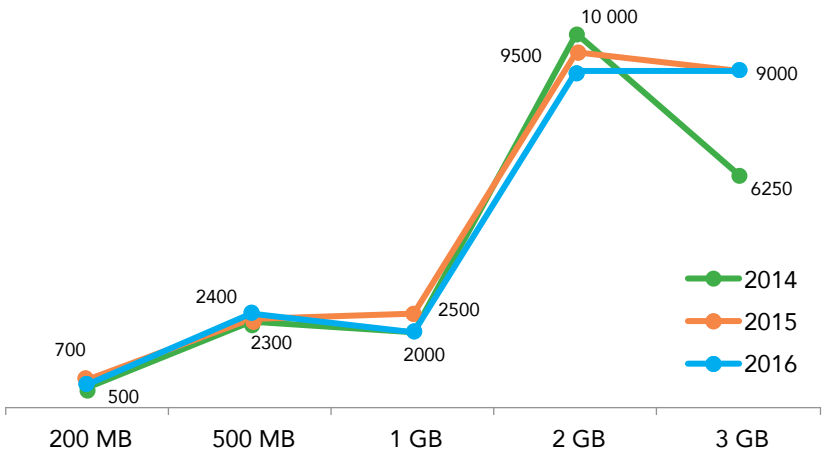
Costa Rica: Prices of the mobile Internet access service, pre-paid modality, 2014-2016
(Figures in colones per month)

Maximum download	Maximum price 2016	Minimum price 2016	Average price 2016	Average price 2015	Average price 2014
40 MB	--	--	--	250	--
50 MB	275	200	238	275	80
100 MB	400	400	400	400	300
150 MB	289	289	289	289	270
200 MB	600	600	600	700	500
300 MB	1300	1300	1300	--	--
500 MB	2500	2500	2500	2400	2300
1 GB	2500	1500	2000	2500	2000
2 GB	9000	9000	9000	9500	10 000
3 GB	9000	9000	9000	9000	6250
6 GB	13 500	13 500	13 500	--	--
15 GB	24 000	24 000	24 000	--	--

Source: SUTEL, Market Management Division.

Chart 127

Costa Rica: Prices of the mobile Internet access service, pre-paid modality, 2014-2016
(Figures in colones per month)

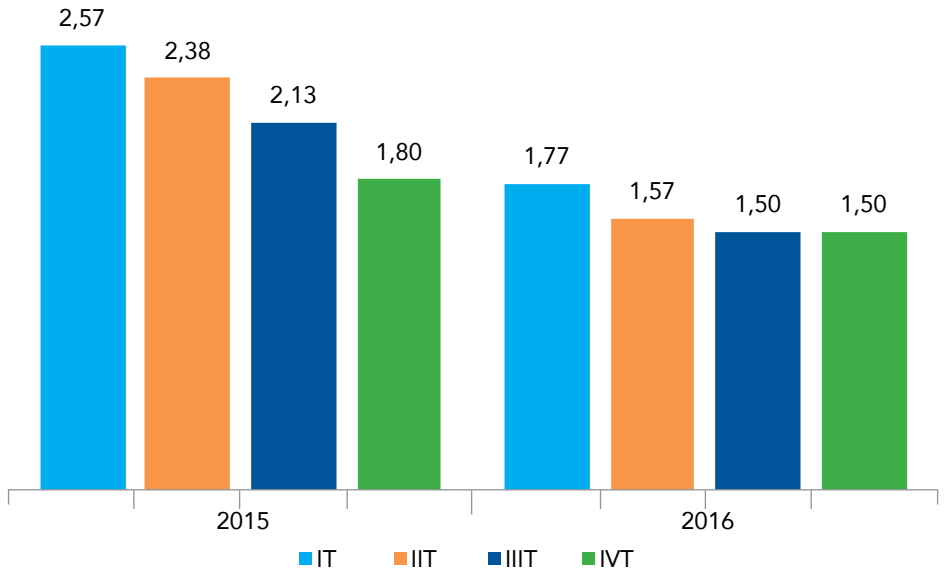


Source: SUTEL, Market Management Division.

Competition has resulted in a **decreasing trend** in the prices of the pre-paid mobile Internet service during the last two years

Chart 128

Costa Rica: Average quarterly prices per MB of traffic in mobile Internet
(Figures in colones per MB)



Source: SUTEL, Market Management Division.

Table 19

Costa Rica: Prices of the asymmetric fixed Internet access service, over-subscription level 1:20, 2016
(Figures in colones per month)

Download / Upload speed (kbps)	Maximum price	Minimum price	Average price
256/128	8576	8576	8576
512/256	10 420	4500	6855
1024/512	15 953	7500	9331
1536/512	21 486	11 766	16 626
2048/768	16 200	8000	11 858
3072/768	30 708	12 500	16 030
4096/768	29 000	8200	17 336
5120/1024	27 000	11 340	16 711
6144/1024	24 996	16 500	20 138
8192-1024	33 328	10 000	19 709
10240/1024	29 767	13 860	25 425

Source: SUTEL, Market Management Division

Table 20

Costa Rica: Average prices of the asymmetric fixed Internet access service, over-subscription level 1:20, 2013-2016
(Figures in colones per month)

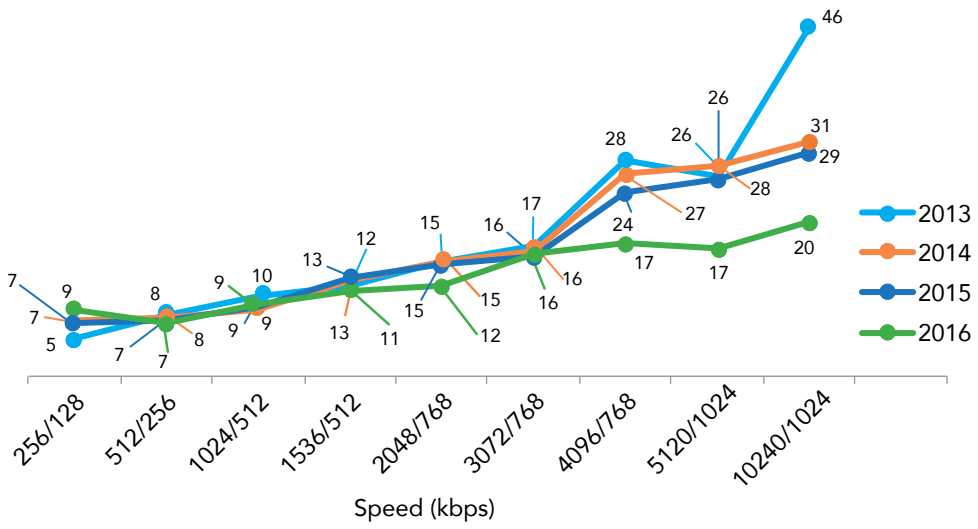
Download / Upload speed (kbps)	2013	2014	2015	2016
256/128	4904	7233	6902	8576
512/256	8088	7690	7444	6855
1024/512	10 343	8663	9019	9331
1536/512	11 780	12 585	12 929	11 084
2048/768	15 138	14 924	14 806	11 858
3072/768	17 172	16 536	15 645	16 030
4096/768	28 422	26 713	24 040	17 336
5120/1024	26 275	27 748	25 848	16 711
10240/1024	45 999	30 767	29 403	25 425

Source: SUTEL, Market Management Division.

Chart 129

Costa Rica: prices of the asymmetric Internet access service, over-subscription 1:20, 2014-2016
(Figures in thousand colones per month)

The presence of a growing number of supplies resulted in a **reduction** in the price of fixed Internet access during 2016 for most of the speed ranges.



Source: SUTEL, Market Management Division.

Table 21

Costa Rica: Prices for asymmetric fixed Internet access – over-subscription level 1:5, 2016
(Figures in colones per month)

Download/Upload speeds (Kbps)	Maximum price	Minimum price	Average price
1024/512	51 700	33 160	39 031
2048/768	68 750	44 358	52 588
3072/768	58 814	58 814	58 814
4096/1024	107 250	78 418	92 834
5120/1024	69 000	50 718	59 859
6144/1024	150 150	117 627	133 889
7168/1024	156 836	156 836	156 836
8192/1024	235 254	121 520	194 100
9216/1024	231 343	217 680	224 512
10240/1024	256 800	214 500	234 521

Source: SUTEL, Market Management Division.

Table 22

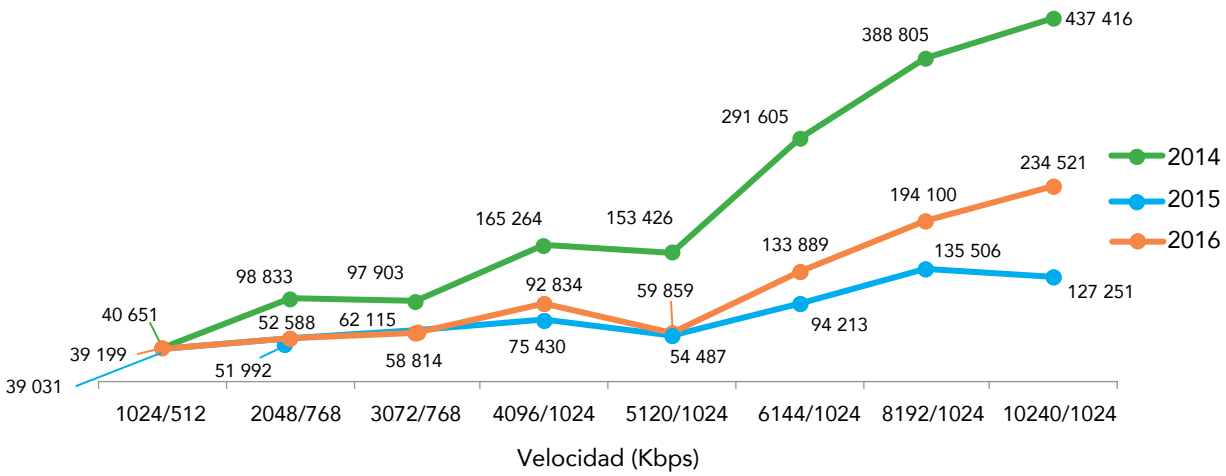
Costa Rica: Average prices for asymmetric fixed Internet access service, over-subscription level 1:5, 2014-2016
(Figures in colones per month)

Download/Upload speeds (Kbps)	Price 2014	Price 2015	Price 2016
512/256	31 762	33 782	-
1024/512	40 651	39 199	39 031
2048/768	98 833	51 992	52 588
3072/768	97 903	62 115	58 814
4096/1024	165 264	75 430	92 834
5120/1024	153 426	54 487	59 859
6144/1024	291 605	94 213	133 889
8192/1024	388 805	135 506	194 100
10240/1024	437 416	127 251	234 521

Source: SUTEL, Market Management Division.

Chart 130

Costa Rica: Prices for asymmetric Internet access service, over-subscription level 1:5, 2014-2016
(Figures in colones per month)



Source: SUTEL, Market Management Division.

Table 23

Costa Rica: Prices for symmetric fixed Internet access service, over-subscription level 1:5, 2016
(Figures in colones per month)

Download/Upload speeds	Maximum price	Minimum price	Average rate
512/256	55 330	55 330	55 330
1/1 Mbps	104 629	64 552	79 976
2/2 Mbps	100 677	86 069	93 373
3/3 Mbps	175 526	104 512	138 536
4/4 Mbps	197 759	116 230	159 917
5/5 Mbps	248 211	142 494	196 784
6/6 Mbps	297 849	164 287	220 917
7/7 Mbps	300 645	187 757	230 931
8/8 Mbps	397 121	273 576	337 937
9/9 Mbps	350 423	300 058	325 240
10/10 Mbps	478 473	360 505	421 283

Source: SUTEL, Market Management Division.

Table 24

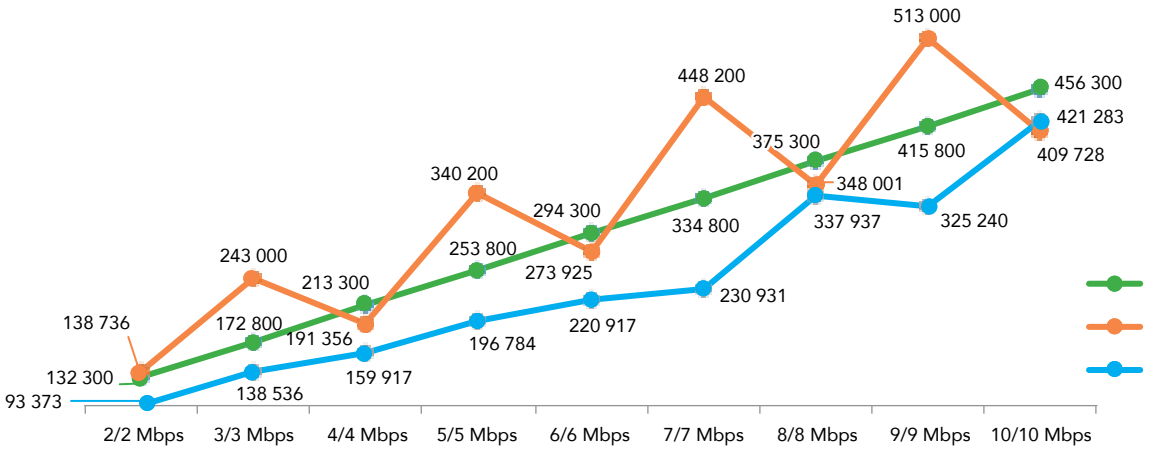
Costa Rica: Average prices symmetric fixed Internet access service, over-subscription level 1:5, 2013-2016
(Figures in colones per month)

Download/Upload speeds	Price 2013	Price 2014	Price 2015	Price 2016
1/1 Mbps	67 500	-	88 651	79 976
2/2 Mbps	130 266	132 300	138 736	93 373
3/3 Mbps	181 471	172 800	243 000	138 536
4/4 Mbps	199 620	213 300	191 356	159 917
5/5 Mbps	254 559	253 800	340 200	196 784
6/6 Mbps	272 435	294 300	273 925	220 917
7/7 Mbps	342 713	334 800	448 200	230 931
8/8 Mbps	341 982	375 300	348 001	337 937
9/9 Mbps	405 605	415 800	513 000	325 240
10/10 Mbps	387 179	456 300	409 728	421 283

Source: SUTEL, Market Management Division.

Chart 131

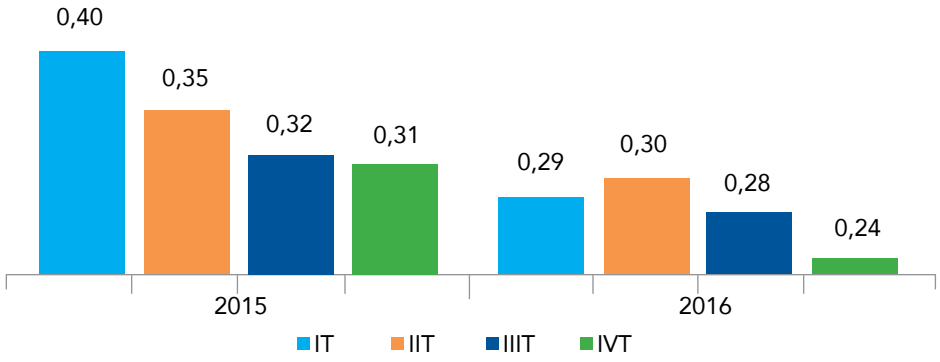
Costa Rica: Prices of the symmetric Internet access service, over-subscription level 1:5, 2014-2016
(Figures in colones per month)



Source: SUTEL, Market Management Division.

Chart 132

Costa Rica: Average quarterly prices per MB of traffic in fixed Internet service
(Figures in colones per MB)



Source: SUTEL, Market Management Division.

Chart 25

Costa Rica: Comparison of prices for asymmetric fixed Internet access service 2009 vs. 2016
Over-subscription level 1:20
(Figures in colones per month)

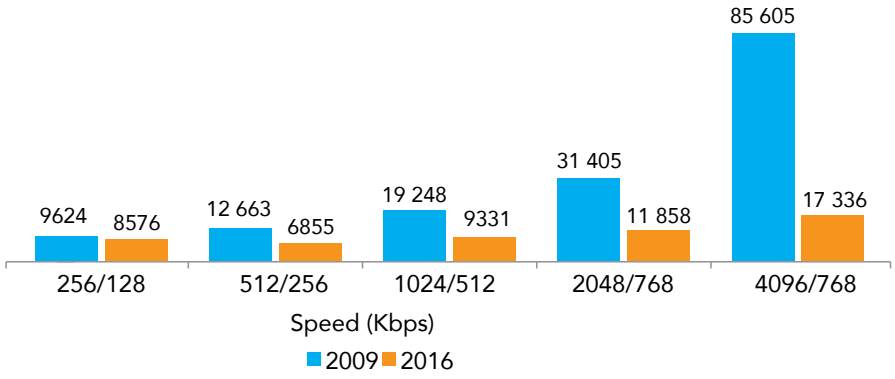
Download/Upload speeds (kbps)	Maximum rate 2009[1]	Average price 2016	Annual variation (%)
256/128	9624	8576	-11 %
512/256	12 663	6855	-46 %
1024/512	19 248	9331	-52 %
2048/768	31 405	11 858	-62 %
4096/768[2]	85 605	17 336	-80 %

[1] Rates set by ARESEP and ratified by SUTEL through resolution RCS-615-2009 from December 2009 for the residential sector

[2] Service directed to small and medium enterprises, which implies a subscription level greater than that offered to the residential sector.

Chart 133

Costa Rica: Comparison of prices of asymmetric Internet access service, over-subscription level 1:20, 2009-2016
(Figures in colones per month)



Source: SUTEL, Market Management Division.

Table 26

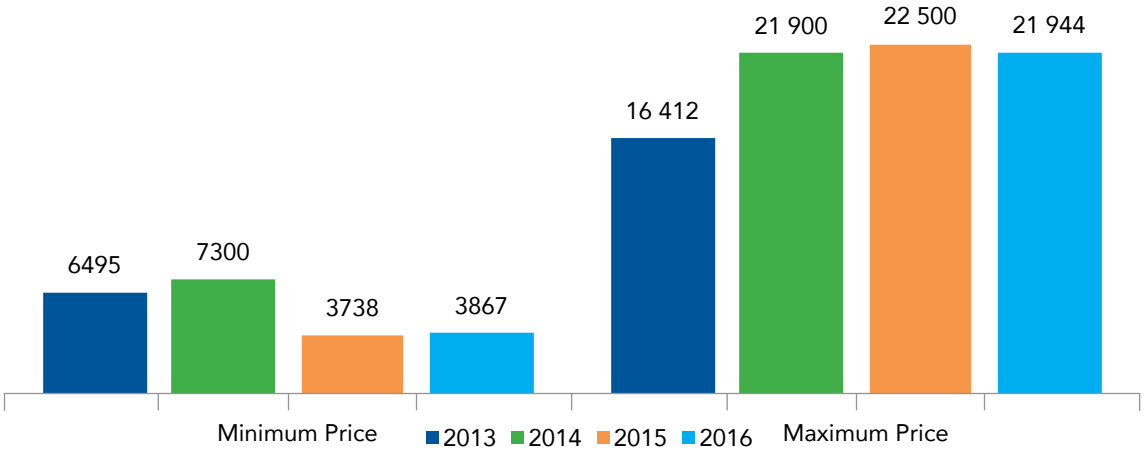
Costa Rica: Price of paid television service with basic package, 2013-2015
(Figures in colones per month)

Price	2013	2014	2015	2016	Variation 2013-2014	Variation 2014-2015	Variation 2015-2016
Maximum	16 412	21 900	22 500	21 944	33,4 %	2,7 %	-2,5 %
Minimum	6495	7300	3738	3867	12,4 %	-48,8 %	3,4 %
Average	11 425	12 803	12 290	13 683	12,1 %	-4,0 %	11,3 %

Source: SUTEL, Market Management Division.

Chart 134

Costa Rica: Maximum and minimum prices of paid television with the basic package, 2013-2015
(Figures in colones per month)



Source: SUTEL, Market Management Division.

The average price of subscription for the basic package for paid television increased by

11,3 %

during 2016

7

International

When considering both mobile telephony penetration and mobile Internet access service, Costa Rica shows indexes comparable to those reached by developed countries.

International

This section analyzes the position of Costa Rica in the international context, from the perspective of the level of development in the telecommunications sector. The analysis also provides an overview of the different services in the international markets and the possible trends foreseen for such behavior in the future.

The following sections will be elaborated in this analysis:

- Analysis of general international indicators
- Analysis of the Affordability Drivers Index

At the time of this report, the International Telecommunications Union (ITU) did not have public information ready for the period 2016; therefore, the information from that year was not included in this edition. Thus, the analysis uses figures from 2015, taking ITU data as the source.

Analysis of general international indicators

The information was supplemented with the updated indexes for 2016 from Costa Rica, which correspond to the ones presented in this report throughout the previous sections.

The analysis considers fixed telephony, mobile telephony, fixed and mobile internet access, all everything related to the evolution in the number of subscribers and total penetration, and the information related to income from telecommunications as a proportion of the GDP.

The penetration of fixed telephony, measured as the percentage of the total users with respect to the total population of the country, has shown, in general, a reduction in the last years. This situation is not exclusive for Costa Rica, since the number of subscribers is decreasing also in countries like Switzerland, Norway, Sweden and the United States, which, by 2015, reached, 50.3%, 18.4%, 36.7% and 38.4%, respectively. In the case of Costa Rica, the penetration in 2015 was 16.6%, while in 2016 it dropped to 15.9%. (See Chart 135).

In mobile telephony services, Costa Rica remains among the countries with the greatest penetration in Latin America, to such extent, that in 2015 it reached the third position only after Panama and Uruguay, with 174% and 160%, respectively. It is important to mention that the percentage of penetration from 2016 (170%) is greater than the previous year (156%), as can be seen in Chart 136. If the 2015 levels for Uruguay and Panama remained unchanged, Costa Rica would move to a second place in the ranking of Latin American countries. It is important to mention that our country is positioned in this indicator better than worldwide leaders.

Analyzing the mobile telephony service, per payment modality, the proportion of pre-paid subscriptions, although it showed some increase in the first years of market aperture, with the maximum value in 2013 (83%), in later periods the increased stopped and the percentage reached in 2016 (78%) is similar to the percentage from the previous year (79%). Similar proportions are detected in most of the countries of the region; namely, Guatemala, Nicaragua, Panama, Mexico, Ecuador, Colombia and Dominican Republic. Such results contrast with the results from European and Asian countries, where the relationship is inverse, as can be seen both in Table 27 and in Chart 137.

Consistent with the events of the previous years, according to data from ITU's Report in 2015, there is still an inverse relationship between the proportion of pre-paid services and the income per capita. The users of mobile telephony in more developed countries opt, mainly, for post-paid services. Please refer to Chart 138.

For Costa Rica, the measurement level of access to fixed Internet for every 100 inhabitants for 2016 (13%) is greater than the value from the previous year (11%). Such indicator, although greater than the one shown in most of the Latin American countries considered in the comparative analysis, is still lower than the indicator from Chile (15%), Argentina (16%), and Uruguay (26%). If the comparison was made with European countries, particularly Switzerland, Denmark, Netherlands and Norway, the values registered for such countries triple the values of Costa Rica. (See Chart 139).

For mobile internet, Costa Rica still shows a high position within the countries evaluated. In fact, the index calculated for 2015 (97%) is the highest at the Latin American level and exceeded by Finland (144%) and other Nordic countries (Sweden, Denmark and Norway) and by Singapore (143%), United States (115%) and Switzerland (102%). If we consider the information from 2016 (113%), Costa Rica's position eventually improves, and is comparable to the developed countries included in the sample under analysis (see Chart 140).

Finally, within this section related to international events, the analysis quantifies the relative weigh of the income from telecommunications with respect to the Gross Domestic Product (GDP) in dollars for each country. Using the most updated information of income from telecommunications in ITU (2015), Costa Rica is among the countries of the region with income percentages with respect to the GDP that exceed the 3%, as shown in Chart 141. This group also includes Peru, United States and Colombia, which was the leading country in this indicator with 4%. It is important to mention that, in the case of the European countries considered, the corresponding values do not exceed the 2%. The information regarding the proportion of income from the Costa Rican telecommunications sector in the GDP for 2016, presented in the analysis of the general evolution of the sector, reached 3.2%.

Affordability Drivers Index (ADI) for 2016

The Affordability Drivers Index is calculated by the "Alliance For Affordable Internet (A4AI)", an alliance made up by a group of worldwide institutions from the private sector, the public-academic sectors and the civil society. Its objective is to meet the provisions from the United Nations Broad Band Commission that established, as one of its goals, that the price of a basic broad band service should be less than 5% of the average monthly income per inhabitant. Additionally, it promotes the goal of universal Internet access by 2020, as stated by the United Nations in September 2015 (http://www.un.org/sustainabledevelopment/sustainable-development-goals/).

It is relevant to indicate that the index does not measure directly the price of Internet services, but there is a strong relationship between the scores of the Index and the average price of broad band in the countries under analysis, as can be seen in Chart 142, where, in general, it is possible to see that countries with high level of prices per mobile GB in pre-paid modality present low levels in the Index. In fact. Costa Rica shows a strong relationship between a high score in the Index and a low price of mobile Internet access service when compared internationally.

It is important to remember that the Affordability Drivers Index is made up by two sub-indexes that are internally defined as follows:

- Infrastructure sub-index: measures the degree of deployment and the operations of infrastructure, as well as policies, regulatory frameworks that promote and allow investment for the growth of the future infrastructure. Some of the variables included are referred to the amount of international bandwidth available and evaluation of the spectrum policy.

- Broad band access sub-index: measures the rates of adoption, regulatory policies and frameworks to promote growth and the supply of broad band services. The variables used are internet penetration rate and evaluation of the efficacy of universal service funds.

For the 2016 report, the index was calculated for 58 countries divided into three groups, depending on the national income per capita (mid-high income economies, mid-low income economies and low income economies). The calculation is made over a 0 to 100 scale, based on rates for penetration, use, universal access, political environment and regulatory environment. The analysis of the index shows that the high scores are co-related to the low prices in broad band, which means that values close to 100, in the index of the countries, show relatively lower prices in broad band services.

By 2016, the report highlights the dominance of Latin American countries in the corresponding ranking; thus, from the first five positions in the index, four are for countries in the region, including Costa Rica, which is ranked in the fifth general position. It is important to highlight

the fact that while, in average, the difference between one country and the others, in those first five positions, is one point, the difference between the fifth position (Costa Rica) and the sixth position (Ecuador) is almost four point in the index. (See Tables 28 and 29).

In the case of our country, the value reached in the Affordability Drivers Index (ADI) is explained according to A4AI by the high degree of penetration that mobile broad band has reached. A second element to highlight is related to the affordability of the basic broad band plan, which monthly cost represents about 2% of the national income per capita registered for Costa Rica according to that same source. Additionally, the report mentions the fact that in the achievement of such goals, the projects promoted and financed by the *"Fondo Nacional de Telecomunicaciones (FONATEL)"* have played a relevant role. This entity prioritizes the investment in infrastructure to facilitate broad band Internet access and contributes to reduce the cost of this access. It is also mentioned that such projects have focused on the connection of communities, specifically through schools and community centers, as well as institutions and people with special social needs, such as shelters for minors and elderly, and homes of female entrepreneurs or people with disabilities, not leaving out the installation of local WiFi networks adjusting to the objectives of the FONATEL, particularly in the following aspects:

- *To promote the access to quality telecommunications services, in a timely and efficient way, and at affordable and competitive prices, for the inhabitants of the areas where the cost of investment for the installation and maintenance of infrastructure make it financially unprofitable to provide these services, and,*

- *To promote the access to quality telecommunications services in a timely and efficient way, and at affordable and competitive prices, for the inhabitants of the country that do not have sufficient resources to afford them.*

A description of the main programs carried out by Fonatel and the detail of the beneficiary population, according to the respective geografical area to which they belong, is present below.

Connected Communities Program

This is an initiative of FONATEL to expand the supply of the telecommunications services to the population and *"Centros de Prestación de Servicios Públicos (CPSP)"* located in rural areas, remote areas and areas in social, economic and cultural vulnerability. The centers are defined as public schools and high schools, EBAIS, CEN-CINAI and Smart Community Centers.

Through this program, FONATEL finances the deployment of infrastructure in the target zones and the connectivity to the CPSP selected by the competent institutions and in zones of the country where the cost of investment for the installation and maintenance of infrastructure make it financially unprofitable to provide these services. The details of the population benefited, stated by zone, is shown in Table 31.

Connected Households Program

This is an initiative of SUTEL, as administrator and implementer of programs and projects from the FONATEL to provide (i) a 2 Mbps fixed Internet connection to households that have been pre-qualified according to the database of the *"Instituto Mixto de Ayuda Social (IMAS")* and (ii) a portable computer in order to generate opportunities for development, education and productivity.

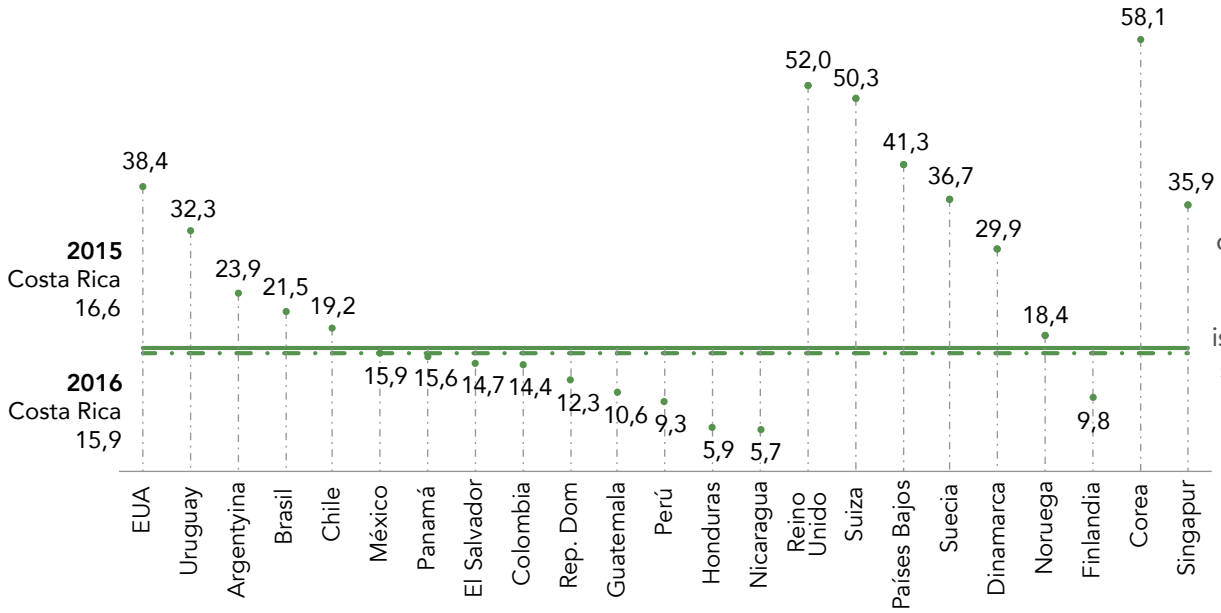
FONATEL pays part of the bill for internet connection and the portable computer, with funds provided by all the telephony, internet and cable television enterprises. The proportion that the household family should pay will depend on the socio-economic classification established by IMAS into 3 large groups:

- Quintile 1 receives an 80% subsidy and pays 3.400 colones per month.
- Quintile 2 receives a 60% subsidy and pays 6.800 colones per month.
- Quintile 3 receives a 40% subsidy and pays 10.100 colones per month.

Table 30 includes the details of the population benefited per area of residence.

Chart 135

Subscriptions to the fixed telephony service for every one hundred inhabitants, 2015

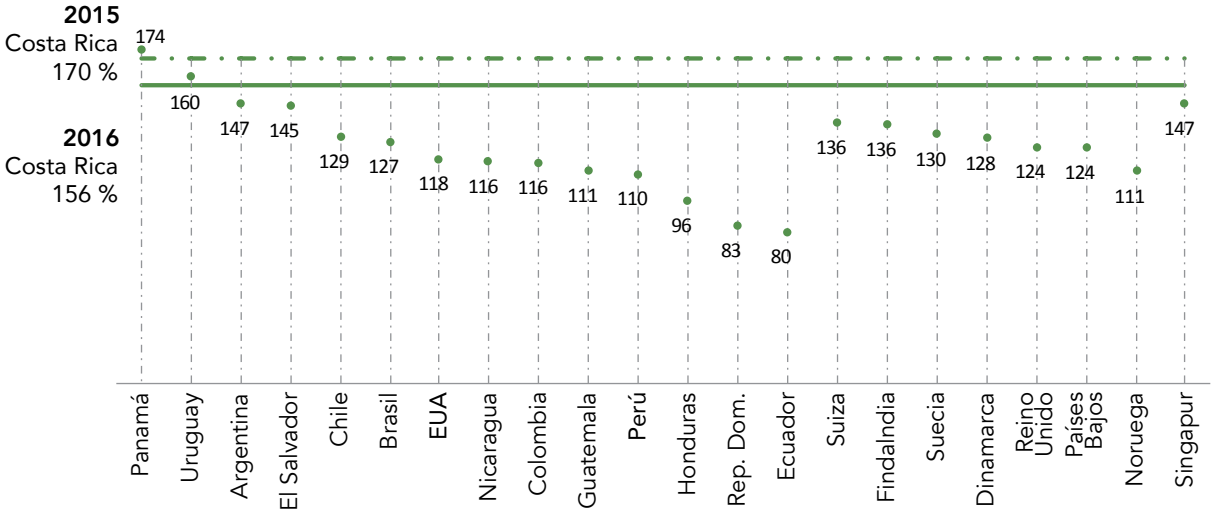


Source: SUTEL, Market Management Division, with information from the International Telecommunications Union.

Although in terms of fixed telephony penetration Costa Rica **exceeds most** of the Latin American countries, the corresponding index is lower that the index shown by developed countries.

Chart 136

Subscriptions to mobile telephony service for every one hundred inhabitants, 2015



Source: SUTEL, Market Management Division, with information from the International Telecommunications Union.

Table 27

Subscriptions to mobile telephony services according to payment modality, 2011-2015
(Figures in percentages)

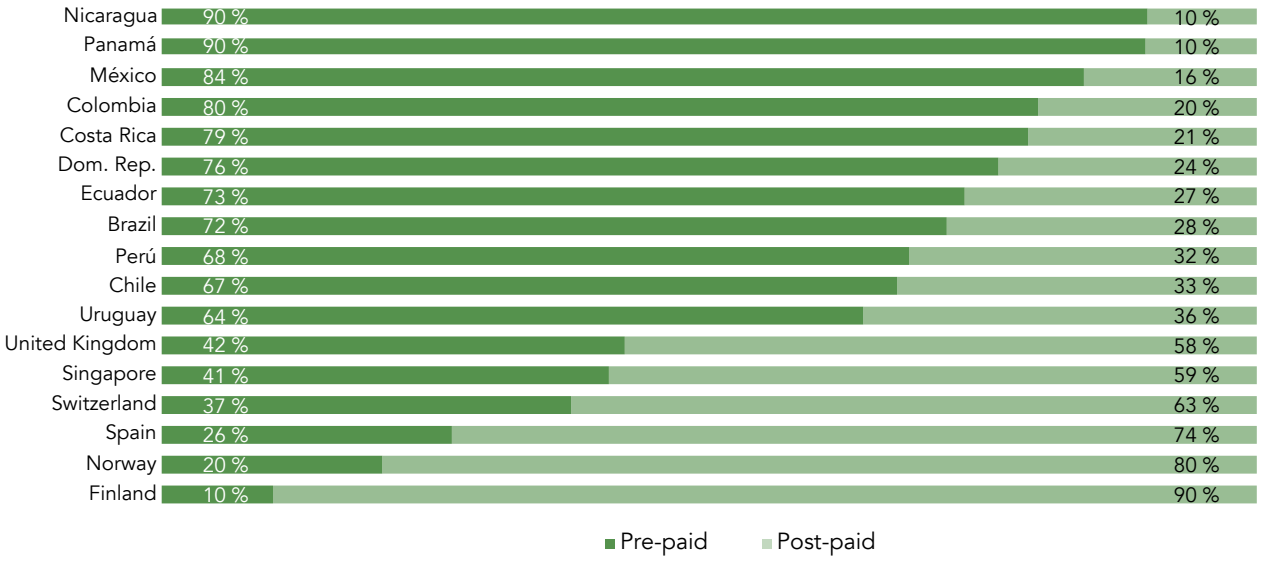
Country	2011		2012		2013		2014		2015	
	Pre-paid	Post-paid	Pre-paid	Post-paid	Pre-paid	Post-paid	Pre-paid	Post-paid	Pre-paid	Post-paid
Panama	93 %	7 %	100 %	0 %	90 %	10 %	90 %	10 %	90 %	10 %
Nicaragua	94 %	6 %	81 %	19 %	94 %	6 %	93 %	7 %	90 %	10 %
Mexico	85 %	15 %	84 %	16 %	85 %	15 %	86 %	14 %	84 %	16 %
Colombia	82 %	18 %	81 %	19 %	79 %	21 %	80 %	20 %	80 %	20 %
Costa Rica	70 %	30 %	79 %	21 %	83 %	17 %	80 %	20 %	79 %	21 %
Dominican Republic	83 %	17 %	82 %	18 %	82 %	18 %	79 %	21 %	76 %	24 %
Ecuador	87 %	13 %	85 %	15 %	84 %	16 %	82 %	18 %	73 %	27 %
Brazil	85 %	15 %	85 %	15 %	78 %	22 %	76 %	24 %	72 %	28 %
Peru	83 %	17 %	76 %	24 %	76 %	24 %	69 %	31 %	68 %	32 %
Chile	71 %	29 %	72 %	28 %	70 %	30 %	69 %	31 %	67 %	33 %
Uruguay	70 %	30 %	69 %	31 %	68 %	33 %	66 %	34 %	64 %	36 %
United Kingdom	57 %	43 %	53 %	47 %	47 %	53 %	44 %	56 %	42 %	58 %
Singapore	52 %	48 %	47 %	53 %	46 %	54 %	42 %	58 %	41 %	59 %
Switzerland	42 %	58 %	39 %	61 %	36 %	64 %	32 %	68 %	37 %	63 %
Spain	39 %	61 %	35 %	65 %	31 %	69 %	29 %	71 %	26 %	74 %
Norway	14 %	86 %	26 %	74 %	25 %	75 %	24 %	76 %	20 %	80 %
Finland	10 %	90 %	10 %	90 %	9 %	91 %	10 %	90 %	10 %	90 %

Source: SUTEL, Market Management Division, with information from the International Telecommunications Union

Chart 137

Distribution of the percentage of mobile subscriptions between post-paid and pre-paid, 2015
(Figures in percentages)

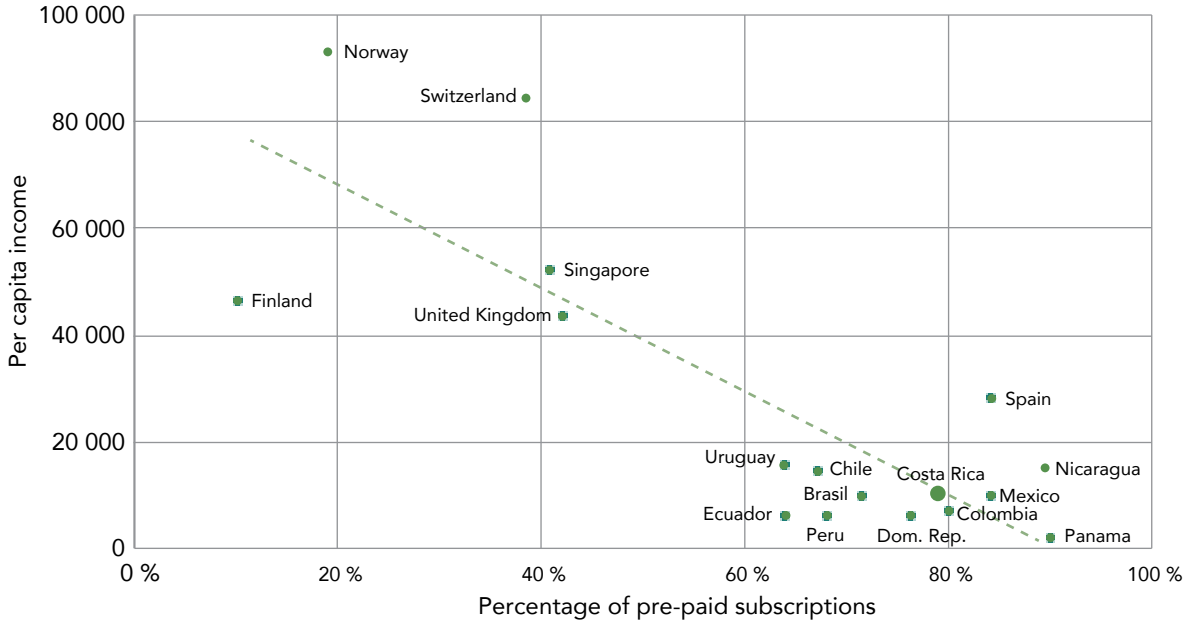
The share of pre-paid in the total mobile subscriptions **is similar** to that in most of the Latin American



Source: SUTEL, Market Management Division, with information from the International Telecommunications Union

Chart 138

Average income per inhabitant and percentage of pre-paid subscriptions, 2015

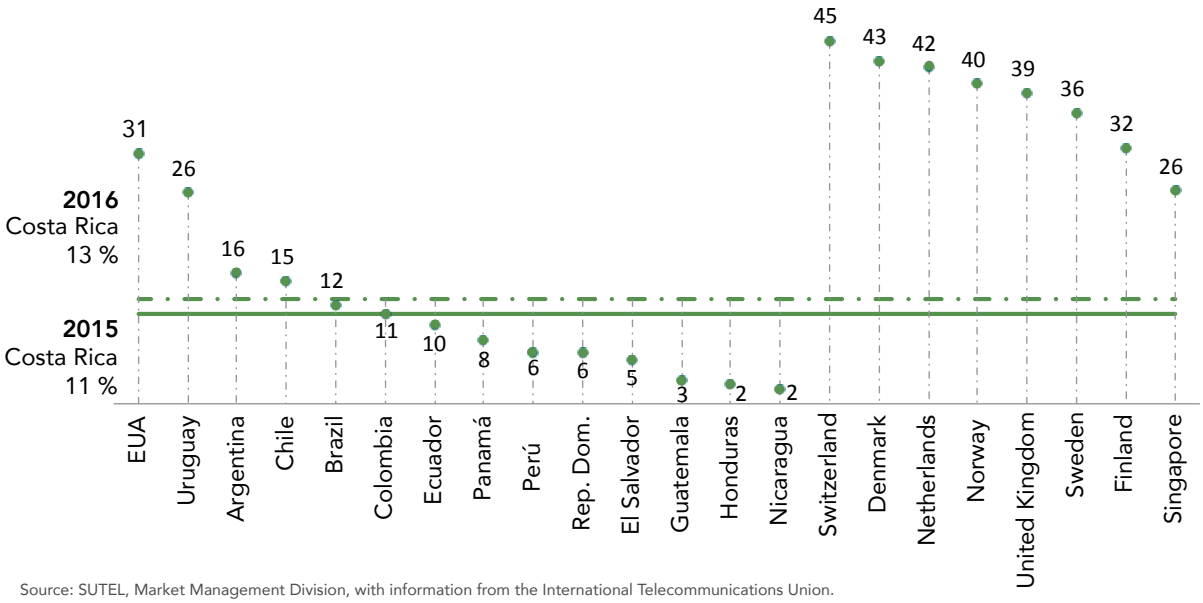


Source: SUTEL, Market Management Division, with information from the International Telecommunications Union.

In Costa Rica, the penetration of fixed Internet access is **lower** than that in developed countries.

Chart 139

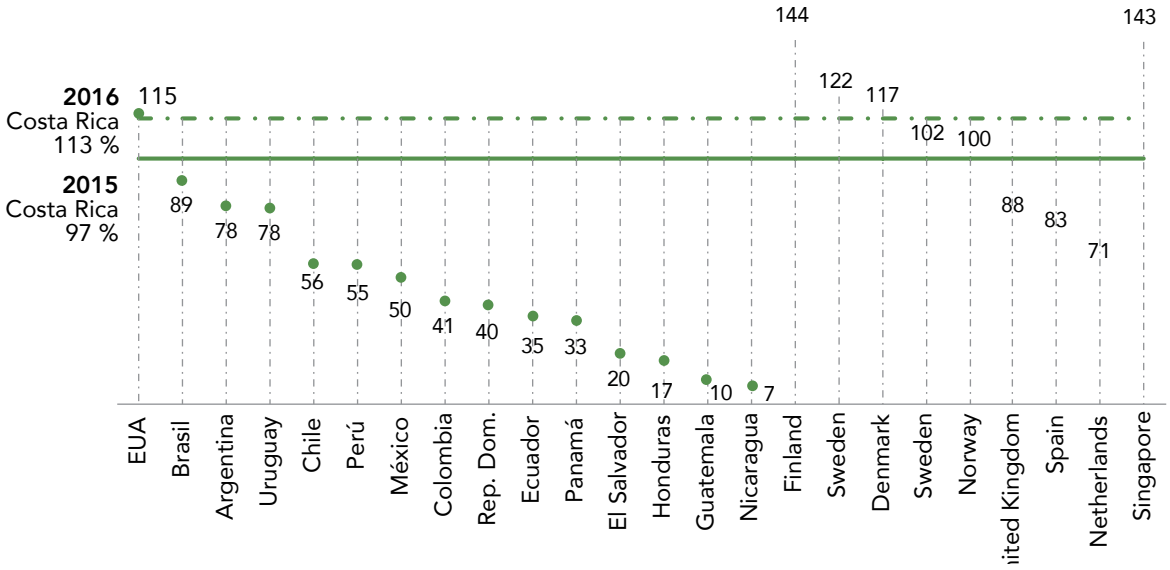
Penetration of fixed Internet access per hundred inhabitants, 2015
(Percentages)



Source: SUTEL, Market Management Division, with information from the International Telecommunications Union.

Chart 140

Penetration of mobile Internet access for every one hundred inhabitants, 2015

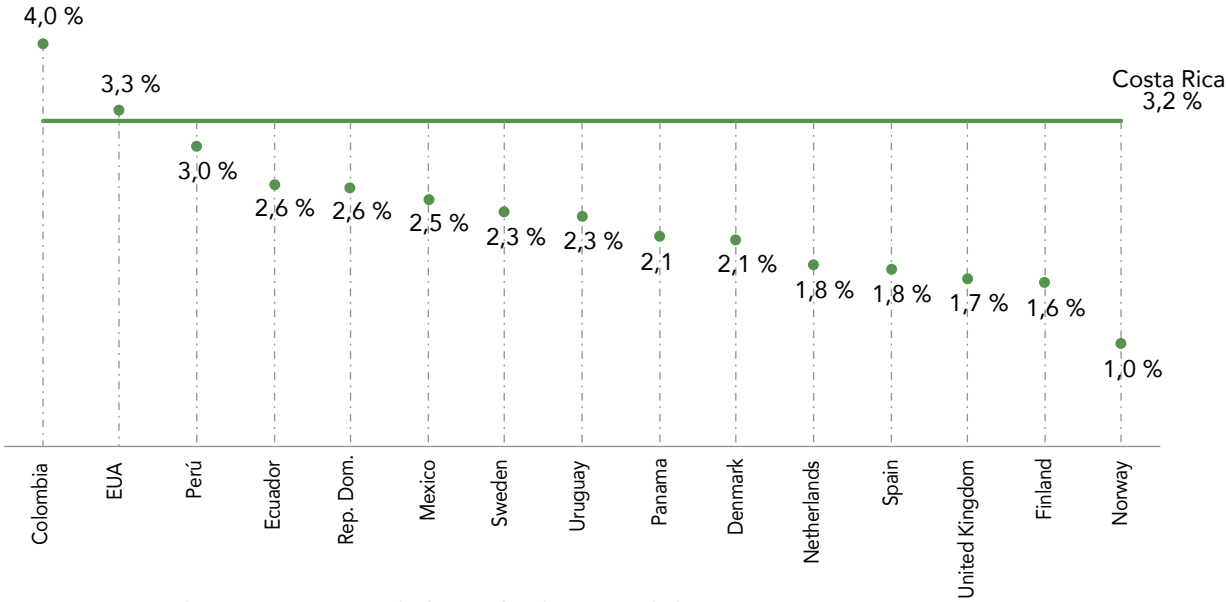


Source: SUTEL, Market Management Division, with information from the International Telecommunications Union

Chart 141

Ratio of total income of the telecommunications sector with respect to the GDP, 2015
(Figures in percentages)

The ration between the investment in telecommunications and the GDP is **greater** in Costa Rica than in developed countries



Source: SUTEL, Market Management Division, with information from the International Telecommunications Union.

Chart 142

Ration between the ADI 2016 score and the price of a pre-paid GB, mobile telephony plan
(% of monthly income per capita, 2016)

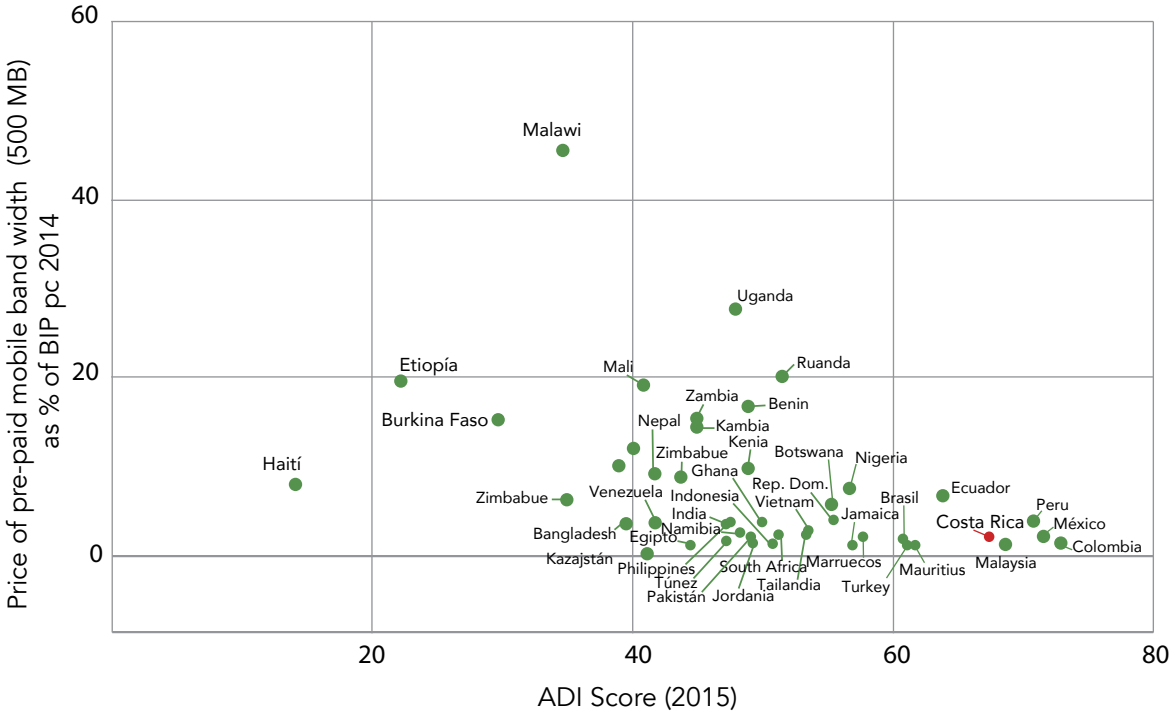


Table 28

Positions of the affordability drivers index per country (emerging economies[1]), 2014-2016

Position	Emerging Economies		
	2014	2015	2016
1	Costa Rica	Colombia	Colombia
2	Colombia	Costa Rica	Mexico
3	Turkey	Malaysia	Peru
4	Malaysia	Turkey	Malaysia
5	Peru	Peru	Costa Rica

[1] The Affordability Drivers Index (ADI) scores and classifies 58 countries based on an exhaustive analysis of public and regulatory policies developed to improve broad band access and affordability. (http://1e8q3q16vyc81g8l3h3md6q5f5e.wpengine.netdna-cdn.com/wp-content/uploads/2017/05/A4AI-2017-LAC-Affordability-Report_Espanol_Online.pdf).

According to the Affordability Drivers Index, Costa Rica is in the **fifth position** of a list of 58 mid and low income countries.

Table 29

Scores of the affordability drivers index per country, 2014-2016

Position	Country	2014	2015	2016
1	Colombia	63,13	65,32	72,87
2	Mexico	48,48	53,85	71,47
3	Peru	59,59	61,82	70,82
4	Malaysia	61,52	63,28	68,65
5	Costa Rica	63,37	64,60	67,40
6	Ecuador	52,31	50,60	63,81
7	Argentina	51,75	53,35	63,62
8	Mauritius	57,18	55,20	61,70
9	Turkey	62,43	62,35	61,13
10	Brazil	57,57	59,90	60,78
11	Morocco	50,83	55,51	57,75
12	Jamaica	47,27	50,84	56,88
13	Nigeria	51,24	52,85	56,58
14	Dominican Republic	44,35	47,23	55,49

Source: SUTEL, Market Management Division, with information from A4AI.

Table 30

Costa Rica: Number of households connected by zone according to quintile, to may 31st 2017

Zone	Quintile 1	Quintile 2	Quintile 3	Total	%
San Jose	5224	628	1	5853	31 %
Alajuela	2926	442		3368	18 %
Cartago	2638	179		2817	15 %
Heredia	2603	185		2788	15 %
Guanacaste	1525	238		1763	9 %
Puntarenas	1250	70	1	1321	7 %
Limon	815	156		971	5 %
Total	16 981	1898	2	18 881	100 %

Source: SUTEL, Direction General of FONATEL, Program 2.

Table 31

Costa Rica: Number of people in connected communities by project according to the zone, on March 31st 2017

Project	Zone	Population benefited to March 31st 2017
Siquirres	Siquirres	2143
Roxana	Roxana	2
Northern Zone	Guatuso	4562
	Los Chiles	11 713
	San Carlos	6550
	Sarapiquí	5439
	Upala	6969
Southern Zone	Perez Zeledon	48 867
	Buenos Aires	45 244
	Coto Brus	32 167
	Golfito	27 866
	Corredores	20 675
Atlantic Zone	Guacimo	21 233
	Limon	20 006
	Matina	35 572
	Pococi L1	75 007
	Pococi L2	3985
	Siquirres	48 659
	Talamanca	15 189
Central Pacific	Aguirre	7839
	Superior	45 634
Chorotega	West	23 176
	Superior	25 864
	Inferior	56 617
	East	28 379
	Nandayure	9090
GENERAL TOTAL		**542 202**

Source: SUTEL, Direction General of FONATEL, Program 1

8

Network QUALITY and performance

Between the periods of 2015 and 2016, there was a 5% increase in the number of districts covered by 3G networks and a 19% increase in the number of districts covered by 4G networks.

Network QUALITY and performance

For the first time in the five years, SUTEL includes a section dedicated to the presentation of information related to the performance of the quality and the perception of the service by users.

This is an integral effort of SUTEL to provide clear information to the market an specially users to allow them to make decisions on a more informed and objective basis. Additionally, it constitutes an important effort to promote a more competitive market, as well as quality in the networks and in the offered services.

This section analyzes information from different nature: first of all, it presents the information derived from the application of a service perception survey with respect to the expectations of the users; secondly, information about the claims per operator that were attended by SUTEL, specifically by the Direction General of Quality; and finally, the results of the measurement of compliance with the standards or quality thresholds established in the Regulations for the Provision and Quality of the Services (RPCS) for mobile networks, both regarding voice services and data services (mobile Internet).

Quality Perception

Since 2014, the Direction General of Quality has been assessing the degree of satisfaction and the perception of quality of the telecommunications services, among them, the fixed telephony service that includes traditional basic telephony and VoIP telephony, mobile telephony, fixed internet access and paid television.

As of 2015, the results of the study have been normalized to a scored based on 10 points; therefore, for the purposes of this report, it is possible to show a comparison of only the results from 2015 and 2016.

The operators analyzed correspond to those operators with a significant market share in each of the services evaluated. The size of the sample analyzed per operator corresponds to 600 users, applying a margin of error of 4%, and a reliability level of 95%. The aspects evaluated include: personalized attention, telephone attention, service delivery, damage repairs, billing of the service and operation of the service.

Fixed Telephony

The fixed telephony service (including traditional basic telephony and VoIP) reports, in damage repairs and telephone attention, perception levels and degree of satisfaction with scores below 8 points.

Among the operators or suppliers in 2016, CallMyWay comes out with a perception level and degree of satisfaction of 9.0 in contrast with Cabletica with a perception level and degree of satisfaction of 7.8. Each of them presents those figures for the two years analyzed. (See Chart 143).

Chart 144 shows the levels of perception observed in 2015 and 2016, respectively, for each of the parameters analyzed. Chart 144 shows that, for 2016, CallMyWay presents the highest perception levels for 5 of the 6 aspects evaluated. The best evaluated aspects for this operator in 2016 were personalized attention and billing of the service, where they got 9.5 points, respectively.

Mobile Telephony

The analysis took into consideration all the operators that provide mobile telephony services, including the virtual mobile operators.

Just as in fixed telephony, the aspects evaluated with scores below 8 points were damage repairs and telephone attention.

In this case, in 2016, Telefónica got 8.8 in perception and degree of satisfaction, contrary to ICE that go 7.9 points. This behavior remains the same in comparison to the previous year. (See Chart 145).

As seen in Chart 146, Telefónica had the best perception scores in 4 out of the 7 aspects evaluated, in contrast with ICE that, in 2016, presented the lowest level of perception in the 7 aspects analyzed.

Data Transfer

For the analysis of fixed internet services, the analysis took into consideration the operators with significant market share, while for mobile Internet services, the analysis took into consideration all the operators that provide the mobile data transfer service, including the virtual mobile operators.

For internet services, the aspects of damage repairs, service operation and telephone attention got scores of less than 8 points. If the information is analyzed by operator, in 2016, Telecable has the highest perception levels in all the aspects analyzed, and for service delivery, it also got the highest score with 9.1 point out of 10 in that line.

With 7.1 in telephone attention, Cabletica has the lowest score in the evaluation in 2016.

It is important to highlight, for the fixed internet service, Telecable had 8.4 in 2015 and 8.5 in 2016 in level of perception and degree of satisfaction, different from Tigo that had 7.8 in 2015 and Cabletica with 7.8 in 2016. (See Charts 147 and 148).

Additionally, in the specific case of mobile internet services, the aspects of telephone attention, billing of the service, operation of the service and damage repairs got scores of less than 8 points.

Regarding mobile Internet services, Telefónica had the highest level of perception and degree of satisfaction for both years evaluated, while Fullmóvil had the lowest level of perception and degree of satisfaction in 2015, and ICE in 2016. (See Charts 149 and 150).

In analyzing separately each aspect evaluated in the perception of users regarding mobile Internet, Telefónica is outstanding in 2016 with the best scores. In terms of personalized attention, this entity gets the best score of 2016 with 9.2 out of 10 points.

Television

For television services, telephone attention had a level of perception and degree of satisfaction of less than 8 points. Telecable had a level of perception and degree of satisfaction of 8.8 for 2015 and 2016, while Tigo had a level of perception and degree of satisfaction of 8.0 and 8.1 in 2015 and 2016, respectively; each of them for both of the years evaluated. (See Charts 151 and 152).

As paid television services supplier, Telecable had, in 2016, the best levels of perception in 4 out of the 6 aspects analyzed. It is important to highlight that this enterprise had its greatest score in the parameter of service delivery, with 9.4 out of 10 points.

Claims attended by SUTEL

During 2016, SUTEL attended a total of 741 claims associated to elements of service quality as a whole. In this case, the claims correspond to all the telecommunications services.

From that total, 66% correspond to claims from users regarding the services of two operators – ICE (258) and Claro (230). (See Chart 153).

Quality measurements for mobile networks

As part of the continuous national evaluation process for quality service of the mobile networks in 2G, 3G and 4G from ICE, Claro and Telefónica, SUTEL made "drive test" type in between June 13th and December 22nd, 2016 (with measurement hours between 8 am and 7 pm in towns, and between 6 am and 10 pm in roads).

The evaluations made by SUTEL are performed with specialized "drive test" equipment in towns and roads, jointly and simultaneously analyzing the conditions of quality offered by the three operators of mobile telephony and mobile Internet, according to the methodologies

set by the procedures, *"Procedures for the evaluation of quality of service parameters in mobile telephony through field tests of the drive test type"* and *"Procedures for the measurement of Data Transfer Service Performance in mobile networks, commercially known as Mobile Internet"*, elaborated by SUTEL, approved and published by the Council through resolutions RCS-260-2012 and RCS-061-2014, respectively.

The distance covered implied a total of 34.106 km in 474 districts of the country, which allowed for the compilation of an average per operator of 16.5 million data samples.

The details of the measurements and technical considerations that were applied can be accesed in the Website mapas.sutel.go.cr.

Based on the processing and analysis of the data obtained, the specific results per operator that allow for the concrete evaluation of the following quality parameters: completion of traffic calls originated in the mobile network (article 59 of the RPCS); delay in call connection tone (article 62 of the RPCS); areas of coverage of mobile service (article 63 of the RPCS); ration between carrier and interference (article 64 of the RPCS); quality of voice in mobile services (article 65 of the RPCS) and compliance with the performance of local and international transfer speed with respect to the speed provided (hired) (article 98 of the RPCS)[1].

- **Level of compliance of quality parameters in the national territory for the voice service (2G and 3G networks)**

Although several additional parameters were analyzed, this section emphasizes the most representative parameters from the perspective of the experience of the final user: call completion[2] and area of coverage.

[1] This parameter of quality was evaluated nationally with measurements from the "drive test" according to the procedure provided in resolution RCS-061-2014 "Procedures for the measurement of data transfer service performance in mobile networks, commercially known as Mobile Internet" for the first time in the period of the second half of 2014.
[2] This parameter implies the possibility for the final users to establish and maintain a telephone call.

Call Completion

For call completion, the threshold established for 2016 corresponds to 70%, which means a minimal quality condition allowed in accordance to the RPCS. For 2G networks, the results obtained indicate that the provinces with the best percentage of call completion are: Guanacaste for ICE and Telefónica, and Limon for Claro. In turn, the province with the lowest call completion percentage for ICE was Cartago; for Claro, Heredia; and for Telefónica, Alajuela.

In general, Telefónica presents, in average, a call completion percentage of 96.16%, while the average for ICE and Claro was 43.12% and 92.43%, respectively. (See Chart 154).

In 2016, it was possible to determine that this parameter improved for Claro and Telefónica in the provinces of San Jose, Cartago, Guanacaste and Limon, while in the case of ICE, there is a reduction in the percentages of call completion in all the provinces.

In the case of 3G networks (see Chart 155), the results of the measurements in 2016 for the call completion parameter show that the provinces with best compliance are: Limon, for Claro and Telefónica, and Puntarenas for ICE. On the contrary, the province with the lowest call completion percentage for Claro is Puntarenas, for Telefonica is Alajuela and for ICE is Cartago.

Claro has the highest call completion percentages in a total of five provinces, with an average call completion percentage of 96.36%, while Telefónica and ICE got percentages of 92.83% and 47.82%, respectively. (See Chart 155).

In the last year, Claro has improved in the provinces of San Jose, Alajuela, Cartago, Heredia and Limon; while Telefónica has improved in San Jose, Cartago and Guanacaste. ICE presents a reduction in call completion percentages in all the provinces.

Coverage Area (precision)

The evaluation of this parameter contemplated the analysis of the four types of coverage: within buildings, within automotive vehicles, only external and out of the range of coverage.

[3] GIS corresponds to the Geographical Information System

The compliance by type of coverage required, as input, the maps provided by the operators of Claro Telefónica for the first quarter of 2017, as well as the map constructed from the data provided by ICE, and compiled in 2016. By using the GIS[3] tool that SUTEL has, a filtered procedure was performed, which consisted in verifying the level of intensity of the signal in the field, compared to each type of coverage reported by the operators.
For 2G networks, the measurements determined that the provinces with the best percentages in coverage precision are: Heredia for ICE and Cartago for Claro and Telefónica. In turn, the provinces with the lowest percentages of coverage precision are: Cartago for ICE and Limon for Claro and Telefónica.

Likewise, Telefónica presented the largest percentages of coverage precision in all the provinces, with an average of 97.20%, while ICE and Claro averaged 94.14% and 85.40%, respectively.

In comparing the coverage precision of the three operators in the last year, Claro reduced the score in all the provinces, while ICE and Telefónica increased in Alajuela, Heredia, Guanacaste, Puntarenas and Limon. (See Chart 154).

In the case of networks using 3G technology, the provinces with the best coverage precision percentages are: Cartago for ICE and Claro, and San Jose for Telefónica. In turn, the provinces with the lowest coverage precision percentages are: Heredia for ICE, Limon for Claro and Puntarenas for Telefónica.

The largest coverage precision percentages were registered by Telefónica for all the provinces, with an average of 94.73%. For ICE and Claro, this percentage was 84-98% and 77.37%, respectively.

When comparing the behavior of this indicator for the three operators in the last year, it was reduced in the provinces of San Jose, Alajuela, Cartago, Guanacaste, Puntarenas and Limon, both for ICE and for Claro, while Telefónica improved its performance in all the provinces between 2015 and 2016. (See Chart 155).

- **Average download speed (measured vs. provided – hired)**

The evaluation of the parameter for compliance of performance for transfer speed with respect to the speed provided (hired), it was based on the application of the measurement procedure, *"Procedure for the measurement of Data Transfer Service Performance in mobile networks, commercially known as mobile Internet"*, approved through resolution RCS-061-2014. The measurements were made in movement along the routes, thus allowing for the compilation of instantaneous speed samples.

[4] The external coverage is excluded due to the level of signal does not allow for the correct operation of the mobile Internet service.

For the calculation of this parameter, it was taken into consideration all the instantaneous speed samples collected within the coverage layers of each operator, corresponding to two types of coverage (interior and in vehicles)[4].

The results presented correspond to the average performance of the download speed measured by districts in respect to the speed provided.
For 3G networks in general, ICE is the operator with the lowest download performance percentage, with 39% in 2016, while Telefónica has the highest percentage with 65% (see Chart 156). Now, if we analyzed the evolution of this parameter, it is seen that in the last year (Chart 156) Claro, although located in intermediate performance in 2016 between the other two operators (60%) presents a reduction in performance equivalent to 11 percentage points.

If we analyzed these results per province, the measurements in 2016 show that for ICE, the province with the highest level of compliance with this parameter is Heredia with 50%, versus Puntarenas with 31%, where the operator presented the lowest performance. (See Chart 157).

In the case of Claro, the highest result was in Puntarenas with 70% and the lowest was Limon with 53%. See Chart 158.

For Telefónica, the best performance was San Jose with 68% and the worst was Alajuela with 62%. See Chart 157.

Likewise, Charts 157, 158 and 159 present the average download speeds for 3G measured in each province, where ICE is compared to a plan with a speed provided of 3 Mbps, Claro has 5 Mbps and Telefónica has 4 Mbps.

In 4G networks, Claro is the operator with the lowest percentage in download performance (56%) in 2016, while ICE has the highest percentage with 84% (see Chart 160). ICE is the operator that improves in the highest proportion in this parameter, by an increase of 17 percentage points in performance in the last year (Chart 160). Telefónica presents an improvement, going from 77% to 80%, while Claro reduces its performance from 77% in 2015 to 56% in 2016.

Analyzing these results per province, for ICE, the province that presents the highest level of compliance of this parameter is Puntarenas with 94% compared to Heredia with 77% where the operator had the lowest performance. See Chart 161.

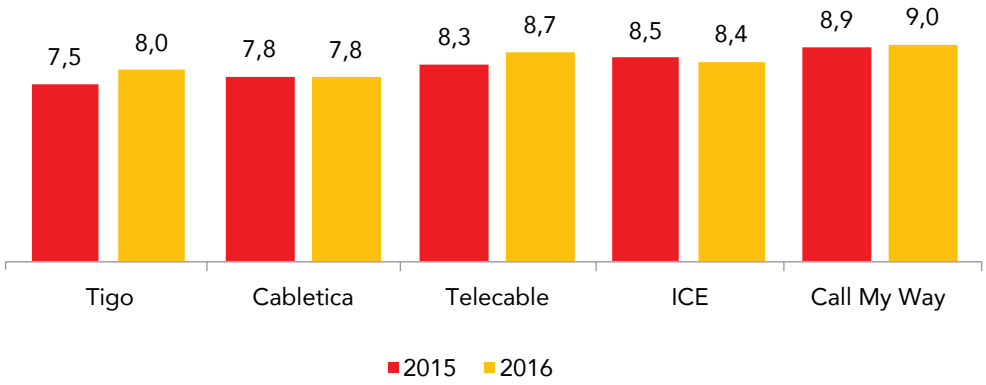
In the case of Claro, the highest result was in Guanacaste with 20% compared to Cartago with 68%. See Chart 162.

For Telefónica, the best performance was in Guanacaste with 90% and the worst was Limon with 68%. See Chart 163.

Charts 161, 162 and 163 show average download speeds measured in each province for 4G networks, where ICE is compared to a plan of a speed provided of 6 Mbps, and Claro and Telefónica of 10 Mbps.

Chart 143

Costa Rica: Final result for perception and degree of satisfaction with the quality of fixed telephony service (traditional basic and VoIP), 2015-2016
(Figures in units[1])

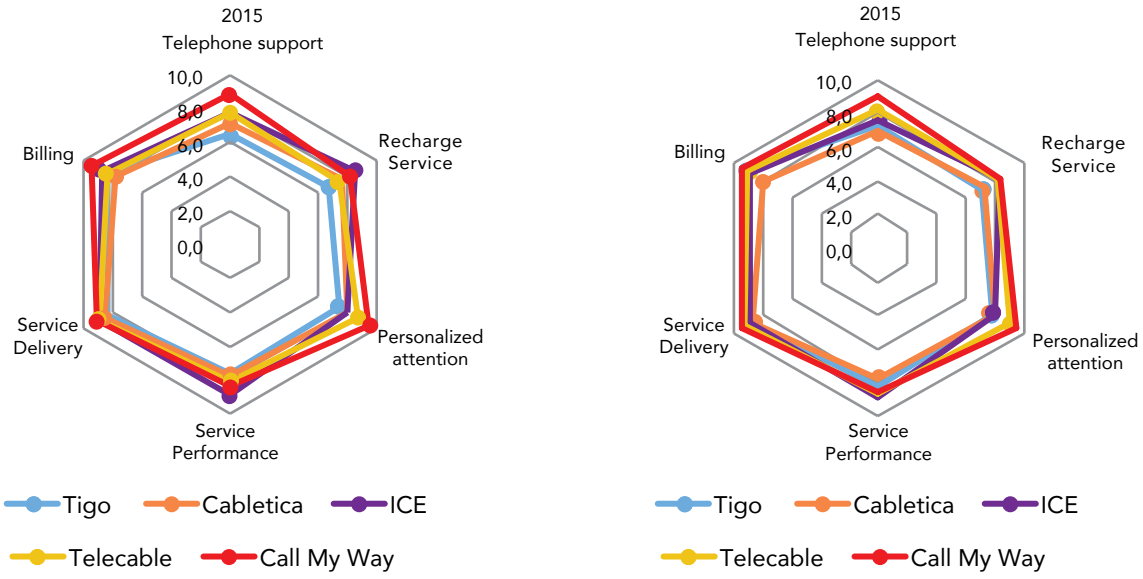


Source: SUTEL, Quality Division

[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 144

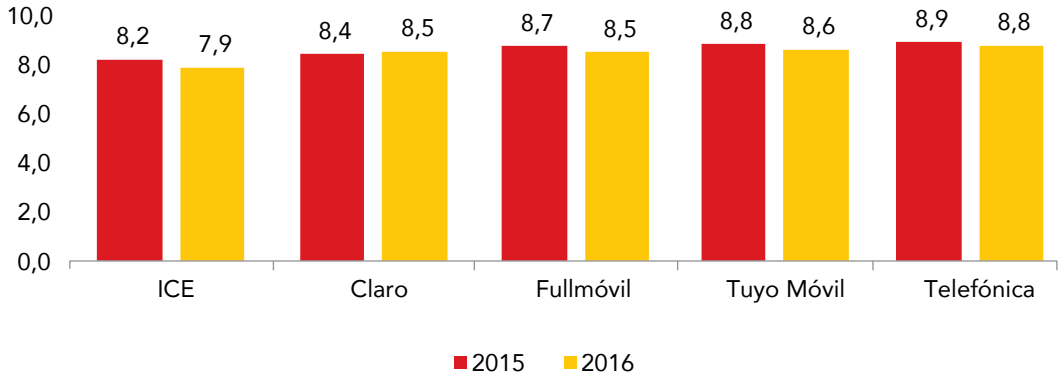
Costa Rica: Results for perception and degree of satisfaction[1] with the quality of fixed telephony services (traditional basic and VoIP) per aspect evaluated, 2015-2016



Source: SUTEL, Quality Division
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 145

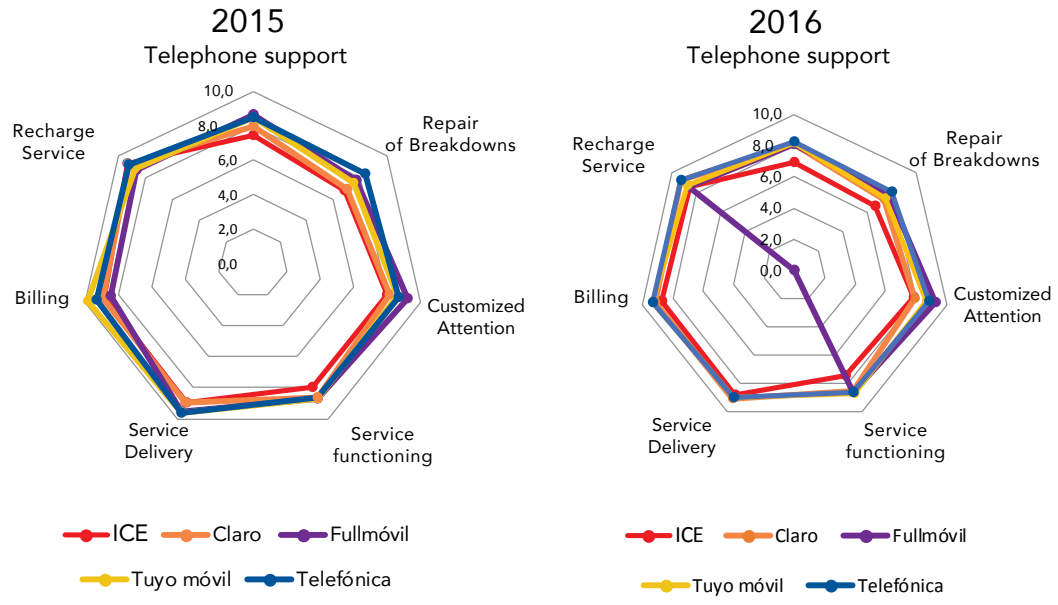
Costa Rica: Final result for perception and degree of satisfaction with the quality of the mobile telephony service, 2015-2016
(Figures in units[1])



Source: SUTEL, Quality Division.
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 146

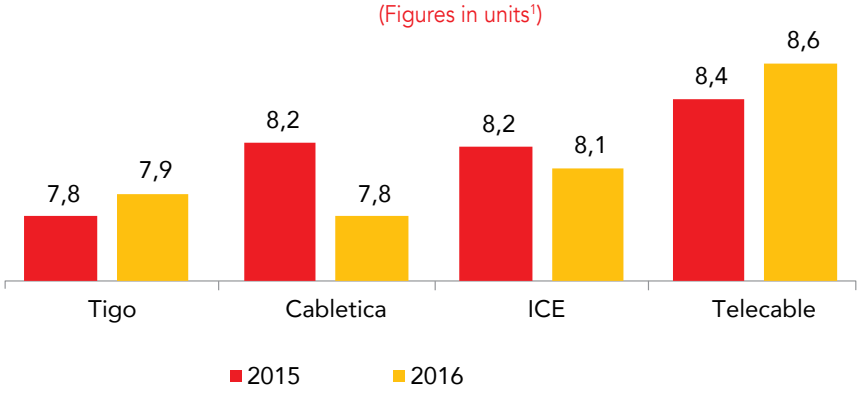
Costa Rica: Results for perception and degree of satisfaction[1] with the quality of mobile telephony services per aspect evaluated



Source: SUTEL, Quality Division
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 147

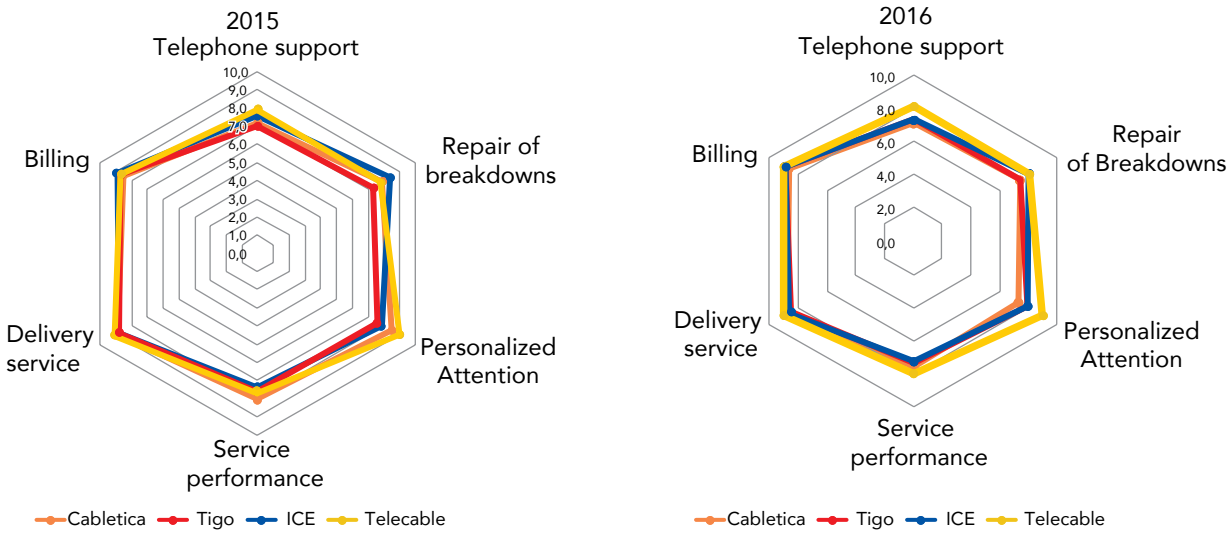
Costa Rica: Final result for the perception and degree of satisfaction with the quality of fixed Internet services, 2015-2016
(Figures in units[1])



Source: SUTEL, Quality Division.
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 148

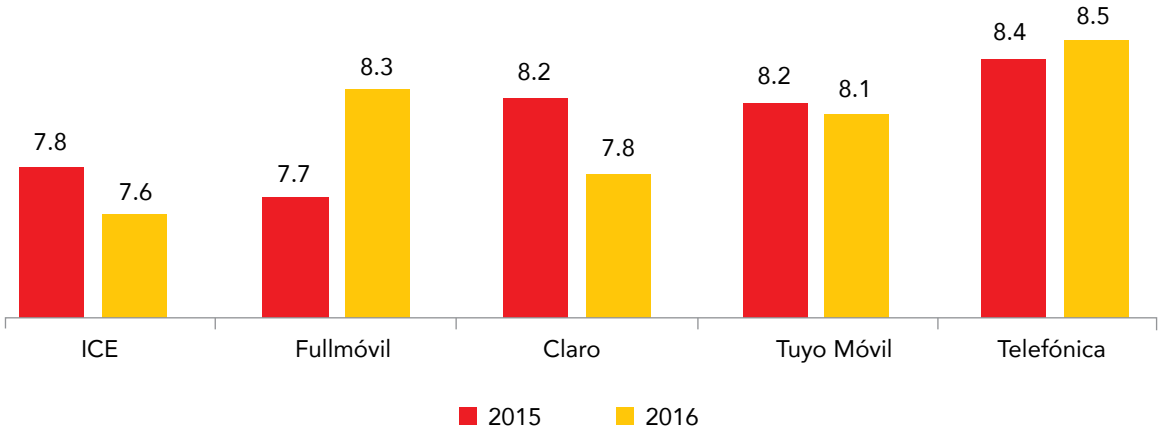
Costa Rica: Results for perception and degree of satisfaction[1] with the quality of fixed Internet per aspect evaluated



Source: SUTEL, Quality Division.
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 149

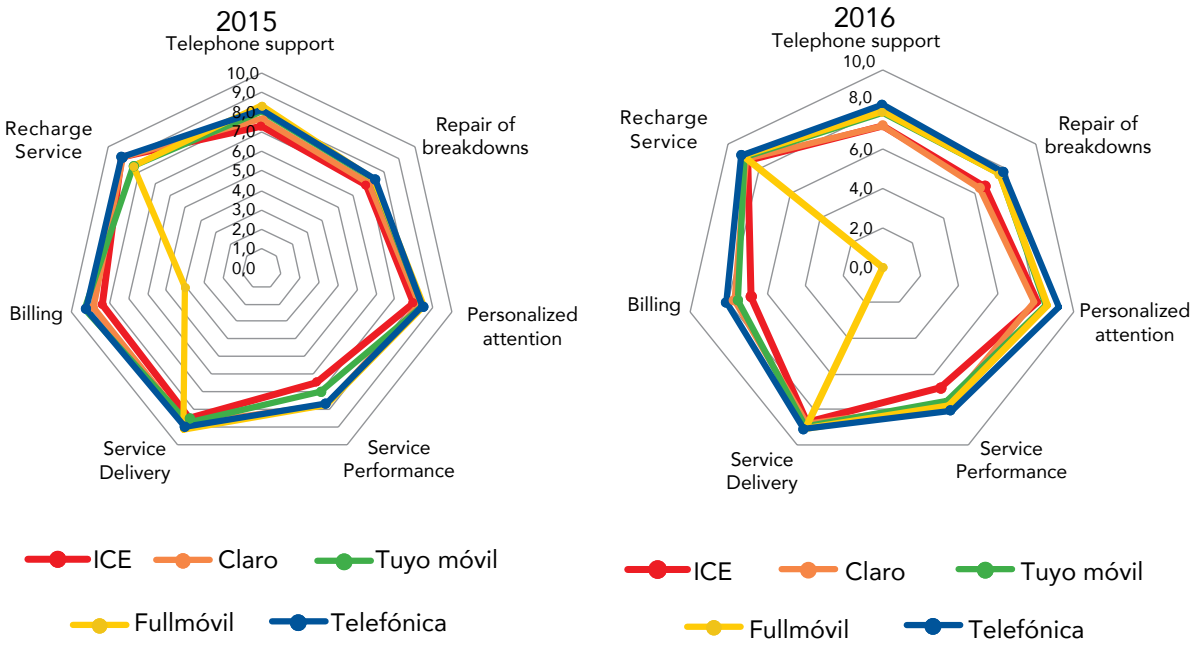
Costa Rica: Final result of perception and degree of satisfaction with the quality of the mobile Internet service, 2015-2016
(Figures in units[1])



Source: SUTEL, Quality Division.
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 150

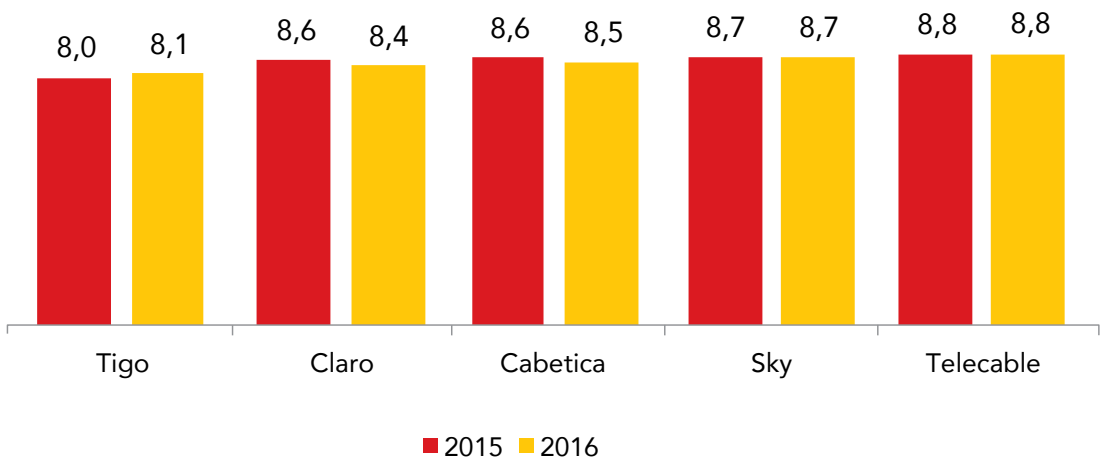
Costa Rica: Results for perception and degree of satisfaction[1] with the quality of mobile Internet services per aspect evaluated



Source: SUTEL, Quality Division
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 151

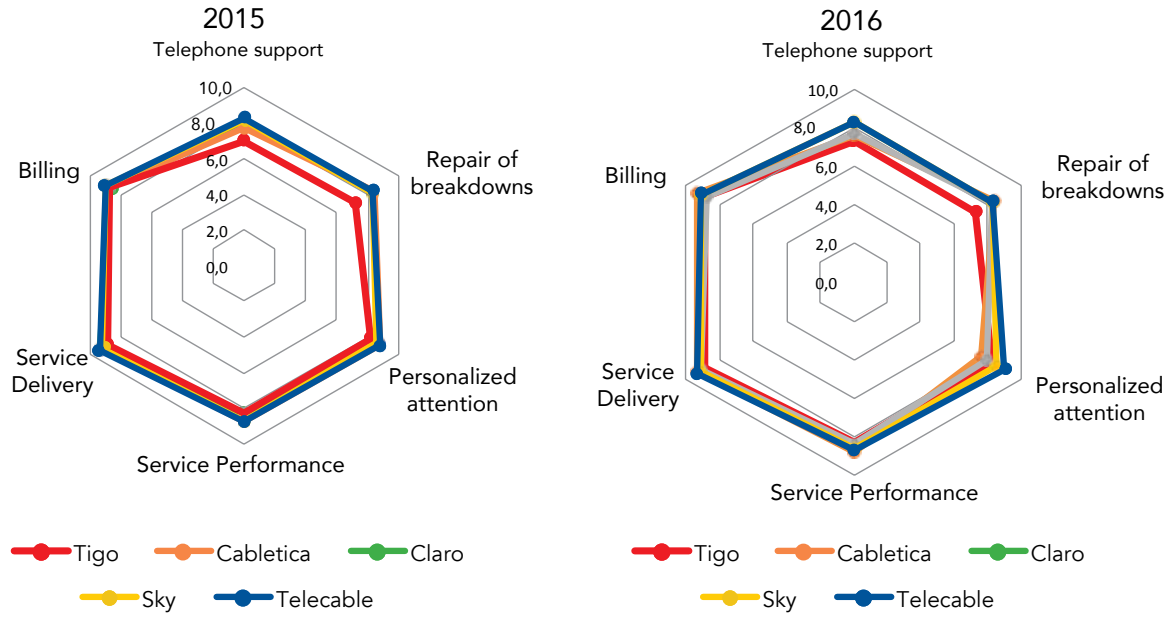
Costa Rica: Final result of perception and degree of satisfaction with the quality of the paid television service, 2015-2016
(Figures in units[1])



[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 152

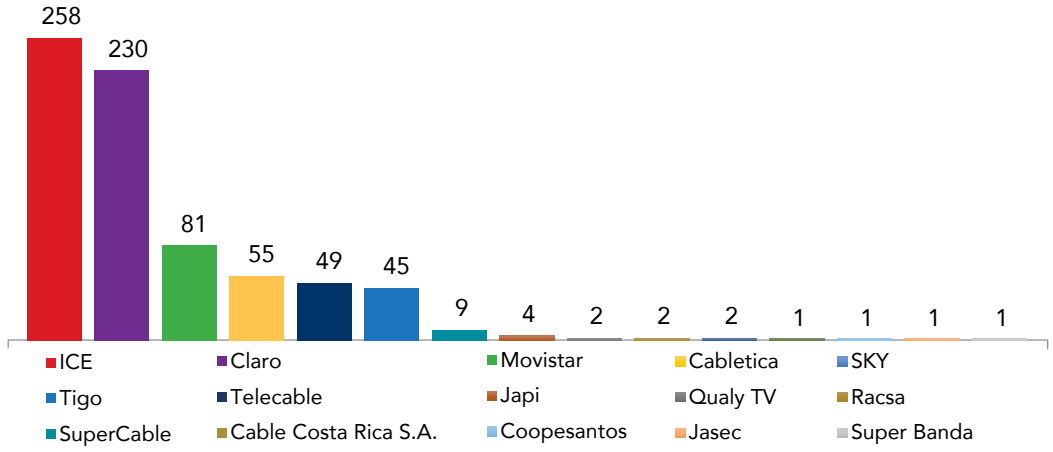
Costa Rica: Results for perception and degree of satisfaction[1] with the quality of mobile Telephony services per aspect evaluated, 2015-2016



Source: SUTEL, Quality Division
[1] The indicator ranges from 1 to 10, where 10 is the highest result in perception.

Chart 153

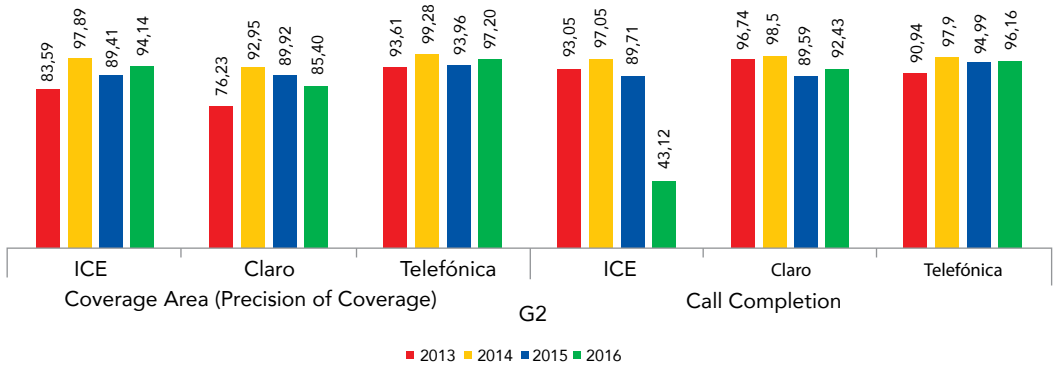
Costa Rica: Number of claims per operator, 2016
(Annual figures)



Source: SUTEL, Quality Division.

Chart 154

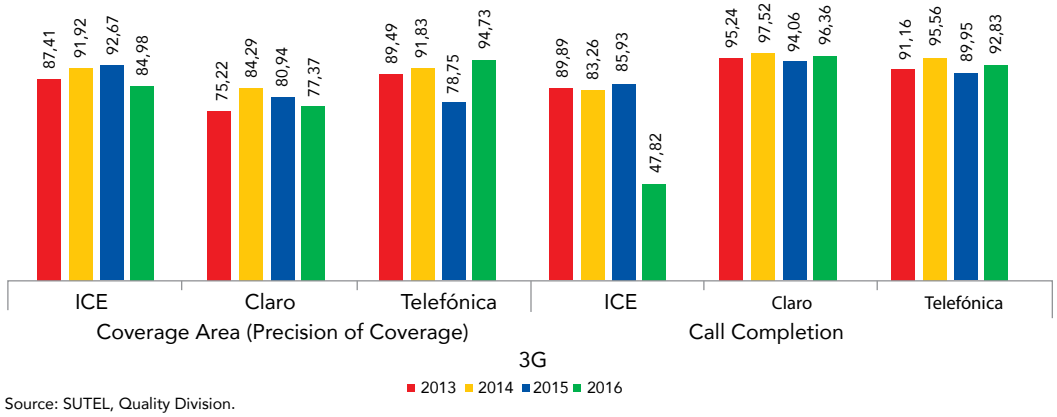
Costa Rica: Percentage of districts that meet the quality parameters for 2G networks for operator, 2013-2016
(Figures in percentages)



Source: SUTEL, Quality Division.

Chart 155

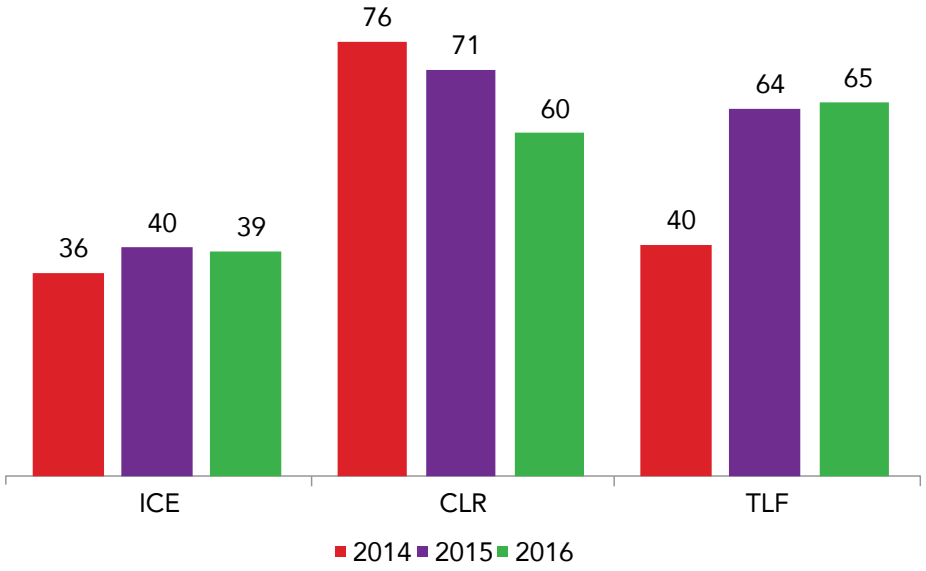
Costa Rica: Percentage of districts that meet the quality parameters for 3G networks for operator, 2013-2016
(Figures in percentages)



Source: SUTEL, Quality Division.

Chart 156

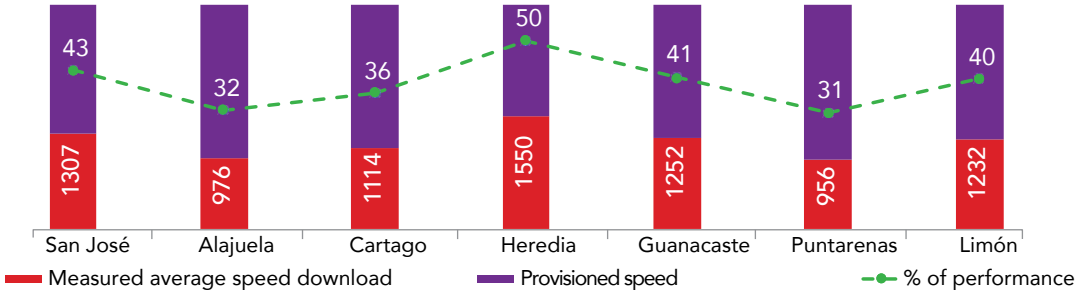
Costa Rica: Evolution of the average performance with respect to download speed hired for 3G networks by operator, 2014-2016
(Figures in percentages)



Fuente: SUTEL, Dirección General de Calidad

Chart N° 157

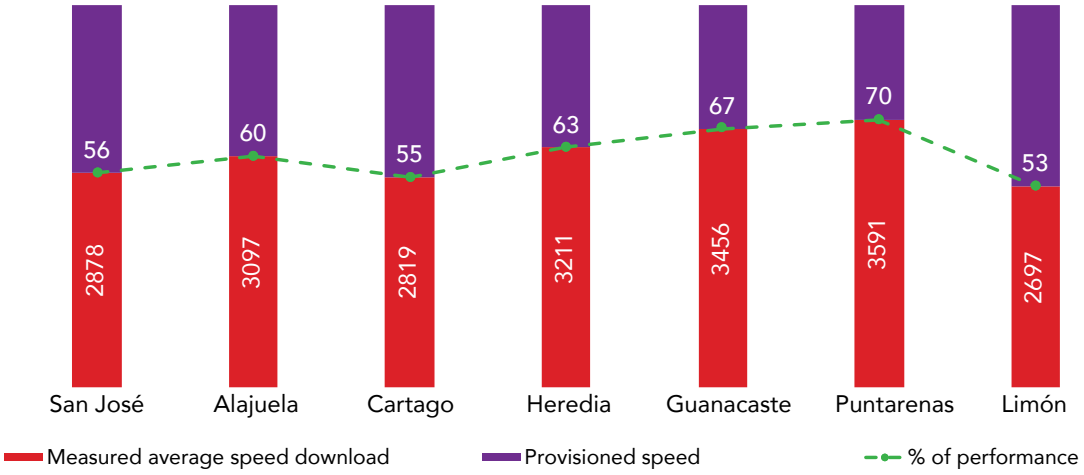
Costa Rica: Average speed measured for download with respect to provided download speed (3072 kbps) and percentage of performance per province for ICE in 3G networks, 2016
(Figures in kbps and percentages)



Source: SUTEL, Quality Division.

Chart 158

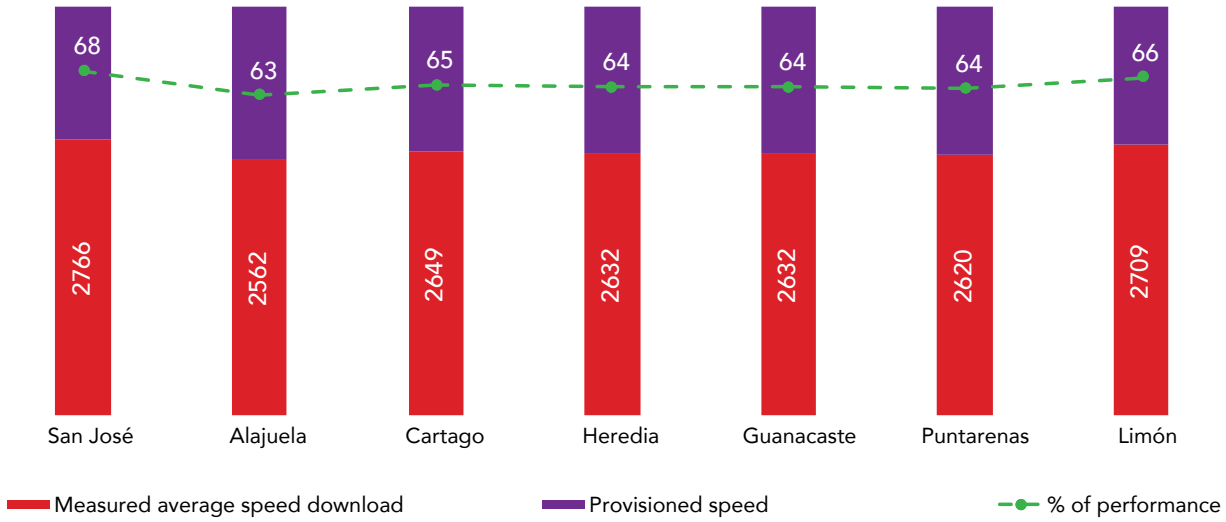
Costa Rica: Average speed measured for download with respect to provided download speed (5120 kbps) and percentage of performance per province for Claro in 3G networks, 2016
(Figures in kbps and percentages)



Source: SUTEL, Quality Division.

Chart 159

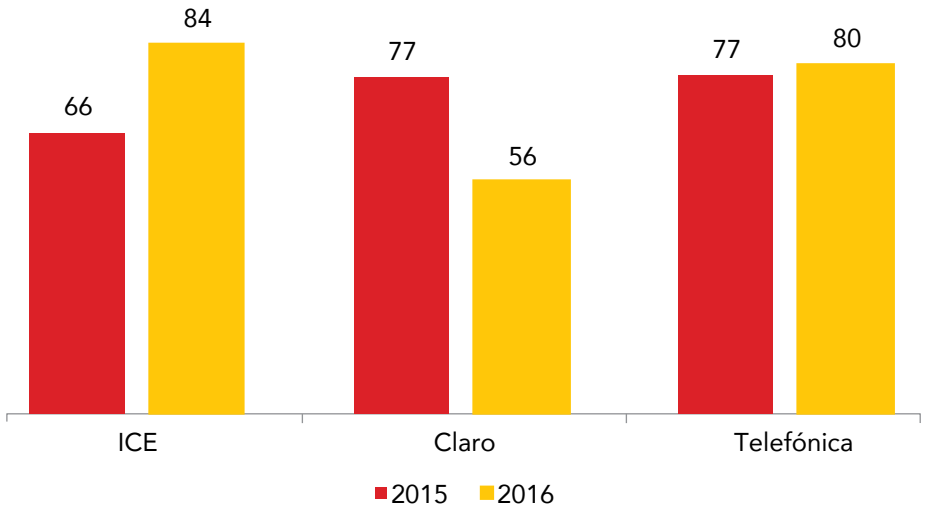
Costa Rica: Average speed measured for download with respect to provided download speed (4068 kbps) and percentage of performance per province for Telefónica in 3G networks, 2016
(Figures in kbps and percentages)



Fuente: SUTEL, Dirección General de Calidad.

Chart 160

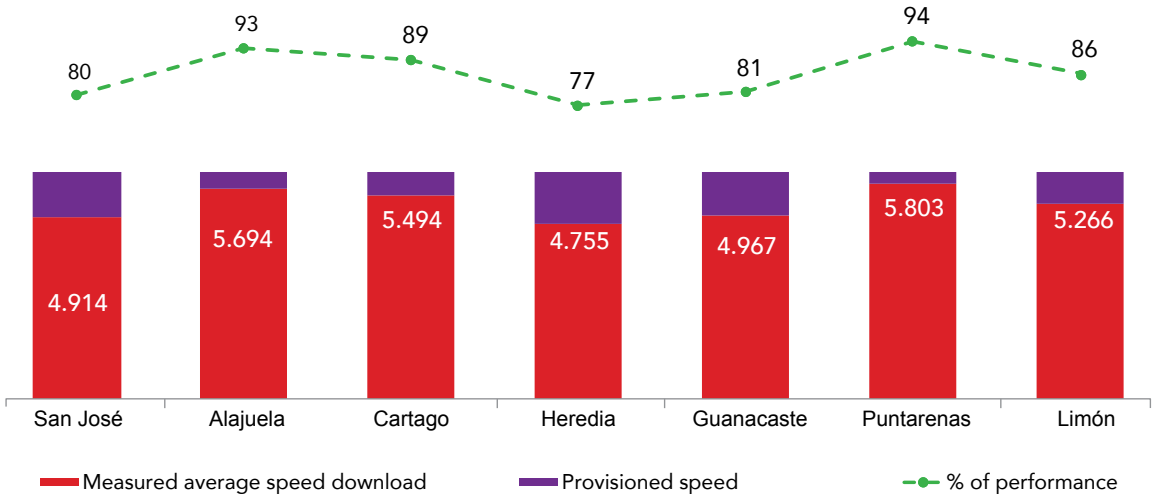
Costa Rica: Evolution of average performance with respect to the download speed hired for 4G networks by operator, 2015-2016
(Figures in percentages)



Source: SUTEL, Quality Division.

Chart 161

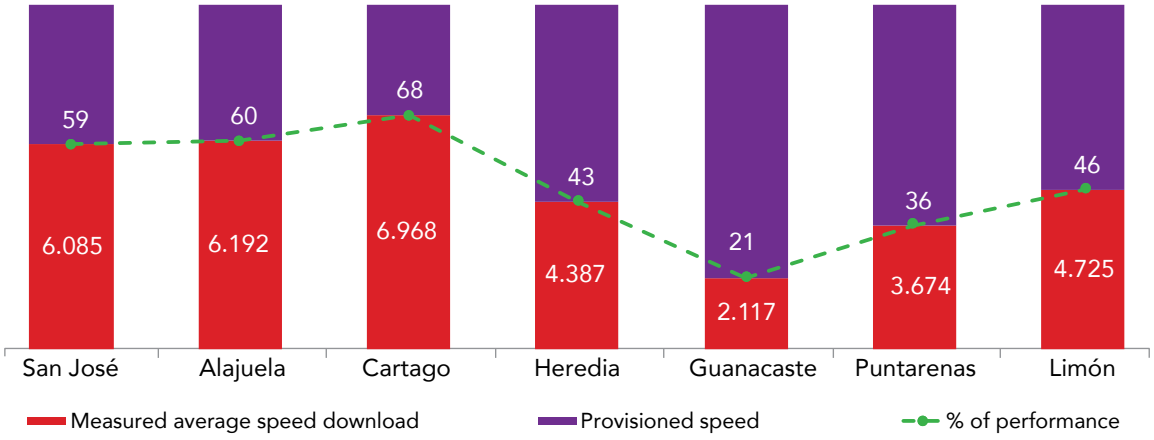
Costa Rica: Average speed measured for download with respect to provided download speed (6144 kbps) and percentage of performance per province for ICE in 4G networks, 2016
(Figures in kbps and percentages)



Source: SUTEL, Quality Division.

Chart 162

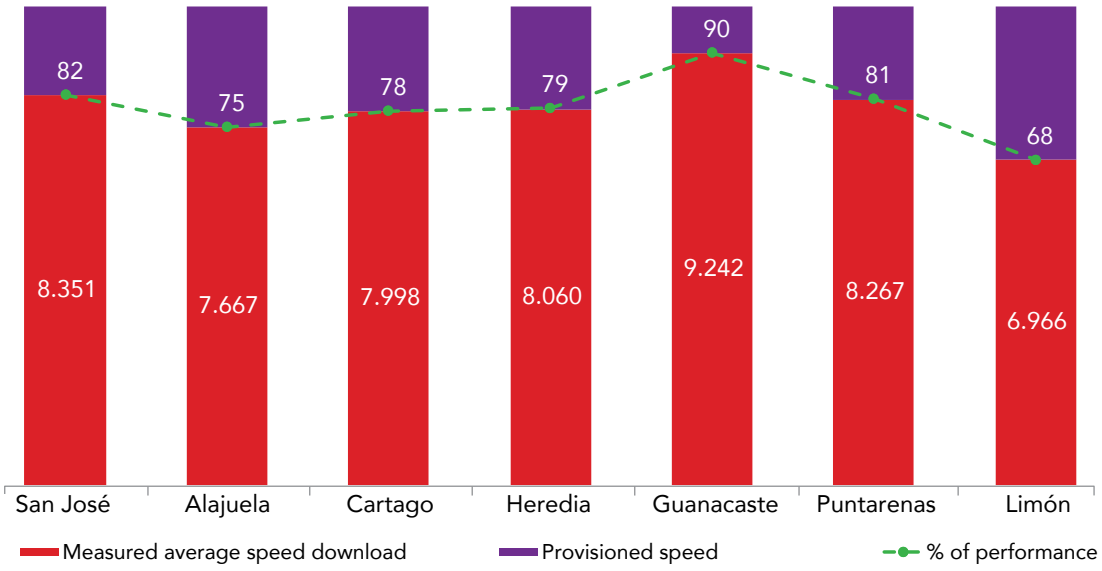
Costa Rica: Average speed measured for download with respect to provided download speed (10240 kbps) and percentage of performance per province for Claro in 4G networks, 2016
(Figures in kbps and percentages)



Source: SUTEL, Quality Division.

Gráfico N° 163

Costa Rica: Average speed measured for download with respect to provided download speed (10240 kbps) and percentage of performance per province for Telefónica in 4G networks, 2016
(Figures in kbps and percentages)



Source: SUTEL, Quality Division.

Statistical Annex

General

Table 32

Costa Rica: Total income of the telecommunications sector, 2013-2016
Quarterly and annual figures in million colones

Indicator	2013				2014				2015				2016				2013	2014	2015	2016
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT				
Income	133 856	140 012	148 801	154 074	178 789	182 611	176 614	180 477	184 637	190 825	187 380	189 322	187 157	191 934	197 219	198 549	576 742	718 491	752 164	752 464
% variation	6 %	2 %	2 %	2 %	3 %	5 %	6 %	4 %	16 %	2 %	-3 %	2 %	2 %	3 %	-2 %	1 %	15 %	25 %	5 %	3 %

Source: SUTEL, Market Management Division.

Table 33

Costa Rica: Total income of the telecommunications sector according to service, 2013-2016
Quarterly figures in million colones

Indicator	2013				2014				2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Traditional basic telephony and VoIP telephony	19 993	20 249	19 568	20 720	23 594	23 226	22 857	22 634	22 044	21 903	20 959	21 457	22 445	22 427	21 546	21 083
Mobile telephony (only voice)	70 336	71 149	74 448	77 264	92 258	92 931	89 201	91 753	89 494	92 544	87 429	88 911	85 652	86 537	87 850	87 675
Internet access (including mobile Internet)	34 122	37 175	44 204	45 413	52 102	55 841	54 345	57 161	64 210	67 027	69 818	70 168	71 449	74 586	78 516	80 659
Dedicated lines	9404	10 439	10 581	10 677	10 835	10 612	10 211	8930	8890	9351	9174	8787	7611	8384	9306	9132
Total	133 856	140 012	148 801	154 074	178 789	182 611	176 614	180 477	184 637	190 825	187 380	189 322	187 157	191 934	197 219	198 549

Source: SUTEL, Market Management Division.

Table 34

Costa Rica: Total income of the telecommunications sector according to service, 2012-2016
Annual figures in million colones

	2012	2013	2014	2015	2016
Mobile telephony (only voice)	273 342	293 197	366 143	358 377	347 713
Traditional basic telephony and VoIP telephony	85 334	80 531	92 311	86 363	87 501
Internet access (including mobile Internet access)	108 920	161 914	219 449	271 222	305 210
Dedicated lines	34 052	41 101	40 588	36 202	34 433
Total	501 648	576 742	718 491	752 164	774 858

Source: SUTEL, Market Management Division.

Table 35

Costa Rica: Total income of the telecommunications sector according to service, 2012-2016
Annual figures in percentages

	2012	2013	2014	2015	2016
Mobile telephony (only voice)	54 %	51 %	51 %	48 %	45 %
Traditional basic telephony and VoIP telephony	17 %	14 %	13 %	11 %	11 %
Internet access (including mobile Internet access)	22 %	28 %	31 %	36 %	39 %
Dedicated lines	7 %	7 %	5 %	5 %	5 %
Total	100 %	100 %	100 %	100 %	100 %

Source: SUTEL, Market Management Division.

Table 36

Costa Rica: Total income of the telecommunications sector according to service, 2012-2016
Annual figures in million colones

	2012	2013	2014	2015	2016
Mobile telephony and mobile Internet access (Mobile Network)	314 598	387 202	493 340	528 751	542 216
Traditional basic telephony and VoIP telephony	85 334	80 531	92 311	86 363	87 501
Fixed Internet access	67 665	67 909	92 252	100 848	110 707
Dedicated lines	34 052	41 101	40 588	36 202	34 433
Total	501 648	576 742	718 491	752 164	774 858

Source: SUTEL, Market Management Division.

Table 37

Costa Rica: Total income of the telecommunications sector according to service, 2012-2016
Annual figures in percentages

	2012	2013	2014	2015	2016
Mobile telephony and mobile Internet access (Mobile network)	63 %	67 %	69 %	70 %	70 %
Traditional basic telephony and VoIP telephony	17 %	14 %	13 %	12 %	11 %
Fixed Internet access	13 %	12 %	13 %	13 %	14 %
Dedicated lines	7 %	7 %	5 %	5 %	5 %
Total	100 %	100 %	100 %	100 %	100 %

Source: SUTEL, Market Management Division.

Tabla 38

Costa Rica: Total income of the telecommunications sector as proportion of the GDP, 2012-2016
Annual figures in percentages

Año	2012	2013	2014	2015	2016
Total income / GDP (Percentage)	2,4 %	2,6 %	2,9 %	2,9 %	3,0 %

Source: SUTEL, Market Management Division.

Tabla 39

Costa Rica: Total investment of the telecommunications sector as proportion of the GDP, 2012-2016
Annual figures in percentages

Año	2012	2013	2014	2015	2016
Total income / GDP (Percentage)	2,2 %	0,9 %	0,9 %	0,9 %	0,7 %

Source: SUTEL, Market Management Division.

Table 40

Costa Rica: Labor force in the telecommunications sector, 2012-2016
Bi-annual and annual figures in number of people and percentages

Indicator	2012		2013		2014		2015		2016		2012	2013	2014	2015	2016
	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem					
People	9933	9900	10 347	10 442	11 006	11 017	11 497	11 426	11 736	11 885	9900	10 442	11 017	11 426	11 885
% of Variation	3 %	0 %	5 %	1 %	5 %	0 %	4 %	-1 %	3 %	1 %	3 %	5 %	6 %	4 %	4 %

Source: SUTEL, Market Management Division.

Table 41

Costa Rica: Percentage of labor force in the telecommunications sector with respect to the economically active population, 2012-2016
Annual figures in number of people and percentages

Indicator	2012	2013	2014	2015	2016
Total country	2 121 031	2 235 770	2 284 142	2 276 104	2 206 179
Telecommunications sector	9900	10 442	11 017	11 426	11 885
Percentage	0,4 %	0,5 %	0,5 %	0,5 %	0,5 %
% of Variation	0 %	4 %	8 %	7 %	7 %

Source: SUTEL, Market Management Division and INEC (Continuous Employment Survey)

Table 42

Costa Rica: Percentage of labor force of the telecommunications sector with respect to the total population, 2012-2016
Annual figures in number of people and percentages

Indicator	2012	2013	2014	2015	2016
Total population	4 652 459	4713 168	4 773 130	4 832 234	4 890 379
Labor force in the telecommunications sector	9900	10 442	11 017	11 426	11 885
Percentage	0,2 %	0,2 %	0,2 %	0,2 %	0,2 %

Source: SUTEL, Market Management Division and INEC.

Tabla 43

Costa Rica: Female labor force in the telecommunications sector, 2012-2016
Bi-annual figures in number of people and percentages

Indicator	2012		2013		2014		2015		2016	
	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
People	2792	2873	2811	2911	2811	2911	2963	3010	3057	3061
% of Variation per semester		3 %		4 %		4 %		2 %		0 %

Source: SUTEL, Market Management Division.

Fixed Telephony

Table 44

Costa Rica: Subscriptions to traditional basic telephony and VoIP telephony, 2012-2016
Figures at the closing of each year

Subscriptions	2012	2013	2014	2015	2016
Total	995 089	968 459	881 217	859 857	849 826
Traditional basic telephony	976 824	936 035	839 968	804 468	779 972
VoIP	18 265	32 424	41 249	55 389	69 854

Source: SUTEL, Market Management Division.

Table 45

Costa Rica: Subscriptions to traditional basic telephony and VoIP telephony, 2015-2016
Figures at the closing of each quarter

Subscriptions	2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Total	880 501	871 756	865 658	859 857	859 294	856 357	853 629	849 826
Traditional basic telephony	831 837	824 070	813 987	804 468	799 696	794 172	787 020	779 972
VoIP	48 664	47 686	51 671	55 389	59 598	62 185	66 609	69 854

Source: SUTEL, Market Management Division.

Table 46

Costa Rica: Distribution of subscriptions of traditional basic telephony and VoIP telephony, 2012-2016
Figures at the closing of each year in percentages

Subscriptions	2012	2013	2014	2015	2016
Traditional basic telephony	98,2 %	96,7 %	95,3 %	93,6 %	91,8 %
VoIP	1,8 %	3,3 %	4,7 %	6,4 %	8,2 %

Source: SUTEL, Market Management Division.

Table 47

Costa Rica: Percentage distribution of subscriptions of traditional basic telephony and VoIP telephony, 2015-2016
Figures at the closing of each quarter in percentages

Subscriptions	2015				2016			
	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim
Traditional basic telephony	94,5 %	94,5 %	94,0 %	93,6 %	93,1 %	92,7 %	92,2 %	91,8 %
VoIP	5,5 %	5,5 %	6,0 %	6,4 %	6,9 %	7,3 %	7,8 %	8,2 %

Source: SUTEL, Market Management Division.

Table 48

Costa Rica: Penetration of the traditional basic telephony service with respect to the population, 2012-2016
Annual figures in percentages

Indicator	2012	2013	2014	2015	2016
Fixed connections for every 100 inhabitants	21,0 %	19,9 %	17,6 %	16,6 %	15,9 %
Fixed traditional basic telephony subscriptions	976 824	936 035	839 968	804 468	779 972
Total population	4 652 459	4 713 168	4 773 130	4 832 234	4 890 379

Source: SUTEL, Market Management Division.

Table 49

Costa Rica: Penetration of VoIP service with respect to the population, 2012-2016
Annual figures

Indicator	2012	2013	2014	2015	2016
Fixed connections for every 100 inhabitants	3,9	6,9	8,6	11,5	14,3
Suscripciones VoIP	18 265	32 424	41 249	55 389	69 854
Total population	4 652 459	4 713 168	4 773 130	4 832 234	4 890 379

Source: SUTEL, Market Management Division.

Tabla 50

Costa Rica: Traditional basic telephony: number of public telephones in operation, 2012-2016
Figures at the closing of each year

Indicator	2012	2013	2014	2015	2016
Public telephones	16 348	13 145	8188	5726	4731

Source: SUTEL, Market Management Division.

Tabla 51

Costa Rica: Total income from fixed telephony services, 2012-2016
Annual figures in million colones and percentages of variation

Indicator	2012	2013	2014	2015	2016
Income	85 334	80 531	92 311	86 363	87 501
% of Variation		-5,6 %	14,6 %	-6,4 %	1,3 %

Source: SUTEL, Market Management Division

Tabla 52

Costa Rica: Total income from VoIP telephony, 2012-2016
Annual figures in million colones and percentages of variation

Indicator	2012	2013	2014	2015	2016
Income	1539	2506	4300	4973	5435
% of variation	---	62,8 %	71.6 %	15,7 %	9,3 %

Source: SUTEL, Market Management Division.

Table 53

Costa Rica: Total income from traditional basic telephony and VoIP telephony, 2015-2016
Quarterly figures in million colones and percentages of variation

Indicator	2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Income	22 044	21 903	20 959	21 457	22 445	22 427	21 546	21 083
% of Variation		-0,6 %	-4,3 %	2,4 %	4,6 %	-0,1 %	-3,9 %	-2,1 %

Source: SUTEL, Market Management Division.

Table 54

Costa Rica: Income from VoIP telephony, 2015-2016
Quarterly figures in million colones and percentages of variation

Indicator	2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Income	1218	1240	1212	1303	1324	1328	1382	1400
% of Variation		1,9 %	-2,2 %	7,5 %	1,6 %	0,3 %	4,1 %	1,3 %

Source: SUTEL, Market Management Division.

Table 55

Costa Rica: Average income per subscriber in traditional basic telephony and VoIP telephony, 2012-2016
Annual figures in colones and percentages of variation

Year	Average income			Percentage variation		
	Traditional basic	VoIP	Fixed Telephony	Traditional basic	VoIP	Fixed Telephony
2012	85 783	84 254	85 755	---	---	---
2013	83 357	77 274	83 153	-3 %	-8 %	-3 %
2014	104 772	104 368	104 753	26 %	35 %	26 %
2015	101 172	90 355	100 479	-3 %	-13 %	-4 %
2016	105 217	77 805	102 963	4 %	-14 %	2 %

Source: SUTEL, Market Management Division.

Table 56

Costa Rica: Average income per minute in traditional basic telephony and VoIP telephony, 2012-2016
Figures in colones and percentages of variation

Year	Average income			Percentage variation		
	VoIP	Traditional basic	Fixed Telephony	VoIP	Traditional basic	Fixed Telephony
2012	40	17	17	---	---	---
2013	32	19	19	-18 %	12 %	12 %
2014	25	27	27	-24 %	39 %	37 %
2015	21	27	27	-14 %	2 %	1 %
2016	21	31	30	-2 %	14 %	13 %

Source: SUTEL, Market Management Division.

Table 57

Costa Rica: Fixed telephony traffic completed on net and outbound, 2012-2016
Annual figures in millions of minutes and percentages of variation

Indicator	2012	2013	2014	2015	2016
Minutes	4909	4138	3472	3210	2909
% of Variation		-15,7 %	-16,1 %	-7,6 %	-9,4 %

Source: SUTEL, Market Management Division.

Table 58

Costa Rica: VoIP telephony traffic completed on net and outbound, 2012-2016
Annual figures in thousands of minutes and percentages of variation

Indicator	2012	2013	2014	2015	2016
Minutes	39 498	77 532	173 391	232 235	279 027
% of Variation		96,3 %	123,6 %	33,9 %	20,1 %

Source: SUTEL, Market Management Division.

Table 59

Costa Rica: Traditional basic telephony and VoIP telephony traffic completed on net and outbound, 2015-2016
Quarterly figures in millions of minutes and percentages of variation

Indicator	2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Minutes	859	809	751	791	736	746	714	712
% of Variation		-5,8 %	-7,2 %	5,4 %	-6,9 %	1,3 %	-4,4 %	-0,3 %

Source: SUTEL, Market Management Division.

Table 60

Costa Rica: VoIP telephony traffic completed on net and outbound, 2015-2016
Quarterly figures in millions of minutes and percentages of variation

Indicator	2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Minutes	50	59	59	64	57	65	77	80
% of Variation		18,1 %	0,2 %	8,8 %	-11,4 %	14,7 %	18,2 %	3,1 %

Source: SUTEL, Market Management Division.

Mobile Telephony

Table 61

Costa Rica: Total subscriptions to the mobile telephony service by operator, 2012-2016
Figures at the closing of each quarter in thousands of subscriptions and percentages of variation

TOTAL	2012				2013				2014				2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim
ICE	3899	3819	3830	3893	3977	4075	4278	4337	4177	4251	4297	4348	4253	3925	4048	4339	4302	4314	4391	4440
% of Variation	4 %	-2 %	0 %	2 %	2 %	2 %	5 %	1 %	-4 %	2 %	1 %	1 %	-2 %	-8 %	3 %	7 %	-1 %	0 %	2 %	1 %
Claro	227	351	601	806	899	923	1056	1307	1386	1282	1121	1144	1206	1319	1328	1414	1526	1559	1551	1639
% of Variation	98 %	55 %	71 %	34 %	12 %	3 %	14 %	24 %	6 %	-7 %	-13 %	2 %	5 %	9 %	1 %	6 %	8 %	2 %	-1 %	6 %
Telefónica	268	361	410	448	645	814	1063	1272	1369	1326	1361	1431	1515	1493	1637	1677	1790	1905	2087	2144
% of Variation	120 %	35 %	14 %	9 %	44 %	26 %	31 %	20 %	8 %	-3 %	3 %	5 %	6 %	-1 %	10 %	2 %	7 %	6 %	10 %	3 %
Fullmóvil	41	59	79	95	79	48	44	45	34	24	27	31	33	41	50	59	63	71	92	101
% of Variation	-46 %	45 %	32 %	21 %	-17 %	-39 %	-8 %	2 %	-24 %	-28 %	9 %	15 %	8 %	24 %	22 %	19 %	7 %	12 %	29 %	10 %
Tuyo Móvil	106	105	109	107	101	93	93	98	83	73	68	67	55	47	48	46	29	11	9	7
% of Variation	12 %	4 %	9 %	4 %	3 %	3 %	7 %	5 %	-16 %	-12 %	-7 %	-2 %	-18 %	-14 %	2 %	-5 %	-37 %	-60 %	-26 %	-13 %
Total	**4540**	**4695**	**5028**	**5349**	**5700**	**5952**	**6534**	**7059**	**7049**	**6957**	**6873**	**7020**	**7061**	**6826**	**7112**	**7536**	**7711**	**7860**	**8130**	**8331**
% of Variation	**10 %**	**4 %**	**7 %**	**7 %**	**7 %**	**5 %**	**10 %**	**8 %**	**0 %**	**-1 %**	**-1 %**	**2 %**	**0 %**	**-1 %**	**-1 %**	**2 %**	**2 %**	**2 %**	**3 %**	**2 %**

Source: SUTEL, Market Management Division.

Table 62

Costa Rica: Total subscriptions of the mobile telephony service per modality of payment, 2012-2016
Figures at the closing of each quarter in thousands of subscriptions and percentages of variation

TOTAL	2012				2013				2014				2015				2016			
	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim
Pre-paid	3318	3548	3896	4212	4544	4808	5367	5832	5723	5590	5491	5599	5602	5344	5579	5951	6100	6189	6379	6469
% of variation pre-paid	16 %	7 %	10 %	8 %	8 %	6 %	12 %	9 %	-2 %	-2 %	-2 %	2 %	0 %	-5 %	4 %	7 %	3 %	1 %	3 %	1 %
Quarterly participation pre-paid	73 %	76 %	77 %	79 %	80 %	81 %	82 %	83 %	81 %	80 %	80 %	80 %	79 %	78 %	78 %	79 %	79 %	79 %	78 %	78 %
Post-paid	1223	1147	1132	1137	1156	1144	1168	1228	1326	1366	1383	1422	1459	1481	1532	1584	1611	1672	1751	1862
% of variation post-paid	-3 %	-6 %	-1 %	0 %	2 %	-1 %	2 %	5 %	8 %	3 %	1 %	3 %	3 %	2 %	3 %	3 %	2 %	4 %	5 %	6 %
Quarterly participation post-paid	27 %	24 %	23 %	21 %	20 %	19 %	18 %	17 %	19 %	20 %	20 %	20 %	21 %	22 %	22 %	21 %	21 %	21 %	22 %	22 %
Total	**4540**	**4695**	**5028**	**5349**	**5700**	**5952**	**6534**	**7059**	**7049**	**6957**	**6873**	**7020**	**7061**	**6826**	**7112**	**7536**	**7711**	**7860**	**8130**	**8331**
% of quarterly variation	**10 %**	**3 %**	**7 %**	**6 %**	**7 %**	**4 %**	**10 %**	**8 %**	**-0 %**	**-1 %**	**-1 %**	**2 %**	**1 %**	**-3 %**	**4 %**	**6 %**	**2 %**	**2 %**	**3 %**	**2 %**

Source: SUTEL, Market Management Division.

Table 63

Costa Rica: Penetration of the mobile telephony service for every 100 inhabitants, 2012-2016
Annual figures in percentages

	2012	2013	2014	2015	2016
Mobile penetration	115 %	150 %	147 %	156 %	170 %

Source: SUTEL, Market Management Division

Table 64

Costa Rica: Participation of mobile telephony subscriptions by operator per payment modality, 2012-2016
Annual figures in percentages

	2012	2013	2014	2015	2016
Pre-paid					
ICE	70 %	57 %	58 %	54 %	49 %
Claro	16 %	20 %	17 %	19 %	19 %
Telefónica	9 %	20 %	23 %	26 %	30 %
Fullmóvil	2,3 %	0,8 %	0,5 %	1,0 %	1,6 %
Tuyo Móvil	2,5 %	1,7 %	1,2 %	0,8 %	0,1 %
Post-paid					
ICE	84 %	80 %	76 %	71 %	68 %
Claro	12 %	12 %	15 %	19 %	21 %
Telefónica	4 %	8 %	9 %	10 %	11 %

Source: SUTEL, Market Management Division

Table 65

Costa Rica: Total income associated to the telephony and mobile network (including Internet) service per component[1], 2012-2016
Annual figures in million colones

	2012	2013	2014	2015	2016
Mobile network	**314 503**	**386 819**	**493 217**	**528 743**	**533 184**
Mobile telephony	**273 342**	**293 197**	**366 143**	**358 377**	**347 713**
Voice	234 567	254 527	342 580	344 057	337 130
SMS/MMS	38 775	38 670	23 562	14 320	10 583
Mobile data	41 161	93 622	127 074	170 366	185 471

[1] It does not include roaming income.
Source: SUTEL, Market Management Division

Table 66

Costa Rica: Total income associated to the mobile network according to payment modality[1], 2012-2016
Annual figures in million colones

TOTAL (pre-paid + post-paid)	2012	2013	2014	2015	2016
	314 503	386 819	493 217	528 743	533 184
Pre-paid	183 374	207 126	278 726	252 553	241 818
Post-paid	131 129	179 693	214 490	276 190	291 366

[1] It does not include income from roaming.
Source: SUTEL, Market Management Division

Table 67

Costa Rica: Average income per minute in mobile telephony (ARPM)1, 2012-2016
Annual figures in colones and minutes

	2012	2013	2014	2015	2016
Income from voice	234 567 473 720	254 526 761 626	342 580 304 459	344 057 278 461	337 130 465 127
Total traffic	7 944 965 963	7 944 965 963	7 944 965 963	7 944 965 963	7 944 965 963
ARPM	30	32	43	43	42

[1] It only includes traffic and income from voice
Source: SUTEL, Market Management Division.

Table 68

Costa Rica: Total traffic and participation according to payment modality per year, 2012-2016
Figures in millions of minutes and percentages

Payment modality	2012	2013	2014	2015	2016
Total traffic	7945	8799	9037	8252	7632
Total pre-paid	5229	5967	5799	4868	4210
Total post-paid	2716	2832	3238	3384	3422
Pre-paid participation	66 %	68 %	64 %	59 %	55 %
Post-paid participation	34 %	32 %	36 %	41 %	45 %

Source: SUTEL, Market Management Division

Table 69

Costa Rica: Distribution in relation to traffic of mobile telephone service according to origin and destination with respect to total traffic, 2012-2016.
Annual figures in millions of minutes and percentages

Mobile traffic (origin and destination)	2012	2013	2014	2015	2016
Total traffic	**7945**	**8799**	**9037**	**8252**	**7632**
Mobile-mobile (on net)	63 %	60 %	58 %	55 %	53 %
Mobile-mobile (off net)	10 %	15 %	20 %	24 %	26 %
Mobile-fixed	24 %	22 %	19 %	18 %	18 %
Mobile-international	3 %	3 %	3 %	3 %	4 %

Source: SUTEL, Market Management Division.

Data Transfer

Table 70

Costa Rica: Subscriptions, income and total traffic of fixed Internet access service, 2014-2016
Quarterly figures

	2014				2015				2016			
	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim
Subscriptions	497 092	502 655	504 105	515 840	527 664	537 483	547 558	558 656	570 826	597 025	614 039	636 087
% of Variation		1,1 %	0,3 %	2,3 %	2,3 %	1,9 %	1,9 %	2,0 %	2,2 %	4,6 %	2,8 %	3,6 %
Income (billion colones)	23 052,06	24 351,38	22 631,31	22 217,08	23 556,40	24 095,63	24 314,23	25 004,17	25 471,27	26 892,22	28 531,19	29 812,71
% of Variation		5,6 %	-7,1 %	-1,8 %	6,0 %	2,3 %	0,9 %	2,8 %	1,9 %	5,6 %	6,1 %	4,5 %
Traffic (TB)	25 012,0	31 849,8	38 282,3	43 400,9	55 997,7	60 688,8	72 942,4	76 726,6	84 792,0	85 233,3	98 932,7	118 560,8
% of Variation		27,3 %	20,2 %	13,4 %	29,0 %	8,4 %	20,2 %	5,2 %	10,5 %	0,5 %	16,1 %	19,8 %

Source: SUTEL, Market Management Division.

Table 71

Costa Rica: Subscriptions, income and total traffic of fixed Internet access service, 2014-2016
Quarterly figures

	2014				2015				2016			
	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim
Subscriptions	4 330 695	4,336,821	4 084,140	4 290 377,00	4 353,404	4 444,433	4 627,875	4 861,898	4 943,450	4 952,368	5 187 265	5 248 233
% of Variation		0,1 %	-5,8 %	5,0 %	1,5 %	2,1 %	4,1 %	5,1 %	1.7 %	0,2 %	4,7 %	1,2 %
Income (billion colones)	29 050,24	31 489,71	31 713.47	34 944,16	39 569,25	42 080,11	44 499,33	44 273,04	45 977,58	47 693,68	49 985,26	50 846,41
% of Variation		8,4 %	0,7 %	10,2 %	13,2 %	6,3 %	5,7 %	-0,5 %	3,9 %	3,7 %	4,8 %	1.7 %
Traffic (TB)	8 268,56	8 426,19	9 956,33	11 316,83	14 663,13	16 821,39	19 945,11	23 503,61	24 737,10	28 953,09	31 875,24	36 623,55
% of Variation		1,9 %	18,2 %	13,7 %	29,6 %	14,7 %	18,6 %	17,8 %	5,2 %	17,0 %	10,1 %	14,9 %

Source: SUTEL, Market Management Division.

Paid Television

Table 72

Costa Rica: Number of subscriptions to the paid television service according to access technology, 2012-2016
Quarterly figures

Technology	2012				2013				2014				2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Cable television	444 924	453 987	455 783	462 977	467 125	469 332	474 119	489 848	500 016	505 883	508 268	510 390	510 578	512 062	526 777	531 807	536 335	530 604	535 920	548 113
Satellite television	67 610	70 449	73 408	76 491	99 610	116 371	130 495	146 936	162 355	171 641	186 591	217 140	226 473	241 269	253 271	257 986	252 604	261 102	258 505	257 486
Television over IP	0	0	0	0	886	1 294	2 168	3 071	3 483	3 674	3 804	4 191	4 534	5 111	5 889	6 434	7 910	10 582	12 956	14 702
Ground television through multi-point distribution	1 173	1 145	1 192	1 225	1 136	1 097	922	1 187	1 091	1 093	876	825	631	657	605	1 003	892	903	942	1 274
Total	**513 707**	**525 581**	**530 383**	**540 693**	**568 757**	**588 094**	**607 704**	**641 042**	**666 945**	**682 291**	**699 539**	**732 546**	**742 216**	**759 099**	**786 542**	**797 230**	**797 741**	**803 191**	**808 323**	**821 575**

Source: SUTEL, Market Management Division

Table 73

Costa Rica: Total income from the paid television service according to access technology, 2012-2016
Quarterly figures in million colones

Technology	2012				2013				2014				2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Cable television	18 434	18 940	18 727	19 267	20 061	19 973	19 907	20 870	22 374	22 642	23 690	23 288	24 344	24 749	24 631	25 134	26 252	25 751	25 823	26 101
Satellite television	3 354	3 496	3 642	3 795	4 510	5 388	6 038	6 548	7 207	7 774	7 590	8 150	8 275	8 583	9 303	8 409	7 377	9 034	9 117	8 691
Television over IP	0	0	0	0	48	72	123	204	426	463	402	328	287	315	371	398	439	522	653	721
Ground television through multi-point distribution	14	15	16	15	17	15	14	15	14	15	14	14	12	12	12	12	13	12	12	12
Total	**21 802**	**22 598**	**22 385**	**23 269**	**24 635**	**25 449**	**26 082**	**27 636**	**30 078**	**30 893**	**31 695**	**31 779**	**32 919**	**33 659**	**34 318**	**33 954**	**34 081**	**35 319**	**35 605**	**35 525**

Source: SUTEL, Market Management Division.

Acronyms

A4AI	Aliance for Affordable Internet
ADI	Affordability Drivers Index
ARPU	Average Revenue per User
BCCR	Banco Central de Costa Rica
DGM	Market Management Division
DWDM	Dense wavelength division multiplexing, optic technology to increase band width in fiber networks using several wave lengths simultaneously
GB	Gigabytes
GSM	Global System for Mobile Communications
HFC	Hybrid-fiber-coaxial, Hybrid fiber and copper networks that use COCSIS or similar technologies to offer the services
ICE	Instituto Costarricense de Electricidad
INEC	Instituto Nacional de Estadística y Censos
IP	Internet Protocol. Set of rules and standards for digital data communication, functionally classified in the Network layer according to the international model DSI.
IPTV	Television over Internet Protocol
ISO	International Standards Organization
Kbps	Kilobit per second
LTE	Long Term Evolution. Wireless broad band technology that is mainly designed to provide support for the access of mobile telephones and portable devices to Internet
Mbps	Megabytes per second
MMDS	Multi-point Microwave Distribution Service
MMS	Multimedia Messaging System
GDP	Gross Domestic Product
PON	Passive optical networks
RCPS	Regulation for Quality and Service Provision
SDH	Synchronous Digital Hierarchy, a protocol to transfer flows of bits in synchrony over fiber
SMS	Short Message Service
TB	Terabyte
ITU	International Telecommunications Union: organization from the United Nations that specializes in the regulation of telecommunications international between the different administrations and operators.
VoIP	Voice over Internet Protocol
XDSL	Digital Subscriber Line, technologies that use the copper telephone platform for access

sutel SUPERINTENDENCIA DE TELECOMUNICACIONES

Guachipelín de Escazú,
Oficentro Multipark Tapantí Building, 1 st floor.
Toll free: 800-88SUTEL
Headquarters: 4000-0000
Fax: 2215-6821
E-mail: gestiondocumental@sutel.go.cr