sutel

SUPERINTENDENCIA DE TELECOMUNICACIONES

Statistics from the Telecommunications Sector

Costa Rica 2018

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1. TELECOMMUNICATIONS - COSTA RICA 2. STATISTICS - COSTA RICA

Presentation

Among its mandates, General Telecommunications Law No. 8642 requires the Superintendencia de Telecomunicaciones (Sutel) to promote diversity of the publicly available telecommunications services and, in turn, promote the introduction of new network deployment technologies. This to ensure Costa Ricans have the best digital tools available to benefit from a connected society that thrives on the welfares provided by the proper use of information and communication.

In order to guarantee these objectives are fulfilled, over the last 10 years, Sutel has paved the way to learn in depth about the situation of the telecommunications market; to this end, it defined as priority input the access to information coming from different market stakeholders. Thus, during the last 7 years, Sutel has published its annual telecommunications statistical report, this corresponding to 2018.

The content of this report is part of Sutel's commitment to the country, to provide evidence of technological advance; likewise, this information serves to establish public policies required to promote the sector's development, as well as provide users with quality information aimed at improving their participation in digital society. Some of the highlights revealed in this publication are summarized below by chapter:

GENERAL EVOLUTION OF THE SECTOR: A total of 809,363 million colones was generated in revenue for the sector during 2018 and, for the first time, most of it comes from Internet consumption, a fact that reflects a change in the way users use telecommunications services.

FIXED TELEPHONY: The number of VoIP users continues to rise and the traffic carried over VoIP services tended to stabilize in 2018 after continuous growth.

MOBILE TELEPHONY: IIn 2018, prepaid subscriptions showed a 7.5 % reduction compared to 2017 and, on the contrary, postpaid subscriptions increased by 8.1 %.

DATA TRANSFER: In postpaid mobile Internet, revenues increase by 27.7 % compared to 2017. It is also observed that 23.6 % of fixed Internet subscriptions correspond to speeds greater than 10 Mbps.

SUBSCRIPTION TV: Network operators over coaxial cable cover 67 % of subscriptions in 2018. As it can be seen, IPTV subscriptions are growing by 50 %.

COMMERCIAL OFFERS AND PRICES: There is a greater number of providers and commercial offers, which affects the fall in the price of fixed Internet and mobile telecommunications services.

NETWORK QUALITY AND PERFORMANCE: Between 2017 and 2018, there was a 4.6 % increase in the number of districts covered by 4G networks.

UNIVERSAL ACCESS AND SERVICE - FONATEL: 913,915 people with service availability in the areas served by Fonatel. We highlight the contribution to 84,268 economically vulnerable households, which now have Internet and computers, through the application of a subsidy and the delivery of equipment charged to their programs.

INTERNATIONAL: Costa Rica remains among the countries with the highest penetration. Moreover, in Latin America, Costa Rica ranks number 4 in the Global Competitiveness Index,

in the ICT adoption pillar, exceeded only by Chile, Mexico and Uruguay.

As shown, the results available to the public are the product of Sutel's joint work, showing comprehensive information that covers all the work of the institution.

The work of the Quality and Spectrum Department makes it possible to follow up on the deployment of the 4G network, which expands in the main population centers and gives encouraging signs of the network's modernization.

The effort of Dirección General de Fonatel is quantified in the number of families and people who have benefited from the programs conceptualized and financed through the Fondo Nacional de Telecomunicaciones, following the objectives established in the Plan Nacional de Desarrollo de Telecomunicaciones (PNDT).

Furthermore, the analysis and the results obtained by the Directorate General for Markets are reflected in the follow-up given to each of the telecommunications services available to the public, where the analysis concludes that the road towards converging networks has begun and will continue evolving. It is enough to simply observe the sustained increase in the use of Internet services, mainly fixed Internet, displaying a competitive dynamic and fast growth; added to the positive behavior shown by VoIP and IPTV services.

Undoubtedly, the climate for telecommunications in Costa Rica is encouraging, with evidence of consolidated markets, several of them in effective competition, improvements in the perception of service quality by users, as well as a significant number of vulnerable populations that have been covered and technological change in service provision.

The latter is very gratifying for Sutel, that each year shows to the country how its fulfilled with the legal obligation to promote diversity of services and to promote the introduction of new technologies in order to contribute to the country's economic and social development. However, added to this, and in order to continue moving forward, we know that we must continue overcoming barriers to investment in infrastructure and to the promotion of market competition, establishing a modern regulatory framework to guarantee the sector's growth.

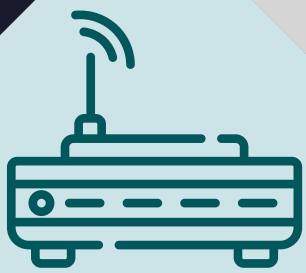
All telecommunications companies, institutions and users, as well as the Sutel's Council and officials who with their effort and commitment contribute constantly to the growth and evolution of this sector, definitely deserve to be acknowledged.

Gilbert Camacho Mora
President
Superintendencia de Telecomunicaciones Council

Hatillo Public Library, SINABI (National Library System).

METHODOLOGY

SITEL



Drive test

Information sent by operators and suppliers

OpenSignals report

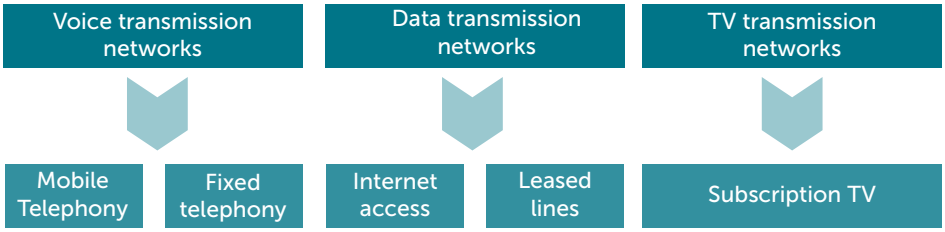
Methodology and Scope of this Report

Description of the telecommunication services included in this report

In order to standardize and simplify the way in which market information delivered by service providers and network operators is gathered, publicly available telecommunications services are divided based on the characteristics of the network deployed and the type of signal carried.

The services covered in this publication fall into three broad categories: voice services, data transfer services and subscription TV services. This classification and the subgroups covered in each case are shown in Figure Nº 1.

Figure Nº 1.
Costa Rica. General service classification



Source: Sutel, General Directorate of Markets, Costa Rica, 2018.

Voice transmission services include:

- **Mobile telephony services:** offers users two subscription modes: prepaid and postpaid.

- **Fixed telephony services:** this service is defined in Article 3 of the *Reglamento sobre el Régimen de Protección al Usuario Final de los Servicios de Telecomunicaciones.* For the purposes of this report, it is subdivided into three different types of service provision: traditional basic telephony, IP telephony or VoIP and public telephony. The provision of fixed telephony includes any means of access as long as the associated terminals do not allow for mobility.

The data transfer service is defined in Article 8, paragraph 75, of the Reglamento de Prestación y Calidad de los Servicios. For this publication, an analysis is carried out subdividing this service in two:

- **Internet access service:** service offered by a provider that gives the required means of access for its subscribers to connect their devices to the Internet.

- **Leased lines service:** this modality involves the data transfer between two or more geographically separated access points. The transport network is based, not exclusively, on wired means.

Finally, television content is not considered a telecommunications service. However, television transmission networks can be used to offer services that operate over the Internet; therefore, it is included in this section:

- **Subscription TV:** Includes satellite television, cable television, IP television and MMDS television.

Table Nº 1 details the marketing modalities and characteristics of the networks that support each of the services included in these 3 groups:

Table Nº 1.
Telecommunications services considered in the statistical report

Service category	Modalities marketed	Features of the supporting networks
Mobile telephony	Instant messaging (SMS), Multimedia messaging (MMS), Postpaid Voice, Prepaid Voice	It facilitates voice communications over wireless media. Its evolution is directed towards all-IP architecture.
Fixed telephony	Traditional Basic Telephony, Voice over IP (VoIP), ISDN	Known as PSTN (Public Switched Telephone Network), it uses a set exchange centrals and trunk links, in order to establish temporary end-to-end connections, known as circuit switching. Further, by implementing a softswitch and other active elements, you can interconnect the PSTN with any data network and provide a Voice over IP service.
Subscription TV	Satellite TV, Cable TV, IP TV and MMDS TV	The service is provided using different technologies; it can be a satellite or a DOCSIS 2.0 based cable system or superior. It is characterized by the transmission or retransmission of television and audio signals to a group of users who subscribe to the service through a contract, compensating the provider monetarily, thus requiring a network consisting of a Head End[1] for wired distribution, or a satellite station for wireless access users[2]. This network established primarily for the provision of television services or content by subscription also allows data transmission. Therefore, although it is not a telecommunications service as well, it is mandatory to analyze its evolution.

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[1] Head End: the place where programming originates and the distribution network begins. Signals are normally received from satellites, broadcast stations, even the Internet, and made available for distribution.

[2] Users or subscribers, either residential or commercial.

...Continuation

Service category	Modalities marketed	Features of the supporting networks
Data transfer	Wholesale Data Carrying	This term is used to describe the service offered by the operator of a telecommunication network that has the capacity to carry traffic from other operators or providers. In other words, end services are delivered by other providers, since this carrier leases a logical or physical connection from the network it manages, in order to other providers can deliver telecommunication services to their end users.
	Internet access	It consists of the service offered by a provider or operator through which it provides the necessary means of access for its subscribers to connect their devices to the Internet.
	Point-to Point Wireless Links	This modality involves data transfer between two or more geographically separated access points. The transport network is based on wireless means.
	Leased lines	This modality involves data transfer between two or more geographically separate access points. The transport network is based, not exclusively, on wireless means.
	Private Virtual Networks	Corresponds to the service where a data network that makes use of a public telecommunications infrastructure is provided, keeping the data private, through different security and routing technologies.

Fuente: Sutel, Directorate General for Markets, Costa Rica, 2018.

This Report does not include geolocation, videoconferencing and trunking which are licensed services, since they require a concession of radio spectrum frequencies for private commercial use. Therefore, the telecommunications network used to provide these services is private and is not interconnected with public telecommunications networks so, they are not considered publicly available services.

It is worth saying that all services and users benefited from the National Telecommunications Fund (Fonatel), are incorporated by service in the statistics. The Fonatel section refers to them separately to show the results of each program under the Fund.

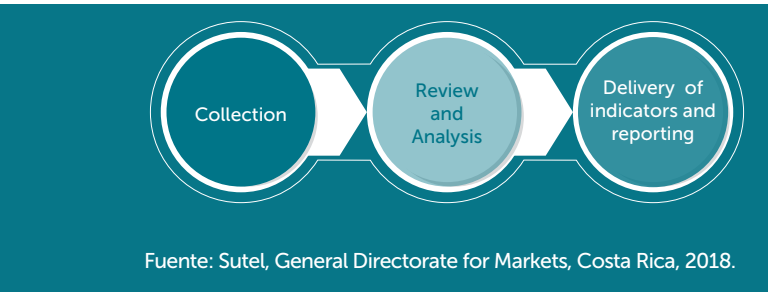
Methodology

The 2018 Telecommunications Sector Indicators Report consolidates the tasks developed by the Directorate General for Markets, Quality and Fonatel (*Fondo Nacional de Telecomunicaciones*). Each directorate applies specific methodologies to obtain its indicators. These are described as follows:

Methodology applied to market performance indicators

The performance indicators of the telecommunications market are obtained as a result of the execution of three stages: information gathering, review and analysis, and delivery of results.

Figure Nº 2.
Collection, review and analysis, and delivery of indicators from the telecommunications sector



Fuente: Sutel, General Directorate for Markets, Costa Rica, 2018.

The following diagrams summarize the main tasks carried out in each of these stages. It should be noted that by 2018, in the case of the telecommunications market follow-up indicators, the collection stage took place only through the Telecommunications Sector Indicators System (SITEL)[3], which facilitated the operators data delivering procedure and its processing for reporting purposes, since each operator enters to the system the information associated with each period by itself.

Data collection

Figure Nº 3.
Data collection process to build telecommunications sector indicators

Preparatory actions

Publication of the data collection calendar: deadlines for companies to provide the required information. Also included are the dates of the annual refresher and training workshops for operators and providers, as well as feedback to improve data capture instruments.
For the compilation of the 2018 indicators, the calendar was published in the official newspaper La Gaceta No. 240 of December 19, 2017.

Quarterly reminders: several reminders are made throughout the year, by e-mails and by telephone contact with the representatives of the data gathering process of each operator and service provider who are required to submit the information.

Updating and training workshops for operators and suppliers: in 2017, SUTEL held the fourth "Workshop on Market Indicators of the Telecommunications Sector", from February 21 to 23, 2018, in which it explained in detail the data collection process that the Directorate General of Markets would follow to obtain results on the sector's performance, the templates or processes to be used in SITEL, and the importance for the regulatory body of having a solid and reliable indicator base.

Submission of information

Formats used: by 2018 the information was only collected through the web application SITEL; however, they continued sending information in Excel templates given some technical aspects SITEL had to solve.

Submission dates and Frequency: The delivery frequency of performance information for the different services is as follows: Fixed Telephony, Mobile Telephony and Data Transfer deliver quarterly information with a monthly breakdown. In the case of subscription television, delivery is monthly.
For all services, the delivery of general information on employment, investments and others is half-yearly.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

[3] It is a platform made up of a WEB application and a Business Intelligence solution, SITEL is made up of two interfaces, one for SUTEL employees and another for operators and/or telecommunications service providers, where they enter the information required to build the indicators in downloadable templates.

The refresher and training workshops for telecommunications operators and service providers, held in 2018, were attended by 81 representatives of telecommunications operators and service providers, corresponding to 49 operators with active commercial offerings. The mechanics applied in these workshops in 2018 was different from that of previous years, as they focused this time on analyzing the experiences of the first year of use of the SITEL on-line tool, the design of new indicators and the results of the Mobile Telecommunications Price Index. In addition, the areas of Economic Regulation, Market Access and General Directorate for Quality also participated. These workshops were held at the facilities of the Public Services Regulatory Authority (ARESEP).

Table Nº 2.
Costa Rica. Participants of the fourth annual telecommunications workshop, 2018

Date/Operator	Representatives
Wednesday 21/02/2018	
BLUE SAT SERVICIOS ADMINISTRADOS DE TELECOMUNICACIONES S.A.	1
CABLE TALAMANCA, S.A.	1
CABLE VISIÓN DE COSTA RICA CVCR, S.A.	1
CABLEVISIÓN DE OCCIDENTE	2
CLARO CR TELECOMUNICACIONES, S.A.	3
CONECTA DEVELOPMENTS SOCIEDAD ANÓNIMA	1
COOPERATIVA ELECTRIFICACIÓN RURAL DE GUANACASTE (COOPEGUANACASTE)	1
EMPRESA DE SERVICIOS PÚBLICOS DE HEREDIA (ESPH)	1
INSTITUTO COSTARRICENSE DE ELECTRICIDAD (ICE)	6
MILLICOM CABLE COSTA RICA, S.A. (TIGO)	3
RADIOGRÁFICA COSTARRICENSE, S.A. (FULLMÓVIL)	2
TELECABLE S.A.	4
TELEFÓNICA DE COSTA RICA TC, S. A.	1
TELEVISORA DE COSTA RICA S.A. (CABLE TICA, TUYO MÓVIL, CABLETICA MÓVIL)	2
TOTAL	**29**
Thursday 22/02/2018	
AMERICAN DATA NETWORKS	1
CABLE CARIBE, S.A.	1
CABLE COSTA, S.A.	2
CALL MY WAY S.A.	1
COOPERATIVA DE ELECTRIFICACIÓN RURAL DE ALFARO RUIZ RL (COOPEALFARO RUIZ)	3
COOPERATIVA DE ELECTRIFICACIÓN RURAL DE SAN CARLOS, R.L. (COPELESCA)	2
COOPERATIVA DE ELECTRIFICACIÓN RURAL LOS SANTOS R.L (COOPESANTOS)	2
FIBERTNET (ULTRA HIGH SPEED INTERNET COSTA RICA)	2

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IBW COMUNICACIONES, S.A.	1
INTERPHONE S.A.	1
JUNTA ADMINISTRATIVA DEL SERVICIO ELÉCTRICO DE CARTAGO (JASEC)	4
METRO WIRELESS SOLUTIONS DE COSTA RICA MWS, S.A.	1
P.R.D. INTERNACIONAL, S.A.	1
REICO (E-DIAY S.A.)	1
RSL TELECOM (PANAMÁ), S.A.	1
SERVICIOS FEMAROCA T.V. S.A. (CABLE PACAYAS)	1
SERVICIOS TECNOLÓGICOS ANTARES S.A.	1
TRANSDATELECOM, S.A.	1
UFINET COSTA RICA S.A	2
TOTAL	**29**

Friday 23/02/2018

ANDITEL INTERNATIONAL AI S.A.	2
AT&T SERVICIOS DE COMUNICACIÓN DE COSTA RICA S.A.	1
BOOMERANG WIRELESS, S.A.	2
COMUNICACIONES J.I.R.K. & J SOTOVAL, S.A.	2
CONTINUM DATACENTER S.A.	2
CRWIFI, LTDA	2
GOLD DATA COSTA RICA SOCIEDAD ANÓNIMA	1
OTHOS TELECOMUNICACIONES S.A.	1
RED CENTROAMERICANA DE TELECOMUNICACIONES S.A (REDCA)	1
RED PUNTO COM TECHNOLOGIES, S.A. (CONTINEX)	1
REDES INTEGRADAS CORPORATIVAS LTDA	1
SERVILINK, S.A.	1
SISTEMA DE RED CMM E.I.R.L.	1
SOCIÉTE INTERNATIONALE DE TÉLÉCOMUNICATIONS AÉRONAUTIQUES, SITA	2
TECNOLOGÍA Y SISTEMAS WILCASJI S.A.	1
TICARIBE S.A.	2
TOTAL	**23**
OVERALL TOTAL	**81**

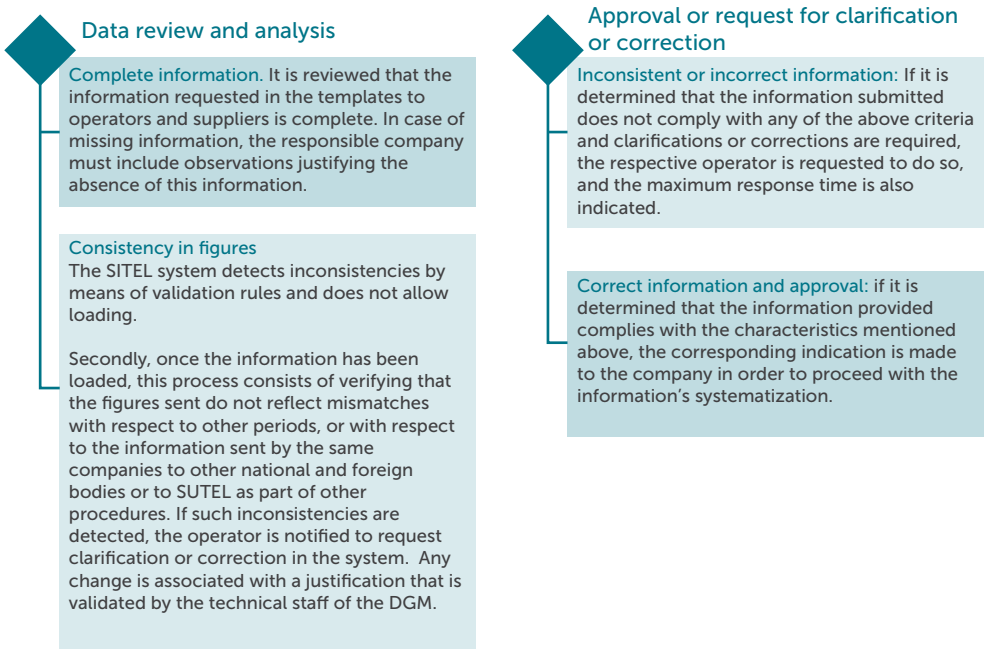
Source: Sutel, General Directorate for Markets, Costa Rica, 2018

Data review and analysis

he SITEL system receives the information entered by operators and suppliers and this is thoroughly reviewed and analyzed by the team of professionals on indicators of the Directorate General for Markets. The actions that undertaken as a result of this general verification consist in determining the consistency in reporting time and data completeness. Where necessary, clarifications or corrections are requested from those involved.

The implementation of the SITEL system in 2018 made it possible to add an additional filter to the review process, since this system includes intrinsic validation rules that limit telecommunications operators and service providers from including information that is not consistent with the information they have historically reported. For example, these rules prevent loading the information system in units different to those previously reported (thousands or millions of colones, Kbps or MB), among others.

Figure Nº 4.
Data review and analysis process to build telecommunications sector indicators



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

In addition to the review work, meetings are held throughout the year with different operators, aimed at clarifying the indicators required in the templates and sharing the observations made by SUTEL regarding the data supplied by them.

Generation of Results

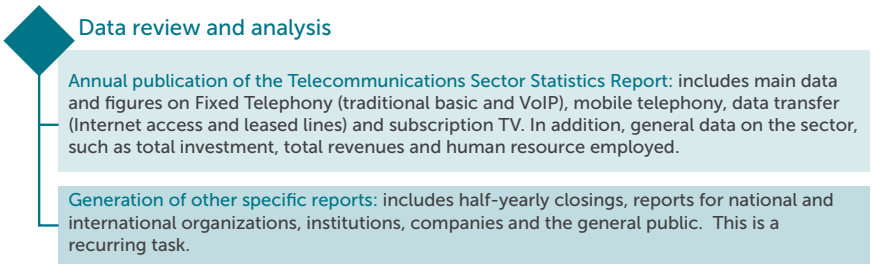
This is the reporting stage, using the information provided by network operators and telecommunications service providers, as well as that collected from national and international secondary sources which includes

the National Institute of Statistics and Census (INEC), the International Telecommunications Union (ITU), and the World Economic Forum, among others. Sutel generates a half-yearly bulletin and an annual report that is published on the website www.sutel.go.cr.

In addition, in compliance with the commitments acquired with international organizations, the following reports are generated:

- Encuesta Reglam Telecom TIC_2019, January 22, 2019 (Regulatory Telecommunications Survey)
- ITU ICT Price Basket Questionnaire 2018: Costa Rica, March 4, 2019.
- World Telecommunication/ICT Indicators (WTI) Short questionnaire, March 29, 2019

Figure Nº 5.
Generation of results and final elaboration of telecommunications indicators



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

The information compiled in this report includes annual and quarterly figures to study service performance in terms of revenue, traffic and subscriptions. To analyze the interannual growth of the indicators, geometric growth rates were calculated. It should be noted that the geometric growth rate assumes a constant percentage growth over time, as opposed to the simple average in which the rate increases in the same amount each time unit considered. In other words, in the simple average the basic assumption is that the analysis variable increases in the same amount (quantity) per time unit, while in the case of the geometric rate the growth percentage per time unit remains constant and not the absolute value (quantity) per time unit; therefore, it can be used for long periods of time.

In addition, the Herfindahl and Hirschman Index (HHI) was analyzed. This index measures the level of concentration in a market and is an indicator analyzed in conjunction with other indicators and performance analyses to determine the level of competition in the market. For this purpose, the participation of each company in a specific market is quantified, and the square of the participation percentage of each of the companies that make up that market is added.

The index is considered a market concentration measure. Scores range from 0 (perfect competition) to 10,000 (monopoly). Thus, the more concentrated a market, the closer it is to monopoly control.

Summary of market performance indicators presented in the report

The general definitions of each market performance indicator are presented in the following table for the purpose of providing clarity to the reader on the information processed in this report.

Table Nº 3.
Costa Rica. Fixed telephony service indicators, 2018

Indicator	Definition
Total number of active fixed telephone lines	Total number of lines in service that have been properly assigned to a customer, when the service is not permanently suspended (Articles 12 and 34 of the Regulation on the Reglamento de Protección al Usuario Final) and which shows at least one billable activity during the last month or which remains as an existing service provision contract with the operator.
VoIP subscriptions/active lines	Number of active subscriptions to active fixed lines, which use the Voice over IP Protocol (VoIP). This number should only include those VoIP service subscriptions that have generated inbound or outbound traffic during the last three months. It excludes: VoIP software applications (e.g., Skype VoIP between computers or PC to phone).
ISDN, BRI & PRI service subscriptions	Total number of subscriptions to the Integrated Services Digital Network (ISDN), which can be separated into: Basic Rate Interface (BRI) and Primary Rate Interface (PRI) services.
Traditional basic telephony total traffic	Traffic generated by calls made through fixed telephone lines, analogue, digital or both
Total VoIP traffic	Traffic generated by calls made via fixed managed VoIP telephony (voice over IP protocol).
International inbound telephone traffic	Total international originated traffic with an on-net fixed destination.
International outbound telephone traffic	Total on-net fixed originated traffic with an international destination.
Total revenues from traditional basic telephony (retail)	Revenues generated as base rate + additional minutes + other items associated with the fixed telephone service.
VoIP total revenues (retail)	This indicator is equivalent to the revenues generated as base rate + additional minutes + other items associated with the VoIP telephone service.

Fuente: Sutel, Directorate General for Markets , Costa Rica, 2018.

Table Nº 4.
Costa Rica. Data transfer service indicators, 2018

Indicator	Definition
Active subscriptions to fixed wired Internet	Sum of active subscriptions to the fixed wired Internet access service (cable modem, xDSL, fiber to the home or building and other fixed wired technologies).
Active subscriptions to fixed wireless Internet	Sum of active subscriptions to the fixed wireless Internet access service (Satellite, fixed WiMax and other fixed wireless technologies).
Active subscriptions to mobile Internet	Sum of active subscriptions to the mobile Internet access service (prepaid and postpaid cellular, Data Card, mobile WiMax and other mobile technologies).
Active subscriptions to dial-up Internet	Number of active Internet subscriptions by telephone dialing. This service consists of an Internet connection via a modem and a fixed telephone line, for which the modem dials a telephone number when Internet access is required.
Number of leased lines (dedicated links)	Number of leased private connections. A leased line will connect two locations of voice and private data telecommunications service. These lines do not have a special cable but a reserved circuit between two points. Typically, companies lease these lines for their office connections, as they guarantee the necessary bandwidth for network traffic.
Internet traffic	This is the amount of transmitted/downloaded data (in Gigabytes) for all users of the Internet access service.
Total revenues generated by leased lines	Total revenues billed by the dedicated line service.
Maximum download speed offered	Full Internet speed offered for data download as part of the Internet access service.
Minimum download speed offered	Minimum Internet speed offered for data download as part of the Internet access service.
Total revenues billed for fixed wired Internet access	Total revenues billed, associated with the fixed wired Internet access service.
Total revenues billed for fixed wireless Internet access	Total revenues billed, associated with the fixed wireless Internet access service.
Total revenues billed for mobile Internet access	Total revenues billed, associated with the mobile Internet access service.

Fuente: Sutel, Directorate General for Markets , Costa Rica, 2018.

Table Nº 5.
Costa Rica. Mobile telephony service indicators, 2018

Indicator	Definition
Postpaid active mobile subscriptions	Total number of subscriptions to postpaid mobile cellular phones that pay a monthly fee, which show at least one billable activity during the month of the valuation and whose service is not permanently suspended, according to Articles 12 and 34 of the Reglamento de Protección al Usuario Final.
Prepaid active mobile subscriptions	Total number of subscriptions to prepaid mobile cellular phones that show at least one billable activity in the balance of the service, within 90 calendar days prior to the final valuation and which are part of the prepaid platform.
Total capacity of mobile lines installed	The maximum number of mobile lines that can be connected. This number includes mobile lines already connected and mobile lines available for future connections, including those used for the technical operation of the central (test numbers).
Mobile traffic (voice, SMS and MMS)	This is the total traffic of the mobile phone service.
Mobile traffic - own fixed network	Traffic originated in the own mobile network (mobile on net) directed to an own fixed network (fixed network of the same operator).
On Net mobile traffic	Traffic originated in the wireless network directed to the same mobile network (on-net traffic).
Mobile traffic - other mobile networks	Traffic originated in the own mobile network (mobile on net) directed to other mobile networks (mobile networks of other operators).
Traffic from other mobile networks - own mobile	Traffic originated in the mobile networks of other operators (mobile off net) directed to an own mobile network (mobile on net).
Traffic from own fixed network - own mobile network	Traffic originated in the own fixed network directed to the own mobile network (mobile on net).
Traffic mobile - other fixed networks	Traffic originated in the own mobile network (mobile on net) directed to other fixed networks (fixed off net).
Traffic from other fixed networks - own mobile network	Traffic originated in fixed networks of other operators (fixed off net) directed to an own mobile network (mobile on net)
Traffic mobile - International	Traffic originated in the own mobile network (mobile on net) directed to an international destination (international off net).
Traffic international networks - own mobile network	Traffic originated in international networks (international off net) directed to a own mobile network (mobile on net)
Traffic transit mobile	Off net traffic (from other fixed networks, mobile networks and international long distance) directed to off net (other fixed networks, mobile networks and international long distance), passing through the own mobile network.
Total mobile voice traffic by payment mode	The sum of mobile voice traffic by payment modality (prepaid and postpaid). In determining this indicator, one must add the on net traffic plus the outbound off net traffic. Total mobile voice traffic: On net mobile voice traffic + total off net mobile voice traffic (outbound mobile voice traffic to other mobile networks, to the own fixed network, to other fixed networks and to international networks).

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Indicator	Definition
Postpaid on net SMS traffic	Short Message Service (SMS) traffic exchanged between subscribers within the same mobile network, under the postpaid payment mode.
Prepaid on net SMS traffic	Traffic from the Short Message Service (SMS) exchanged between subscribers within the same mobile network, under the prepaid payment mode.
Postpaid off net SMS traffic	Traffic from the Short Message Service (SMS) sent and received by subscribers to the mobile telephony service under the postpaid payment mode.
Prepaid off net SMS traffic	Traffic from the Short Message Service (SMS) sent and received by subscribers to the mobile telephony service under the prepaid payment mode.
Postpaid or prepaid SMS traffic sent domestically	Traffic from the Short Message Service (SMS) sent to domestic destinations, from mobile phones under the postpaid or prepaid payment mode.
SMS traffic sent to international destinations, postpaid or prepaid	Traffic from the Short Message Service (SMS) sent to international destinations, from mobile phones under the postpaid or prepaid payment mode.
Postpaid on net MMS traffic	Traffic from the Multimedia Messaging Service (MMS) exchanged between subscribers within the same mobile network, under the postpaid payment mode.
Prepaid on net MMS traffic	Traffic from the Multimedia Messaging Service (MMS) exchanged between subscribers within the same mobile network, under the prepaid payment mode.
Postpaid off net MMS traffic	Traffic from the Short Message Service (SMS) sent and received by subscribers to the mobile telephony service under the postpaid payment mode.
Prepaid off net MMS traffic	Traffic of the Multimedia Messaging Service (MMS) sent and received by subscribers to the mobile telephony service under the prepaid payment mode. Excludes: The on net MMS traffic.
Traffic of MMS sent domestically, postpaid or prepaid	Traffic of the Multimedia Messaging Service (MMS) sent to domestic destinations from mobile phones under the postpaid or prepaid payment mode.
Traffic of MMS sent to international destinations, postpaid or prepaid	Traffic of the Multimedia Messaging Service (MMS) sent to international destinations from mobile phones under the postpaid or prepaid payment modes.
Outbound roaming telephone traffic	Total number of traffic minutes of calls made by proprietary customers through local networks under the roaming modality with foreign networks, when outside the service area of the local network (outbound roaming).
Inbound roaming telephone traffic	Total number of traffic minutes of calls received by proprietary customers through local networks under the roaming modality with foreign networks, when outside the service area of the local network (outbound roaming).
Outbound SMS and MMS international roaming traffic	Traffic generated by mobile resident subscribers when sending SMS and MMS while out of the service area of their local network.
Inbound SMS and MMS international roaming traffic	Traffic generated by mobile resident subscribers when receiving SMS and MMS while out of the service area of their local network (inbound roaming).
Inbound roaming data traffic (TB)	Traffic broadcast (TB) by resident subscribers when accessing the Internet service while out of the service area of the local network (inbound roaming).

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Indicator	Definition
Outbound roaming data traffic (TB)	Traffic received (TB) by resident subscribers when accessing the Internet service while out of the service area of the local network (outbound roaming).
Average rates	These are the average call rates from a mobile phone (prepaid or postpaid).
Average rate of a local 1-minute call (peak hours, on net) for mobile telephony	Rate of a local 1-minute call, made during peak hours from a mobile phone. The calculation of this indicator can be made based on the distribution of the revenues generated by mobile on net calls (prepaid or postpaid), made during the time slot considered to be "peak" or high consumption, divided by the number of minutes used (traffic) on these calls. It includes taxes.
Average rate of a local call per minute (off-peak hours, on net) for mobile telephony	Rate of a local 1-minute call, made on off-peak hours from a mobile phone (prepaid or postpaid) to another mobile phone within the same network. The calculation of this indicator can be made based on the distribution of the revenues generated by prepaid mobile on net calls, made during the time slot considered to be "off-peak" or low consumption, divided by the number of minutes used (traffic) on these calls. It includes taxes.
Average rate of a local call per minute (off-peak, off net) for mobile telephony	Rate of a local off-peak call per minute, made from a mobile cellular phone (prepaid or postpaid) to a mobile cellular phone on another network. The calculation of this indicator can be made based on the distribution of the revenues generated by prepaid mobile off net calls, made during the time slot considered to be "off-peak" or low consumption, divided by the number of minutes used (traffic) on these calls. It includes taxes.
Average rate of a local call per minute (during peak hours to a fixed network) for mobile telephony	Rate of a local call per minute in peak hours, made from a mobile cellular phone (prepaid or postpaid) to the fixed telephone network. The calculation of this indicator can be made based on the distribution of the revenues generated by mobile prepaid calls to a fixed network, made during "peak" hours or high consumption, divided by the number of minutes used (traffic) on these calls. It includes taxes.
Average rate of a local call per minute (off-peak to a fixed network) for mobile telephony	Rate of a local call per minute, on off-peak hours, made from a mobile cellular phone (prepaid or postpaid) to the fixed telephone network. The calculation of this indicator can be made based on the distribution of the revenues generated by prepaid mobile calls, made during off-peak hours or low consumption, divided by the number of minutes used (traffic) on these calls. It includes taxes.
Average rate of a local calls per minute (during peak hours, off net) for mobile telephony	Rate of a local call per minute in peak hours, made from a mobile phone (prepaid or postpaid) to a mobile cellular phone on another network. The calculation of this indicator can be made based on the distribution of the revenues generated by prepaid mobile off net calls, divided by the number of minutes used (traffic) on these calls. It includes taxes.

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Indicator	Definition
Average rate of a local call per minute (weekend/nighttime, on net) for mobile telephony.	Rate of a local call per minute on a weekend/during nighttime, made from a mobile phone (prepaid or postpaid) to another mobile phone in the same network. Taxes must be included. Otherwise, a note should be included showing the applicable tax rate. This indicator can be calculated based on the distribution of the revenues generated by prepaid mobile on net calls, made on the weekend/during nighttime, divided by the number of minutes used (traffic). It includes taxes.
Average rate of a local mobile call per minute (on the weekend/during nighttime, off net) for mobile cellular telephony.	Rate of a local call per minute made on the weekend/during nighttime from a mobile phone (prepaid or postpaid) to a mobile phone on another network. This indicator can be calculated based on the distribution of the revenues generated by prepaid mobile off net calls, made on the weekend/during nighttime, divided by the number of minutes used (traffic). It includes taxes.
Average rate of a local call per minute (on the weekend/during nighttime to a fixed network) for mobile cellular telephony.	Rate of a local call per minute made on the weekend/during nighttime from a mobile phone (prepaid or postpaid) to a fixed telephone network. This indicator can be calculated based on the distribution of the revenues generated by mobile prepaid calls to a fixed network, on the weekend or during nighttime, divided by the number of minutes used (traffic). It includes taxes.
Average SMS rate (on net) for mobile telephony, both prepaid and postpaid.	Average rate of sending a SMS message from a mobile phone (prepaid or postpaid) to another mobile phone in the same network. The calculation of this indicator can be made based on the distribution of the revenues generated, divided by the number of on net SMSs. It includes taxes.
SMS average rate (off net) for mobile telephony, both prepaid and postpaid.	Average rate of sending a SMS message from a mobile phone (prepaid or postpaid) to another mobile phone on another network. This indicator can be calculated based on the distribution of the revenues generated, divided by the amount of off-net SMSs. It includes taxes.
Revenues generated by the mobile telephony service, both prepaid and postpaid.	Revenues related to the mobile telephony service, prepaid or postpaid. It can be calculated by adding the revenues generated by the monthly fees, the revenues generated using off-plan minutes and the amount of charges made as part of other fees of the mobile phone service, such as fines for suspension and reconnection.
Revenues generated by on net mobile voice traffic, prepaid or postpaid	Revenues related to mobile voice traffic, originated in the proprietary mobile network (mobile on net) directed to the same mobile network (mobile on net).
Revenues generated by outbound mobile voice traffic, prepaid or postpaid	Revenues related to mobile voice traffic, originated in the proprietary mobile network (mobile on net), directed to an off-net destination (proprietary fixed network, other fixed networks, other mobile networks, international networks).

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Indicator	Definition
Revenues generated by monthly subscription fees or by minimum prepaid or postpaid fees.	Revenues generated by the collection of recurring charges billable for the subscription to the mobile telephony service, prepaid or postpaid.
Revenues generated by off-plan minutes in the fixed mobile telephony service, prepaid or postpaid.	Revenues related to the off-plan minutes or with minutes that are not covered by the minimum fee of the prepaid or postpaid services. This includes off-plan minutes for local and international calls.
Revenues generated by inbound mobile voice traffic, prepaid or postpaid.	Revenues related to off net traffic (own mobile network, other fixed networks, other mobile networks, international networks) directed to an on-net destination (own fixed network).
Revenues generated by international outbound mobile voice traffic, prepaid or postpaid.	Revenues related to the mobile voice traffic, originated in the own mobile network (on-net mobile), directed to an international off-net destination.
Revenues generated by international inbound mobile voice traffic, prepaid or postpaid.	Revenues related to the traffic that has an off net international origin and an on-net destination (own mobile network).
Revenues generated by number of on net SMSs, postpaid or prepaid.	Revenues related to the traffic of SMS messages, exchanged between users in the same mobile network, both under the postpaid and prepaid modes.
Revenues generated by the number of off net SMSs, both postpaid and prepaid.	Revenues related to the traffic of SMS messages, sent to domestic and international destinations from mobile phones, in the postpaid service.
Revenues generated by the number of on-net MMSs, postpaid or prepaid.	Revenues related to the traffic of MMS messages, exchanged between users of the same mobile network, under the postpaid or prepaid modes.
Revenues generated by the number of off-net MMSs, postpaid or prepaid.	Revenues related to the traffic of Multimedia Messaging Service (MMS) messages, sent to domestic and international destinations from mobile phones, under the postpaid or prepaid modes.
Revenues generated by MMSs sent domestically, postpaid or prepaid.	Revenues related to the total traffic of multimedia (MMS) messages, sent to domestic destinations. Messages sent from a computer to another computer are not included, neither are those sent from computers to mobile phones.
Revenues generated by MMSs sent to an international destination, postpaid or prepaid.	Revenues related to the total traffic of multimedia (MMS) messages, sent to international destinations. Messages sent from a computer to other computers are not included, neither are those sent to mobile phones.
Revenues generated by the number of SMSs sent domestically, postpaid or prepaid.	Revenues related to the traffic of SMS messages, sent to domestic and international destinations from mobile phones.
Revenues generated by the amount of SMSs sent to international destinations, postpaid or prepaid.	Revenues related to the traffic of SMS messages sent to international destinations from mobile phones.
Revenues generated by the total number of MMSs.	Revenues related to the total traffic of MMS messages sent to local and international destinations. Messages sent from a computer to another computer are not included, neither are those sent from computers to mobile phones.

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Indicator	Definition
Revenues generated by outbound roaming telephony traffic (minutes)	Revenues generated by proprietary subscribers to mobile phones when making and receiving calls while outside the service area of their country's network, e.g. when traveling abroad.
Revenues generated by inbound roaming telephony traffic (minutes)	Revenues generated by visiting subscribers (foreigners) when making and receiving calls within a country. This revenue is obtained by the network operators in the country visited by these subscribers.
Revenues generated by outbound roaming SMS and MMS messages	Revenues generated by the proprietary subscribers to a mobile network when sending SMSs and MMSs while out of the service area of their country's network.
Revenues generated by inbound roaming SMS and MMS messages	Revenues generated by the traffic created by visiting subscribers (foreigners) when receiving SMS and MMS messages. This revenue is obtained by the network operators in the country visited by these subscribers.
Inbound roaming data traffic (TB)	Transmitted traffic by resident subscribers when accessing the Internet out of the local network services area (inbound roaming).
Outbound roaming data traffic (TB)	Received traffic by the resident subscribers when accessing the Internet while they are outside of the service area of their local network (outbound roaming).
Wholesale revenues generated by the mobile telephony service	Wholesale revenues related to the delivery of the mobile telephony service. Specifically, this refers to the revenues generated by the termination charges of the calls on their proprietary mobile network. This indicator is calculated based on the revenues received by the inbound traffic into the proprietary mobile network.

Fuente: Sutel, Directorate General for Markets, Costa Rica, 2018.

Table Nº 6.
Costa Rica. Subscription TV service indicators, 2018

Indicator	Definition
Total number of subscriptions to the service of multichannel cable TV	Number of subscriptions to multichannel TV, broadcast by land via hybrid networks of fiber optic and coaxial cable (HFC). These networks allow the delivery of other telecommunication services.
Total number of subscriptions to multichannel TV through DTH antennas	Number of subscriptions to multichannel TV, corresponding to TV signals received from a telecommunications satellite and broadcast from the operator to the end user's receiver.
Total number of subscriptions to multichannel TV via IPTV	Number of subscriptions to multichannel TV via broadband connections over IP protocol
Total number of subscriptions to multichannel TV by Multipoint Microwave Distribution Service (MMDS)	Number of subscriptions to multichannel TV, using Multipoint Microwave Distribution Service (MMDS), which broadcasts the signals wirelessly to the end user. This service allows the delivery of other telecommunications services.

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Indicator	Definition
Revenues generated by subscription TV (revenues from subscriptions, connection, basic plan and value added)	Total revenues billed by subscription TV, without any deductions (taxes, returns, rebates, allowances, discounts, canceled sales, etc.), obtained by the country's subscription TV service providers.

Fuente: Sutel, Directorate General for Markets, Costa Rica, 2018.

Sutel as a sectoral competition authority in telecommunications

General Telecommunications Law No. 8642 establishes in Chapter II of Title III a Sectoral Competition Regime, which assigns to the Superintendency of Telecommunications a series of functions as a sectoral competition authority in telecommunications, particularly:

- Promote competition principles in the national telecommunications market.
- Assess n the level of effective competition in the markets.
- Determine when operations or acts carried out or held outside the country by operators or suppliers may affect effective competition in the domestic market.
- Guarantee the access of operators and suppliers to the telecommunications market on reasonable and non-discriminatory terms.
- Guarantee access to essential facilities on fair and non-discriminatory terms.
- Avoid abuses and monopolistic practices by operators or suppliers in the market.

Sutel has the competence to investigate and sanction, when appropriate, monopolistic practices committed by telecommunications operators; to approve or block mergers among telecommunications operators; to conduct market studies; to assess the level of effective competition in the markets; and to promote competition principles in the telecommunications market.

This year, in the general market performance section, was included information on the activities carried out by Sutel as a sectoral competition authority. In particular:

- Assess of the level of competition in telecommunications markets
- Merger notifications
- Investigation on the commission of monopolistic practices (there are two types of monopolistic practices: absolutes and relatives)
  - Issuance of guidelines, with the object to promote transparency, predictability and legal security in relation with the enforcement of the law by Sutel
  - Advocacy activities.
  - Conduction of market studies.

Methodology to assess price changes in commercial offers of telecommunication services

In order to analyze the price trend of telecommunications services during 2018, and specifically with regard to mobile telephony and fixed Internet services, the data submitted by telecommunications operators in the Sutel on-line tool "Mi Comparador" are used first.

In the case of mobile telephony, the 2017-2018 price comparison is carried out based on two supply profiles defined in this tool, which are subject both to the number of minutes available in mobile telephony plans and to the maximum download of Internet data that operators offer in the market.

In regard to these profiles, it should be noted that they are defined in the following terms:

- **Offer Profile 1:** the right to make calls for a maximum of 300 minutes and download data for an equivalent of 4 GB.

- **Offer Profile 2:** the right to make calls for up to 600 minutes and download data for an equivalent of 8 GB.

As for fixed Internet, the information sent by means of this platform allows the identification of the main characteristics of the commercial offers made by these providers. However, it must be considered that, in the case of fixed Internet, some of these providers serve limited geographical areas, defined on the basis of the respective authorization initially granted to them to provide subscription television service, or that, although they have an authorization to provide the service at a national level, their commercial coverage does not yet reach that level. Such consideration must be taken into account when evaluating the comparative characterization of the commercial offers made by the different operators.

Methodology of the Mobile Telecommunications Services Price Index

This index makes it possible to monitor the trend in the prices of services purchased by mobile telecommunication users. Its construction is based on a series of technical criteria of a statistical and economic nature that are described below.

The index allows monitoring the mobile telecommunications service in different ways or perspectives: general or national index, sub-indexes by payment modality and sub-indexes by component (voice, data, SMS).

It is important to clarify that in order to calculate this index and its different openness levels, no adjustments are made for mobile data quality and that in the case of voice and SMS services, they are considered homogeneous services, which indicates that the different operators maintain similar performance quality factors among them, given the similarity in the telecommunications infrastructure used to provide services. Some considerations in the calculation are:

It does not include mobile Internet services provided through mobile Internet data cards (Datacards).

- Excludes prepaid promotions aimed at specific segments, such as double top-ups to only numbers ending in 1.

- Mobile telecommunications bundled with other services are not covered.

An important aspect worth mentioning is that since telecommunications are one of the most dynamic and changing groups both from a technological point of view and in relation to changes in consumer habits, this methodology will be constantly updated and improved. To the extent that changes are introduced, efforts will be made to maintain the possibility

of making historical comparisons with the corresponding warnings.

The following is the methodological description:

Postpaid mode methodology:

The following prices are analyzed monthly for each operator **(i)**:

- **$plPT_{i,c,pl,m_1}$** Unit prices[4] per component (on net voice, off net voice, on net SMS and off net SMS and mobile data) from the selected plans. Each of the selected plans (pl) are those that represent at least 80 % of the postpaid revenues each month for each operator. Included are plans that are currently within the commercial offer, such as those that, although not available for new users, maintain affiliated subscribers.

- **$pePT_{i,c,m_1}$** Surplus prices by component.

At an operator level **(i)** and in the month of analysis **(m_1)**, in each selected postpaid plan there is a unit price for each component (c) **($plPT_{i,c,pl,m_1}$)**. These are arithmetically averaged to obtain a mean unit price per component from the information in the plans at an operator level. **($PMedplPT_{i,c,m_1}$).**

Then, in order to obtain a single price per component of each operator in **m_1** that takes into account the price per surplus **(pePT)**, a weighed average is calculated taking into account: (a) the average unit price of each component **($PMedplPT_{i,c,m_1}$)** weighed by the relative weight of plan revenues within each operator's total revenues[5] **(α_{i,m_1})** and (b) the surplus price of each component **($pePT_{i,c,m_1}$)** weighed by the relative weight of surplus revenues within the total postpaid revenues **(β_{i,m_1})**. With the above we obtain for each operator in **m_1** a unique price per component **(PPT_{i,c,m_1}).**

Once the above is obtained, in **m_1** the relative change of the single component prices at an operator level is calculated with respect to July 2017 **($\Delta PPT_{i,c,m_1}$)**. These, in turn, are weighed by the monthly share of each component in the operator's postpaid revenues **($\text{Ʊ}PT_{i,c,m_1}$)**[6] thus obtaining a postpaid price index for each provider in this market **($\mu PT_{i,m_1}$)**.

To conclude, we take the index per operator **($\mu PT_{i,m_1}$)** and weigh it by the monthly share of each operator within the total postpaid revenues, **($\text{þ}PT_{i,m_1}$)**[7], and with it we obtain the monthly postpaid index at a national level **($\tilde{I}PT_{m_1}$)**.

In addition, the monthly index per component is calculated nationally **($\tilde{I}PT_{c,m_1}$)**,to obtain it, **($\Delta PPT_{i,c,m_1}$)** is used and weighed by **($\text{þ}PT_{i,m_1}$)**.

[4] Unit prices: to obtain unit prices, the value of each plan is distributed between voice (on and off net), data and SMS (on and off net), according to the weighing at an operator level of these components in the postpaid revenues of July 2017 (reference month) and then each of these amounts is divided by the number of minutes, messages and GB hired at the maximum speed available for each plan, obtaining a price per unit of measurement.

[5] Total postpaid revenues = minimum revenues (monthly package cost revenues) + surplus revenues

[6] Where for each **i** in **m_1** it is fulfilled that $\sum_{(c=1)}^{5}$ $\text{Ʊ}PT_c=1$

[7] Where for each **i** in **m_1** it is fulfilled that $\sum_{(i=1)}^{3}$ $\text{þ}PT_i=1$

Postpaid index formulas:

$$(1)\ PMedplPT_{i,c,m_1} = \frac{\sum_{npl=1}^{npl} plPT_{i,c,pl,m_1}}{npl_{i,c,m_1}}$$

$$(2)\ PPT_{i,c,m_1} = \propto_{i,m_1} * PMedplPT_{i,c,m_1} + \beta_{i,m_1} * pePT_{i,c,m_1}$$

$$(3)\ \Delta PPT_{i,c,m_1} = \frac{PPT_{i,c,m_1}}{PPT_{i,c,m_0}}$$

$$(4)\ \mu PT_{i,m_1} = \sum_{c=1}^{5} \Delta PPT_{i,c,m_1} * \text{Ʊ}PT_{i,c,m_1}$$

$$(5)\ \tilde{\text{I}}PT_{m_1} = \sum_{i=1}^{3} \mu PT_{i,m_1} * \text{þ}PT_{i,m_1}$$

$$(6)\ \tilde{\text{I}}PT_{c,m_1} = \Delta PPT_{i,c,m_1} * \text{þ}PT_{i,m_1}$$

Nomenclature

i= Market providers, where 1= Kölbi, 2 = Movistar and 3= Claro

m_0 = Base month, July 2017

m_1 = Month analyzed

c = Components, 1= on net voice, 2= off net voice 3= on net SMS 4= off net SMS and 5 = mobile data.

PT= Postpayment

pl= It is the selected plan of each operator, which goes from 1 to z

z= Totalidad de los planes seleccionados por cada operador en **m_1**

npl_{i,c,m_1} = Number of plans of operator **i** which were selected and which contains the component being analyzed in **m_1**

Prepaid mode methodology

The user under the prepaid mode is faced with three types of prices for each component: prices in packages **($paqPR_{i,c,paq,m_1}$)**, process in promotions **($prPR_{i,c,pr,m_1}$)** and recharge prices **($recPR_{i,c,m_1}$)**.

In order to consolidate these prices, the approach for each will be explained:

1. For the mean monthly unit prices, per package in an operator **($paqPR_{i,c,paq,m_1}$)**, the same methodology is used as for the unit prices of postpaid plans with the exception that all prepaid packages offered in **m_1**, are used, obtaining **($PMedprPR_{i,c,m_1}$)**.

2. Market prices for each component per operator in **m_1** **($recPR_{i,c,m_1}$)**, these are already set by the operator.

3. 3. In the case of promotions per **m_1** operator **($prPR_{i,c,pr,m_1}$)** the details of the commercial offer are analyzed in order to estimate a price per component in each

promotion. In addition to international reference information such as: data consumption by mobile applications[8] (Facebook, Whatsapp, Waze, Youtube among others) and based on information requested from operators, such as the average consumption per user of minutes, data and unlimited messages. Once the prices by components in each promotion for each operator are obtained, they are arithmetically averaged to obtain a single mean price of promotions by components and operator **($PMedprPR_{i,c,m_1}$)**.

Once the above is obtained, the prices of the three previous sources are weighed in m_1 weighed by their share in the prepaid revenues of the reference month[9] at an operator level, ***wrec***$_i$ (weight of revenues from operator i recharges), ***wpaq***$_i$ (weight of revenues from operator i packages) and ***wpr***$_i$ (weight of revenues from operator i promotions), thus obtaining for each operator in the month of analysis a single price per component ***(PPRi,c,m$_1$).***

Based on this information, in the month of study the relative percentage change of the single prices per component at operator level is calculated with respect to July 2017 **($\Delta PPR_{i,c,m_1}$)**. These, in turn, are weighed by the monthly share of each component in the operator's prepaid revenues **($\text{Ʊ}PR_{i,c,m_1}$)**[10], thus obtaining a prepaid price index for each provider in this market in said month **($\mu PR_{i,m_1}$)**.

To conclude, the index is taken by operator **($\mu PR_{i,m_1}$)** and weighed by the monthly share of each operator within the total prepaid revenues of the month of study **($\text{þ}PR_{i,m_1}$)**[11], and with this we obtain the monthly prepaid index at the national level **($\tilde{\text{I}}PR_{m_1}$)**.

Likewise, the monthly index is calculated per component at a national level **($\tilde{\text{I}}PR_{c,m_1}$)**, **($\Delta PPR_{i,c,m_1}$)** is used to obtain it and is weighed by **($\text{þ}PR_{i,m_1}$)**.

Prepaid index formulas

$$(7)\ PMedprPR_{i,c,m_1} = \frac{\sum_{npr=1}^{npr} prPR_{i,c,pr,m_1}}{npr_{i,c,m_1}}$$

$$(8)\ PPR_{i,c,m_1} = wrec_i * recPR_{i,c,m_1} + wpaq_i * PMedpaqPR_{i,c,m_1\,i,c,m_1} + wpr_i * PMedprPR_{i,c,m_1\,i,c,m_1}$$

$$(9)\ \Delta PPR_{i,c,m_1} = \frac{PPR_{i,c,m_1}}{PPR_{i,c,m_0}}$$

$$(10)\ \mu PR_{i,m_1} = \sum_{c=1}^{5} \Delta PPR_{i,c,m_1} * \text{Ʊ}PR_{i,c,m_1}$$

$$(11)\ \tilde{\text{I}}PR_{m_1} = \sum_{i=1}^{5} \mu PR_{i,m_1} * \text{þ}PR_{i,m_1}$$

$$(12)\ \tilde{\text{I}}PR_{c,m_1} = \Delta PPR_{i,c,m_1} * \text{þ}PR_{i,m_1}$$

[8] Chilean Telecommunications Company, ENTEL. www.entel.cl/calculadora-datos/

[9] Sutel has the information for this indicator only for the base month.

[10] Where in each **i** in m_1 : $\sum_{(c=1)}^{5}$ $\text{Ʊ}PT_c$=1

[11] Where in each **i** in m_1 : $\sum_{(i=1)}^{5}$ $\text{þ}PT_i$=1

Nomenclature

i = Market providers: 1= Kölbi, 2= Movistar, 3= Claro, 4= Tuyomóvil and 5= Fullmóvil

m_0 = Base month, July 2017

m_1 = Month analyzed

c = Components, 1= on net voice, 2= off net voice, 3= on net SMS, 4= off net SMS and 5 = mobile data.

PR= Prepayment

npr_{i,c,m_1} = Number of plans of operator i which were selected and which contains the component being analyzed in **m_1**

pr= Each prepaid promotion of operator **i** for **m_1**, starts from 1 up to £.

£= Total number of promotions from **i** to **m_1**

paq = Each operator package **i** for **m_1** starts from 1 up to η

η= Total number of packages of **i** for **m_1**

rec= Amount of recharge prices per unit of consumption of each component (one minute for voice, SMS or GB) of operator **i** for **m_1**

National Index ($\tilde{I}NAL_{m_1}$):

For **m_1** the postpaid **($\tilde{I}PT_{m_1}$)** and prepaid **($\tilde{I}PR_{m_1}$)** indexes are weighed according to the relative weight of each modality within the total mobile telecommunications revenues[12] **πPT_{m_1}** (weight of the postpaid modality) and **πPR_{m_1}*** (weight of the prepaid modality)[13].

National Index formulas:

$$\tilde{I}NAL_{m_1} = \pi PT_{m1} * \tilde{I}PT_{m_1} + \pi PR_{m1} * \tilde{I}PR_{m_1}$$

Nomenclature

m_1 = Month analyzed

Methodology of the Fixed Internet Price Index

Having Internet at home is increasingly common and has become, in many cases, essential for daily life. As a matter of fact, the total number of people with Internet in their homes is 60.2 % (INEC, 2015) and the most recent data 73.08 % (INEC, 2018), and the data presented in this report indicate that subscriptions registered for the fixed Internet service have increased 17 % between 2017 and 2018 thus having by 2018 a total of 834,784 subscriptions.

Another important aspect: in December 2017[14], Sutel declares this service in competition conditions, therefore prices are set by the market's dynamics between supply and demand.

Given the above, there is a need to have a tool that measures price variation per Giga[15] in such a way that Sutel has one more input for decision making with a view to ex post regulation.

The retail fixed Internet service price index (IPIF) measures the variation of prices per speed contracted by Costa Rican households from July 2018, which allows analyzing what is their trend in the market.

[12] The sum of the prepaid revenues plus the postpaid revenues of the month analyzed.
[13] **$\pi PT_{m_1} + \pi PR_{m_1} = 1$** is proven.
[14] Sutel (2016). "Market review for retail residential Internet access service from a fixed location, analysis of the degree of competition in that market, declaration of major operators and imposition of obligations." (RCS-258-2016) Retrieved from: https://www.sutel.go.cr/SUTEL/resoluciones?field_tipo_documento_tid=All&=Aplicar
[15] The Internet is unlimited in data, so commercial offers are based on the contracted speed.

The following is considered to calculate the IPIF:

- The 4 operators with the highest market share (Kölbi, Tigo, Cabletica and Telecable which among them represent 95 % of the subscriptions) are taken into account; the total is 18 operators that offer fixed Internet services. However, the rest of the operators each represent between 0 % and 1 %, which is why they are excluded, since the commercial actions they undertake will not significantly change the results of the index.

- Commercial offers aimed at the household (residential) level and which are also being offered as a single service (not packaged) are analyzed.

- The technology (xDSL, HFC, FTTx and wireless) by which the operator offers Internet service is not relevant to this calculation. According to operators' perception of market competition, "this occurs mainly at a price level because the end customer mainly focuses his purchasing decision on obtaining a better price and not necessarily on obtaining better quality," according to report RCS-258-2016. In addition, the report shows that Internet services from a fixed location have similar characteristics, quality levels and prices; therefore, all technologies are considered to belong to the same relevant market. Therefore, the determining factor for consumption decision-making is the speed (data transfer rates) they need for their homes.

- These operators provide the customer with a variety of Internet speeds. However, given that the quality levels and consumption levels for households are lower than that of companies, not all the speeds available in the market will be considered.

  In this case, a maximum speed of up to 100 Mbps will be considered for each operator. This is since up to 100 Mbps is the speed offered by most operators for residential fixed Internet.

  In addition, based on the behavior of household spending, using information from the 2013 National Household Revenues and Expenditure Survey (ENIGH), and using the relative weight of the spending structure, to extrapolate to 2018, it was found that communications spending ranges between 13,000 and 64,000 colones according to revenues quintiles, with an average of 36,000 colones. This information stands in contrast to the average value of packages of more than 100 Mbps that exceed 50,000 colones. In this sense, it is verified that it is unlikely for a household to consume more than 100 Mbps because it exceeds by far in total consumption in communications estimated in average per household in the ENIGH.

- Commercial offers are selected by operator, representing at least 80 % of fixed Internet service subscriptions. In addition, plans that are currently within the commercial offer are included, as well as those that, although not available, maintain affiliated subscriptions.

- The prices analyzed only measure the fixed Internet service; therefore, the cost of the modem and/or installation is not included.

- The reference month is July 2018.

Indicator Calculation:

1. Obtain the unit prices **(PIF_{i,v,m_1})**, dividing the price offered by the amount of Mbps per second of the commercial offer under study.

$$PIF_{i,v,m_1} = \frac{PIF_{i,v,m_1}}{Cant\ Mbps_{v,i,m_1}}$$

2. To obtain an average unit price per operator **($PMedIF_{i,m_1}$)** each unit price is taken from operator **(i)** and in the month analyzed **(m_1)** and weighed according to the share they obtained in the revenues of the reference month **(δ_{i,v,m_1})**

$$PMedIF_{i,m_1} = \sum_{v=1}^{v=n} PIF_{i,v,m1} \cdot \delta_{i,v,m_1}$$

3. In order to obtain a national average price **PIF_{m_1}**, a weigthed average of **$PMedIF_{i,m_1}$** according to each operator's monthly participation in the total revenues of the fixed Internet of the month studied is performed **($\beta IF_{i,m_1}$)**

$$PIF_{m_1} = PMedIF_{i,m_1} \cdot \beta IF_{i,m_1}$$

4. Finally, the relative percentage change of national prices with respect to the reference month **($\Delta PIF_{i,v,m_1}$)**, is calculated, obtaining the monthly fixed Internet index at a national level **($\tilde{I}IF_{m_1}$)**

$$\tilde{I}IF_{m_1} = \Delta PIF_{i,v,m_1} = \frac{PIF_{m_1}}{PIF_{m_0}}$$

According to the theory, the weights of price indicators are usually based on household expenditure on goods and services. In this case, since we do not have the expenditures that households have with respect to the fixed Internet, we will use the revenues that operators obtain from them.

Nomenclature

Cant= Amount of Megabytes

IF= Fixed Internet

i= Market providers, where 1= Kölbi, 2= Tigo, 3= Cabletica and 4= Telecable

m_0= Base month

m_1= Month analyzed

n= Number of packages from operator **(i)** that were selected in the month analyzed **(m_1)**

v= Commercial offer speed

Methodology applied for QoS KPIs

The QoS KPIs evaluated by Sutel and included in this publication are those related to the measurement of indicators of the provision of mobile services (drive test QoS measurements for mobile networks).

The methodological aspects applied to this case are detailed below.

Methodology applied to drive test QoS measurements for mobile networks

QoS of mobile services, both call service and mobile Internet service, is assessed annually at a national level by Sutel through field tests (drive test). These measurements are carried out in several stages, which are listed below:

- Collection of information to define the areas to be evaluated
- Delimitation of the annual plan and timeline for mobile service QoS measurements
- Execution of field tests (drive test)
- Processing of collected data

Collection of information and definition of the areas to be evaluated

The main information require for the measurements of mobile service QoS is the coverage maps or coverage data provided by operators, published in their own websites.

The coverage maps and data, is use by to SUTEL in order to define the areas to be evaluated at the national level, delimiting towns and national roads that have at least outdoor coverage (yellow coverage[16]).

In the define areas SUTEL collects data, simultaneously and by operator, for the KPIs listed below:

- Coverage (signal strength)
- Call status (unsuccessful calls and dropped calls)
- Call set-up time (time to set up calls)
- Voice quality (call quality)
- Performance of the measured speed compare against the provisioned speed (speed performance)

[16] El Reglamento de prestación y calidad de servicio published on February 17, 2017 in Issue N°36 of the official newspaper La Gaceta defines four types of coverage, namely: coverage inside buildings or indoor coverage whose strength level for 2G networks is greater than -75dBm and is marked in blue, coverage inside vehicles or vehicle coverage whose strength level is between -75dB and -85dBm and is marked in green, only outdoor coverage or outdoor coverage whose strength level is between -85dBm and -95dBm and is marked in yellow, and outside the coverage area whose strength level is less than -95dBm and is marked in red. The strength levels for 3G are greater than -85dBm and are marked in blue, coverage inside vehicles or vehicle coverage whose strength level is between -85dB and -95dBm and is marked in green, only outdoor coverage or outdoor coverage whose strength level is between -95dBm and -105dBm and is marked in yellow, and outside the coverage area whose strength level is less than -105dBm and is marked in red. The strength levels for 4G are greater than -95dBm and are marked in blue, coverage within vehicles or vehicle coverage whose strength level is between -95dB and -105dBm and is marked in green, only outdoor coverage or outdoor coverage whose strength level is between -105dBm and -115dBm and is marked in yellow, and outside the coverage area whose strength level is less than -115dBm and is marked in red.

Delimitation of the annual plan and timetable

Once the areas to be measure has been define, the measurement plan and timeline is implemented, in order to schedule the dates in which the evaluations will be carried out collecting data in the define areas, covering in a sequential and continuous way all the towns and national roads. This measurement plan ends with the definition of the measurement schedule, that requires at least 9 months to be completed or executed.

Execution of field test "drive test"

Once the plan and measurement schedule are completed, Sutel's technical team starts collecting data from the Claro, ICE and Telefónica operators for 2G, 3G and 4G mobile networks.

The data collection process is carried out using specialized "drive test" equipment located in a vehicle specially conditioned for this purpose, which carries out tours along the towns and national roads, compiling jointly and simultaneously the QoS conditions offered by the three operators of mobile telephone and Internet networks, in accordance with the methodologies known as "Measurement methodology applicable to mobile telephony services of the Reglamento de prestación y calidad de Servicio" and "Measurement methodology applicable to Internet access services of the Reglamento de prestación y calidad de servicio", approved by the Sutel Council by means of resolution RCS-019-2018[17] "Resolution on Measurement Methodologies applicable to the Reglamento de prestación y calidad de servicio".

It should be noted that, on average, 15 officials are required for each of these field trips. They are technical engineers.

Measurements made in 2018 began on February 12 and ended on November 22, with allowed measurement schedules between 6:00 a.m. and 11:00 p.m., both in towns and national roads.

The measurements carried out in 2018 covered a total of 47,021 km of national roads, in 471 districts of the country, allowing the collection of an average of 27 million data samples per operator.

Processing of collected data

To process the collected data it is requiere at least 3 months, it is necessary to use a tool called Geographic Information System (GIS). This tool makes possible the data filtering process, which consists of preserving only the measuring points that are within each coverage map corresponding to each operator for the KPI under evaluation, according to the classification of the respective technology, which excludes all samples collected outside these reported coverage maps.

Once the valid samples have been selected, they are compared against the minimum quality thresholds defined in the Reglamento de prestación y calidad de servicio in force at the date of the measurements applied. This comparison process makes it possible to estimate the percentage of compliance for each of the analyzed KPIs.

Summary of the QoS KPIs obtained through drive tests for mobile networks

The following table shows the definitions of the QoS KPIs, for which data are collected by means of the annual field test "drive test".

[17] Resolution RCS-019-2018 was published in Issue N°42 of the official newpaper La Gaceta on February 27, 2018

Table Nº 7.
Costa Rica. Definitions of service quality indicators in accordance with the Reglamento de prestación y calidad de servicio in force[18] since February 17, 2018

Indicator	Definition
Percentage of unsuccessful calls	The percentage of unsuccessful calls, uses as reference the technical[19] standard ETSI EG 201 769 for fixed telephony and standard ETSI EG 202 057-3 for mobile telephony. This KPI evaluates the accessibility of the telephony service and will be measured as the percentage ratio between the number of unsuccessful calls and the total number of valid call attempts. An unsuccessful call is a valid call attempt, for which the caller fails to obtain any of the following types of response within 10 seconds of the instant the last digit of the destination number is received by the network: ring tone reception, busy tone reception, or called-side response.
Voice quality in telephone services	Voice quality in telephone services will be measured as the percentage ratio of the number of measurements that meet the MOS[20] threshold set by Sutel to the total number of measurements made. The POLQA[21] test described in the ITU-T P.863 Recommendation will be used to measure the voice quality indicator in telephone services in general. The PESQ[22] test described in ITU-T P.862.1 and P.862.2 Recommendations, as well as the E-Model of the ITU-T G.107 Recommendation, may be used as a supplement for the case of fixed telephone services. Voice quality in telephone services corresponds to the comparison of the characteristics of the signals emitted with those received in a telephone communication.
Call set-up time	The call set-up time, for which standard ETSI EG 201 769 is used as a reference, will be measured as the percentage ratio of calls successfully established within the maximum time (threshold) established by Sutel to the total number of calls successfully established. For the purposes of this indicator, a call is considered to have been successfully established when the caller receives a busy tone, ring tone or answer signal. The call set-up time is defined as the time elapsed from the moment the addressing information required to establish the call is received by the network (i.e., recognized by the access network of the calling user), until the caller receives a busy tone, ring tone, or response signal.
Percentage of dropped calls	The percentage of dropped calls, for which standard ETSI EG 202 057-3 is used as a reference, evaluates the retainability of the mobile service and will be measured as the percentage ratio of incoming and outgoing calls, which, once they have been correctly established and thus assigned a communication channel, are been dropped or are interrupted before their normal termination by the user, this early termination being caused by the operator's network.

...Continue

[18] Reglamento de prestación y calidad de servicio published on February 17, 2017 in the Scope N°36 of the Official Gazette, and effective as of February 17, 2018.
[19] Standard established by the European Telecommunication Standard Institute.
[20] It is measured on a scale from 1 to 5 and measures audio quality.
[21-22] Standardized test defined by the UIT to measure voice quality.

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Mobile service coverage areas

The coverage area of the mobile service must be calculated independently for each technology, and must be based on the measurements made during the execution of field tests "drive test", in accordance with the measurement methodology established by Sutel, according to the following formulas:

$$IM\text{-}14_{blue} = \frac{CM_{blue}}{CT_{blue}} \times 100\ \%$$

Where

CM_{blue}: *Number of samples whose signal strength corresponds to blue coverage or which are correlated to a sample of blue coverage*

CT_{blue}: *Total number of samples classified as blue by the operator or located within a zone classified by the operator as blue*

$$IM\text{-}14_{green} = \frac{CM_{green}}{CT_{green}} \times 100\ \%$$

Where

CM_{green}: *Number of samples whose signal strength corresponds to green coverage or which are correlated to a sample of green coverage*

CT_{green}: *Total number of samples classified as green by the operator or located within a zone classified by the operator as green*

$$IM\text{-}14_{yellow} = \frac{CM_{yellow}}{CT_{yellow}} \times 100\ \%$$

Donde

CM_{yellow}: *Number of samples whose signal strength corresponds to yellow coverage or which are correlated to a sample of yellow coverage*

CT_{yellow}: *Total number of samples classified as yellow by the operator or located within a zone classified by the operator as yellow*

$$IM\text{-}14 = \frac{IM\text{-}14_{blue} + IM\text{-}14_{green} + IM\text{-}14_{yellow}}{3}$$

The coverage areas (IM-14) are classified into four different types depending on the signal strength (with units in dBm)[23] measured outdoors, which are represented by a color scale as indicated below:

Scale color	Expected coverage
Blue	Inside buildings, inside motor vehicles and outdoors
Green	Inside motor vehicles and outdoors
Yellow	Only outdoors
Red	Without coverage

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[23] dBm: Unit of measurement of the signal strength expressed in decibels (dB).

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<table>
<tr><td></td><td>The applicable thresholds are:

<table>
<tr><th>Scale color</th><th>2G: Value of Rxlev (dBm) measured outdoors</th><th>3G: Value of RSCP (dBm) measured outdoors</th><th>4G: Value of RSRP (dBm) measured outdoors</th></tr>
<tr><td>Blue</td><td>≥ -75</td><td>≥ -85</td><td>≥ -95</td></tr>
<tr><td>Green</td><td>-75 > signal level ≥ -85</td><td>-85 > signal level ≥ -95</td><td>-95 > signal level ≥ -105</td></tr>
<tr><td>Yellow</td><td>-85 > signal level > -95</td><td>-95 > signal level > -105</td><td>-105 > signal level > -115</td></tr>
<tr><td>Red</td><td>≤-95</td><td>≤ -105</td><td>≤ -115</td></tr>
</table>
</td></tr>
<tr><td>Comparison between the local or international transfer speed against the provisioned speed</td><td>The comparison between the local or international transfer speed against the provisioned speed, uses as a reference the technical standard ETSI EG 202 057-4[24]. This KPI is calculated as the percentage ratio of the number of measurements meeting the threshold established by Sutel to the total number of measurements made.

The comparison between the local or international transfer speed against the provisioned speed will be evaluated using the ratio between the reference speed (in bits per second) experienced by users and the provisioned speed (in bits per second) by the operator/provider to the contracting user of the service.

The reference speed indicated above will be the rate used by Sutel for the purpose of analyzing the performance of the service provided by the operator/provider. This indicator is applicable for both local and international communications.

The reference speed is the rate used to evaluate the performance of Internet access services. The reference speed is obtained from effective measurements of the service, from the perspective of the end user. For services provided over fixed networks, the reference speed will be estimated as the simple average of the measured speed for a specific Internet access service. In the case of services provided over mobile networks, the reference speed corresponds to the simple average of the instantaneous speed obtained by Sutel from field test measurements “drive test”, using measurement phones which the provisioned speed is equal to the speed plan with the largest number of users. The provisioned speed corresponds to the speed at which a data transfer service is provisioned for Internet access through networks that provide fixed services or mobile services.</td></tr>
</table>

Fuente: Sutel, Directorate General for Quality, Costa Rica, 2018.

[24] Standard established by the European Telecommunication Standard Institute.

Methodology applied to the monitoring and evaluation system of Fonatel's programs and projects

The General Law of Telecommunications (articles 31 to 40 and transitory IV) gives SUTEL the power to develop programs that will guarantee the access and use of telecommunications to those in vulnerable economic and social conditions. This is carried out with funds coming from the National Found of Telecommunications (Fonatel, in Spanish), according to the objectives set therein, as well as the goals and priorities defined in the current National Plan of Telecommunications.

To determine the scope of the projects developed thru Fonatel and based on the goals defined in the National Plan of Telecommunications the SUTEL puts together an Annual Plan of Projects and Programs (PAPyP in Spanish), a mechanism that helps communicate, organize, monitor and evaluate programs and projects of universal access, universal service and solidarity during the existing period.

In 2018, the portfolio reported six programs in the execution phase[25].

Figure Nº 6.
Portfolio of Programs in the Development Phase[26] Fonatel 2018

Fuente: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

[25] The three programs with active projects in 2018 are the Program of Communities Connected, Program of Homes Connected and Program of Equipped Public Centers.
[26] Includes all programs that are in one of the phases of the life cycle of a project; namely: initiation, planning, execution, and closure.

To understand the nature of the phases of those projects in progress, consider each one of the four phases has a specific duration:

- **Initiation:** process that includes from reception and evaluation of initiatives to financial prefeasibility and work order authorizing start of a project.

- **Planning:** includes the process to write the bid to award the Project to the vendor that will be responsible for the Project; socioeconomic study; development of the financial structure, Project and Program plan, bid and award.

- **Execution:** this phase starts once the Project is awarded to a telecommunications network operator. It includes the sub-phases that correspond to the execution itself, as well as monitoring and control.

- **Closing:** includes the closing of contracts and the generation of all the documentation required to finalize the project.

Under the phases, and as part of the functions of control, monitoring and evaluation of projects, Sutel considers two type of indicators to compile, analyze and generate results: operational indicators and indicators of perception. This report includes only operational indicators associated to the programs in the execution phase.

Note that all the indicators comprised in this section of the report are already included in the results related to the performance of the Telecommunications (market indicators) sector that is compiled and analyzed in the first section of this report.

Operational Indicators associated to Fonatel Programs

Operational indicators measure progress of the targets included in each program of the current National Plan of Telecommunications. In other words, they provide information about the performance of those actions related to the delivery of services, development of infrastructure and provision of devices and products of support [27], starting with each intervention. The reports of execution prepared monthly by the Fiduciary Trustee (Banco Nacional de Costa Rica) in collaboration with the administration[28] of each program and project include a compilation and analysis of this data.

The compilation of operational indicators uses a methodology based on the "Model of Logical Framework"[29] and "Results Chain"[30] This ensures alignment of the programs and projects with the objectives and targets set in the current National Plan of Telecommunications.

This model includes templates to register information and a catalog of indicators created in collaboration with the corresponding offices. The administration fills out the templates on a monthly basis and sends them to the General Directorate of Fonatel on behalf of the Fiduciary Trustee. The technical team of the Directorate then reviews the series of historical records, as well as the details provided by the Fiduciary

[27] Products of support include equipment, instruments, technologies, software and products designed to promote the autonomy of people with disabilities.

[28] Management Unit: the auxiliary body of the Trust, formed by a team of professionals or specialists hired by the Trustee to support it in the required technical areas, related to the projects and programs to be carried out under the resources of the Trust. For the programs in execution, the management units oversawthe companies Ernst & Young and Price WaterhouseCoopers.

[29] The logical framework matrix is a four-row by four-column instrument, which summarizes the most important aspects of the project. Columns: narrative summary of objectives and activities, indicators (specific results to be achieved), means of verification and assumptions (external factors that involve risks). Rows: components of the EAP: purpose, purpose, components/results, and the activities required to produce the Components / Results.

[30] The results chain provides a clear and logical definition of how the sequence of inputs, events, and products, directly related to the intervention, interact and allow the achievement of effects and impacts.

Trustee in the monthly reports of those programs and projects approved by the Council of SUTEL and the monthly monitoring meetings between the trustee and the administration. It also carries out additional controls starting with the visits to those locations covered and the request for information to those institutions included in the execution.

To facilitate comprehension and presentation, operational indicators are sub-divided in two groups:

- **Aggregate indicators:** it groups the indicators that measure the results obtained in the execution of programs and projects managed thru Fonatel.
- **Program indicators** it refers to the indicators that specifically measure the results of the programs and projects managed thru Fonatel.

Table N° 8 presents and extract of the catalog of operational indicators, by program.

Table Nº 8.
Costa Rica. Catalog of indicators to monitor and evaluate programs and projects in the execution phase 2018

Group	Name of the Indicator	Description of the Indicator
Aggregate	Total number of projects developed thru Fonatel	Number of projects of the programs developed thru Fonatel, by phase.
Aggregate	Geographic coverage of the programs and projects developed thru Fonatel del Fonatel	Graphic representation of the districts and territories impacted with resources from Fonatel, thru at least one program or project. The representation uses color dots over a map of Costa Rica.
Aggregate	Number of households, houses and people with availability of telecommunications services in the geographic areas covered thru Fonatel.	Total number of households, houses and people in the districts covered by telecommunication services provided thru Fonatel.
Aggregate	Number of subscriptions to fixed services of telecommunications provided thru Fonatel	Total number of homes with a subscription to fixed services of voice and Internet provided thru the programs and projects developed thru Fonatel.
Aggregate	Amount of subscriptions to the service of mobile telephony in the geographic areas covered thru Fonatel.	Total number of subscriptions to the service of mobile telephony within the geographic areas covered by the programs and projects ran thru Fonatel. These subscriptions are commercialized at the expense of network operators and telecommunications service providers adjudicated in these areas thanks to their incursion thru the telecommunications infrastructure subsidized by the fund. The service of mobile telephony gives subscribers the possibility to use both voice and data.
Aggregate	Total number of devices and products of support provided thru Fonatel.	Total number of devices and products supporting the access to and use of telecommunication services provided through Fonatel. Products of support are defined as equipment, instruments, technologies, software and products designed to promote the personal autonomy of people with disabilities.
Aggregate	Patrimony of Fonatel	Sum of the assets and liabilities Fonatel owns, expressed in millions of colones.

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Group	Name of the Indicator	Description of the Indicator
Aggregate	Forecast of investment for the development of programs and projects	Total sum of the amounts forecasted by Fonatel for the entire duration of programs in the execution phase, expressed in millions of colones.
Aggregate	Investment executed by the fund, by program	Total sum of the amounts executed by the Fund for the development of each of the programs of the Annual Plan of Projects and Programs (PAPyP) expressed in millions of colones.
Aggregate	Investment executed by the fund by operator	Total sum of disbursements for the execution of programs and projects in the phase of production, by network operator and telecommunications service provider, express in millions of colones.
Program 1	Number of projects of the Program Communities Connected	Number of projects in the Program Communities Connected, developed thru Fonatel.
Program 1	Geographic coverage of the Program Communities Connected	Graphic representation of the districts and territories coveredthru the projects of the Program Communities Connected. The representation uses color dots over a map of Costa Rica.
Program 1	Number of people with Access to telecommunications services in those areas covered by the Program Communities Connected.	Number of people with telecommunications services available in the geographic areas of the districts covered by the projects of the Program Communities Connected.
Program 1	Number of Public Service Providing Centers with fixed services provided thru the Program Communities Connected by project	Number of Public Centers (CPSP) with voice and Internet services provided thru the projects of the Program Communities Connected, by Project.
Program 1	Number of subscriptions to fixed telecommunication services provided by the Program Communities Connected	Total number of subscriptions to fixed services of voice and Internet provided thru the projects of the Program Communities Connected.
Program 1	Number of subscriptions to the service of mobile telephony by geographic area covered by the Program Communities Connected	Total number of subscriptions to the service of mobile telephony within the geographic areas covered by the Program Communities Connected. These subscriptions are commercialized at the expense of network operators and telecommunications service providers awarded because of the incursion thru the infrastructure of telecommunications subsidized by this fund. The service of mobile telephone gives subscribers the opportunity to use both voice and data.
Program 1	Percentage of subscriptions to the service of mobile telephony in the geographic areas covered by the Program Communities Connected, by project	Percentage of subscriptions to the service of mobile telephony within the geographic areas covered by the Program Communities Connected, by Project in execution. These subscriptions are commercialized at the expense of network operators and telecomm service providers awarded in these zones, as a consequence of their incursion thru the telecommunications infrastructure subsidized by this fund. The service of mobile telephony provided allows the subscriber to us both voice and data.

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Group	Name of the Indicator	Description of the Indicator
Program 1	Percentage of subscriptions to the service of fixed telephony provided by the Program Communities Connected, by project	Percentage of subscriptions to the service of fixed telephone provided thru the Program Communities Connected, by Project.
Program 1	Percentage of subscriptions to the service of fixed Internet provided by the Program of Communities Connected by project.	Percentage of subscriptions to the service of fixed internet provided thru the Program Communities Connected, by Project.
Program 1	Investment executed thru the Program of Communities Connected	Total sum of disbursements made on projects in the production phase of the Program Communities Connected, expressed in millions of colones. It includes: OPEX: Operational expenditures, permanent costs associated to the operation of the Project (operating costs). CAPEX: Capital expenditure, capital investments executed when a fixed asset is purchased or to add value to an existing asset with a lifetime that extends beyond the taxable year. Services: Recurring payment for the consumption of telecommunications fixed services provided to Public Centers.
Program 1	Percentage of the investment executed thru the Program of Communities Connected, by operator.	Percentage of disbursements completed in those projects in the phase of production of the Program Communities Connected (includes OPEX, CAPEX and services), by network operator and telecomm service provider.
Program 2	Total number of homes registered in the System for the Administration of Beneficiaries of the Program Households Connected	Total number of homes registered in the System for the Administration of Beneficiaries of the Program Households Connected, according to the status of the process of incorporation. It includes the households that are part of this program (beneficiaries), those that have active internet service (active), those that have cancelled (cancellations) and those that have changed status (administrative changes).
Programa 2	Cobertura geográfica del Programa Hogares Conectados	Graphic representation of the districts where network operators and service providers have the Program Households Connected available to them. The representation uses color dots over a map of Costa Rica.
Program 2	Geographic coverage of the Program Households Connected	Porcentaje de los hogares que han recibido subsidio para el acceso a Internet y una computadora portátil a través del Programa Hogares Conectados, según quintil de ingreso total del hogar.
Program 2	Percentage of homes benefited thru the Program Households Connected, according to income quintile	Percentage of households that have received a subsidy for Internet access and a laptop through the Program Households Connected Program, according to total household income quintile.
Program 2	Percentage of households benefited by the Program Households Connected, by province	Percentage of homes that have received a subsidy to Access Internet and a laptop thru the Program Households Connected, by province.

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Group	Name of the Indicator	Description of the Indicator
Program 2	Investment executed through the Program Households Connected	Total sum of the disbursements made for the payment of the subsidy applied to the service of Internet and laptop computer within the framework of the Program Household Connected (Connected Homes) expressed in millions of colones.
Program 2	Percentage of the investment executed thru the Program of Households Connected, by operator.	Percentage of the investment spent on the execution of the Program Households Connected, by network operator and telecomm service provider.
Program 3	Number of devices and products of support for the use of telecommunication services provided by the Program Public Centers Equipped.	Number of total devices and products of support delivered to Service Provider Centers thru the Program of Public Centers Equipped. Products of support include equipment, instruments, technologies, software and products designed to promote personal autonomy of people with disabilities.
Program 3	Distribution of devices and products of support for the use of telecommunications services provided thru the Program of Public Centers Equipped, by institution	Absolute and relative distribution of the number of devices and products of support delivered to each of the Public Service Delivery Centers (CPSP) through the Program Public Centers Equipped. Support products are defined as equipment, instruments, technologies, software and products designed to promote the personal autonomy of people with disabilities.
Program 3	Level of fulfillment of the targets of the Program Equipped Public Centers described in the National Plan of Telecommunications by institution.	Level of fulfillment of the target relative to the delivery of devices and products of support for the use of telecommunications services established in the National Plan for the Development of Telecommunications (PNDT) within the framework of the Program Public Centers Equipped, according to the receiving institution. This level is established as the percentage of devices and products of support delivered and pending delivery to each institution, with respect to the target defined in the current PNDT. Support products are defined as equipment, instruments, technologies, software and products designed to promote the personal autonomy of people with disabilities.
Program 3	Investment executed in the Program Equipped Public Centers	Total sum of disbursements executed for the payment of devices and products of support provided under the Program Public Centers Equipped, expressed in millions of colones.

Fuente: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

San Juan de Chicuá, community located on the slopes of the Irazú volcano in Cartago.

GENERAL EVOLUTION OF THE SECTOR

¢ 809,363 millones

million of revenues generated during 2018

Internet revenues exceeded the ones on mobile voice

67 %

of revenues

correspond to voice and mobile data

The sector's general evolution

Commercial offer of telecommunication services in 2018

At the end of 2018, 152 telecommunication operators and service providers were registered, which corresponds to 9 more operators and providers compared to the amount registered in 2017 and 30 compared to 2014. This shows that the market continues to show an increase in the number of companies that enter the commercialization of telecommunications services and thus offering new commercial alternatives to users.

In relation to the number of operators that provided information during the period analyzed, according to the service they provide, in the case of Fixed Telephony 100 % of active operators reported information; Mobile Telephony 100 %, Data Transfer 62 % and Subscription Television 100 %. In the case of data transfer, the operators that provided information are the ones with the highest market share.

Revenues behavior of the telecommunications sector

In 2018, the market registered 809,363 million colones of revenues, registering an increase of 0.3 % compared to 2017, which shows on one hand that the market is reaching maturity, due to the fact that revenues growth has slowed down, but, on the other hand, it is also a trend consistent with the growth of national productive activity during that last year that reduced its real growth from 3.4 % to 2.88 %. When analyzing the 2014-2018 period, the growing trend continues to be shown, with an average annual growth rate of 3 % in the period.

The relation between the sector's total revenues and the Gross Domestic Product at market prices (see Graph Nº 2), was of 2.3 % for 2018. Compared to 2017, it shows a slight decrease (-0, 02 percentage points). It is worth noting that during 2018, the Banco Central de Costa Rica made the change in the basis of calculation of GDP, for this reason from 2018 on, the value of the GDP will be used with the base of 2012.

Regarding revenues behavior at a service level (see Graph Nº 3), in general terms it is observed that fixed telephony services (basic traditional and VoIP), leased lines and mobile telephony show a slight decrease in revenues generated, but not Internet access service as a whole (Data Transfer). In 2018, these revenues surpassed those generated by mobile telephony, which had historically been the service that generated the most revenues in the Costa Rican telecommunications industry, thus reflecting a new competitive reality in the market and an important change in the consumption habits of national users

A separate analysis of each service reveals the following:

Mobile Telephony

Revenues from voice and messaging traffic report a total of 333,466 million colones by 2018, representing a -4 % decrease compared to 2017. For the 2014-2018 period, the average annual growth rate is -2 % as detailed in Graph Nº 3. From the revenues reported in mobile telephony, 97.1 % come from voice traffic and 2.9 % from messaging.

Fixed Telephony (traditional basic and VoIP)

For the fixed telephony service (basic traditional and VoIP telephony), revenues for 2018 totaled 72,565 million colones, representing a -8.5 %

decrease compared to 2017. This service has shown a tendency to decrease throughout the years, due to the decrease in its use, which is evident when analyzing the average growth rate of 2014-2018, which amounts to an annual average of -6 % (see Graph Nº 3).

Traditional basic telephony

Revenues generated by traditional basic telephony showed a declining trend during the period analyzed. Thus, this service shows a reduction of 9 % in the last year in the revenues generated and a negative average annual growth rate of -5 %. Even so, the relative weight of this service in relation to the total of basic telephony continues to be very important, with 91.4 %.

VoIP fixed telephony

The behavior of VoIP fixed telephony is quite different from that registered in traditional basic telephony, since it maintains a growing trend throughout the period analyzed, compared to 2017, the increase is 2.4 %, and the average annual growth rate since 2014 is 10 %.

Internet access (includes mobile Internet access)

In this service the item for revenues shows a growing trend since for the 2014-2018 period the average annual growth rate is 13 %.

By 2018, this service generated as a whole 359,014 million colones, representing a 7.1 % increase compared to 2017, this shows growth in the intensity of use of this type of service. It is important to highlight that the revenues from fixed Internet represents 41 % and mobile Internet 59 %. If each subgroup is analyzed separately, both show a similar behavior in relation to the average annual growth rate with 10 % and 11 % respectively for mobile Internet access and fixed Internet access. The growth rates for the last year for these services were 16 % and 2 % respectively from 2017 to 2018.

Leased lines

Revenues generated in the leased lines service showed a decrease in the period analyzed. By 2018, 44,319 million colones were reported, representing a 1.5 % decrease compared to 2017. In this case, the growth rate from 2014 to 2018 is an annual average of 2 %.

When analyzing the percentage weights of the revenues of each service in relation to the total revenues of the sector, two scenarios are presented. The first scenario totals mobile telephony and mobile Internet (mobile network) revenues in the same category, followed by fixed Internet access, traditional telephony and VoIP telephony and finally leased lines (see Graph Nº 4). In the second scenario, fixed and mobile Internet access revenues are added in a single revenue line, followed by mobile telephony (voice only), traditional telephony and VoIP telephony, and finally leased lines (Graph Nº 5).

In the first scenario, mobile telephony service and mobile Internet access (mobile network) represent 67 % of revenues by 2018. This percentage has been decreasing over the years. Secondly, there is the fixed Internet service with 18 %, followed by traditional basic telephony and VoIP telephony with 9 % and dedicated lines with 6 %. The great percentage weight that telecommunications services have over the mobile network where they represent almost three quarters of the market is evident.

In relation to the second scenario, the Internet access service (fixed and mobile) with 44 % of the revenues of the telecommunications market, followed by mobile telephony (voice only) generate 41 % in this case, the percentage reversed compared to 2017, where the percentages were 41 % and 43 % respectively. Finally, as in the first scenario, fixed telephony provides 9 % and leased lines, 6 %. In this instance, mobile telephony

service and Internet access together generate 85 % of the sector's revenues.

Behavior of subscriptions in the telecommunications sector

An important aspect in the telecommunications market is analyzing the behavior of subscriptions in the different services. Table Nº 11 can be observed in detail for this subject, showing information on the penetration level of services measured by the number of inhabitants or households for the period analyzed (2014-2018).

Mobile Telephony

The mobile telephony service registered 8,495,585 subscriptions in 2018. For the prepaid modality 6,285,188 and for the postpaid modality 2,210,397 were counted, with a ratio of 74 % and 26 % respectively of the total. By 2018, this service changed its behavior when 344,757 fewer subscriptions were reported compared to 2017. This decrease is occurring especially in the prepaid service with 510,403 fewer lines, but in the case of the postpaid modality 165,646 more lines are registered, an increase that does not compensate the decline of prepaid subscriptions. The penetration of this service in 2018 is 170 %, with a decrease of 9 percentage points compared to that registered in 2017.

Fixed telephony (basic traditional and VoIP)

In the case of fixed telephony, the indicators of the number of subscriptions continue to show a decreasing behavior, going from 814 910 in 2017 to 774,303 in 2018, representing a decrease of 40 607 subscriptions (7 %). In relation to the penetration of the service in the population and households, it is found that by 2018 it is 15 % and 50 %, respectively. This is a decrease of 2 and 5 percentage points respectively in relation to the figure registered the previous year.

By separating traditional basic telephony and VoIP telephony, it is shown that the decreases focus on traditional basic telephony where 51,910 fewer subscriptions were registered compared to 2017 (7 %), but in VoIP telephony service there is also an increase of 11,300 subscriptions (17 %).

In the case of Service penetration during 2018 separately shows that, for basic traditional at a population level is 14 % and household 45 %, while VoIP service 1.57 % and 5.12 %, respectively.

Traditional basic telephony

Traditional fixed telephony subscriptions in the last 5 years show a decrease; 695,518 subscriptions were registered by 2018; 144,450 less than those registered for 2014 (839,968), with a negative average annual growth rate of 3.2 %.

VoIP Fixed Telephony

In the case of VoIP fixed telephony, the growth it had been experiencing over the last few years has continued; therefore, subscriptions grew by 17.6 % between 2014 and 2018.

Internet access (including mobile Internet access)

Internet access service (fixed and mobile) shows sustained growth compared to 2017. At the end of 2018, 5,575,821 were registered, representing 42,816 new subscriptions. By separating fixed and mobile Internet subscriptions, the mobile service represents 85 % of the links. The penetration of fixed Internet in homes is 54 %, showing an increase compared to 2017 of 4 percentage points. The mobile Internet measured as a percentage of the population is 95 %, with a decrease of 2 percentage points compared to 2017.

Leased lines

The performance of leased line service subscriptions has been variable over the period analyzed, but by 2018 there is an increase in subscriptions compared to 2017, with 651 more connections.

Total Investment

Total investment in the telecommunications sector in recent years has been stable, but by 2018 this indicator contracted to 0.5 % of GDP, compared to 0.9 % in 2017. During 2018, there were fewer investments, due to exogenous variables in the market. Among them are the sale of operations by some operators; the uncertainty in the approval of the Law to Strengthen Public Finances (Fiscal Plan) during 2018; the exit of companies and fluctuations in the dollar exchange rate that caused greater caution in the sector's investment.

Human resource used

The human resource directly associated with telecommunications services remains stable throughout the 5 years. By 2018, the personnel hired directly associated with the provision of telecommunication services decreased by 382 people, representing a -3 % of compared to the year 2017. By estimating the growth from 2014 onwards, an average annual growth of 1.4 % is obtained. (See Graph Nº 6). When comparing the human resource of the sector in relation to the country's labor force, the indicator shows a slight decrease compared to 2017, but always stable throughout the period analyzed. (See Graph Nº 7). In the case of the sector's labor force and total population, as shown in Graph Nº 8, there have been no significant changes over time, with a slight decrease in the last year.

When analyzing the behavior of the female population working in telecommunications, this time this indicator shows a slight decrease (-3 %), compared to 2017, with an accumulated growth rate of 2 % compared to 2014.

Sutel as sectorial authority of competition in telecommunications

The Superintendencia de Telecomunicaciones has achieved the following results as a sectoral competition authority.

Seven studies were carried out to determine the level of competence during the 2017-2018 period.

- Mobile Telecommunications Retail Service, RCS-248-2017.
- Wholesale mobile network access and origination service, RCS-040-2018.
- Retail Business Connectivity Service, RCS-266-2018.
- Wholesale loop unbundling service, RCS-191-2017.
- Wholesale access and origination service on a mobile network, RCS-040-2018.
- Wholesale access service and transport of international outgoing capacity, RCS-297-2018.
- Leased line wholesale service, RCS-339-2018.

This process began in 2015, with the issuance of a "Methodology for the analysis of the degree of effective competition in the telecommunications markets," issued through RCS-082-2015 and published in Scope No. 39 of the official newspaper La Gaceta No. 104 of June 1, 2015[31], and required a detailed analysis of each of the markets, carried out throughout the years 2016, 2017 and 2018.

[31] Available at: https://sutel.go.cr/sites/default/files/rcs-082-2015_n_metodologia_para_analisis_grado_competencia_mercados_telecomunicaciones.pdf

In addition, between 2015 and 2018, 46 requests for merger authorization were analyzed, of these, 78 % were authorized without conditions, 17 % with conditions, and 4 % were rejected.

Among the most outstanding cases handled by Sutel in this matter are the mergers between the companies MILLICOM CABLE COSTA RICA S.A. and TELECABLE ECONÓMICO TVE S.A. (2015) and between the companies LBT ACQUISITIONS S.A. and TELEVISORA DE COSTA RICA S.A. (2018), see Table Nº 12. All the merger authorizations processed by Sutel can be consulted at the following link: http://www.sutel.go.cr/resoluciones-competencia

As part of the area's tasks, thirty investigations have also been carried out regarding the possible commission of monopolistic practices, carried out in the markets of mobile telecommunications, residential Internet access, subscription television and related infrastructures. All investigations of relative monopolistic practices resolved by Sutel can be consulted at the following link: http://www.sutel.go.cr/resoluciones-competencia.

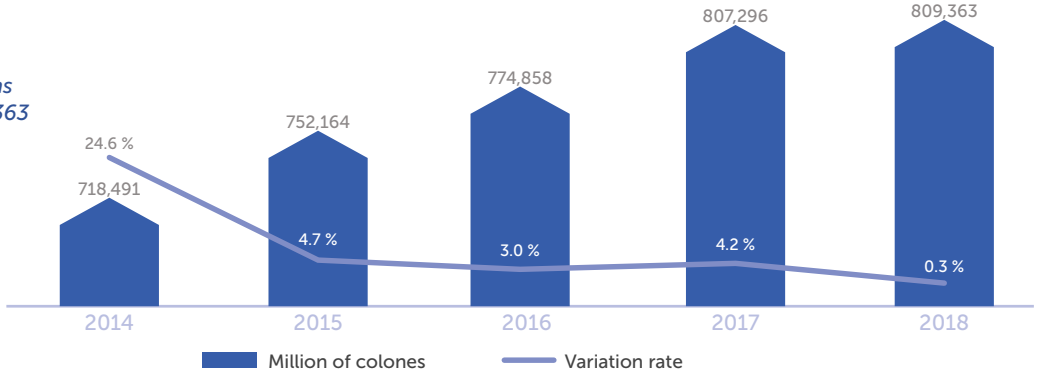
In addition, a methodological guide was issued in 2017 to ensure the transparency of decisions. This guide corresponded to the "Market Research Guide"[32]: this guide was issued in 2017 aimed at helping interested parties, i.e. companies, trade associations, consumers, consumer organizations and public entities (including ministries, independent regulators and other public agencies) to understand what market research is, what is intended to achieve with it, how it is carried out and what its results may be. And explain shareholders how to collaborate on market research. Its issuance in 2017 was fundamental for a market study to be carried out in 2018 on access by telecommunications service providers to shared infrastructure in condominiums.

In addition, as a sectoral competition authority, fifteen activities were carried out to promote competition culture, including workshops for economic agents, specialized training with competition law practitioners and training organized jointly with the Judicial Branch for judges and judicial officials, as part of the agreement between Sutel and the Judicial Academy.

[32] Available at: https://SUTELSUTEL.go.cr/sites/default/files/guia_de_estdios_de_mercado_ei_vf.pdf

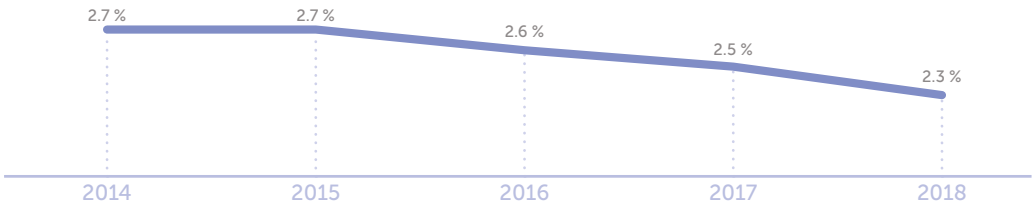
Graph Nº 1.
Costa Rica. Total revenues of the telecommunications sector, 2014 – 2018
(Annual figures in millions of colones and variation percentages)

The telecommunications market generated 809,363 million colones during. 2018.



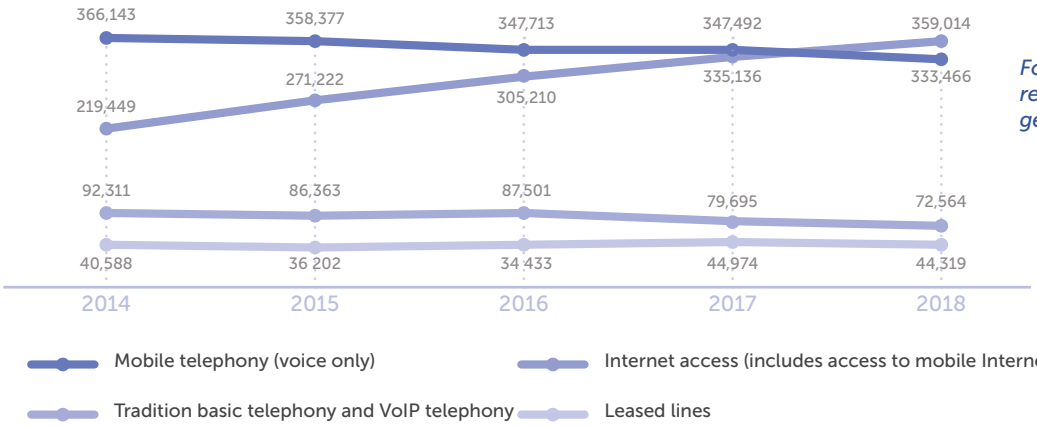
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 2.
Costa Rica. Total revenues of the telecommunications sector as GDP[1] proportion, 2014 – 2018
(Annual figures in percentages)



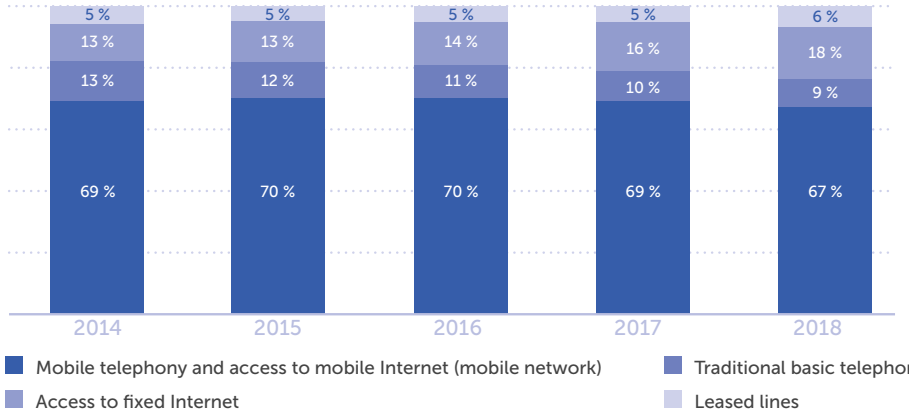
Note: [1]Gross Domestic Product at regular market prices.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 3.
Costa Rica. Total revenues of the telecommunicatios sector by service, 2014 -2018
(Annual figures in millions of colones)



For the first time Internet revenues surpassed those generated by mobile voice.

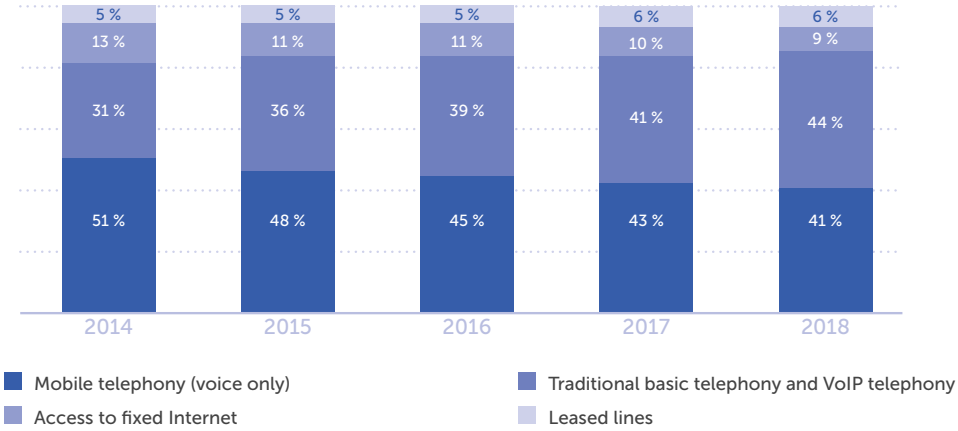
Graph Nº 4.
Costa Rica. Total revenues of the telecommunications sector by service, 2014 – 2018
(Annual figures in percentages)



Voice and data services over the mobile network account for 67% of revenues del sector.

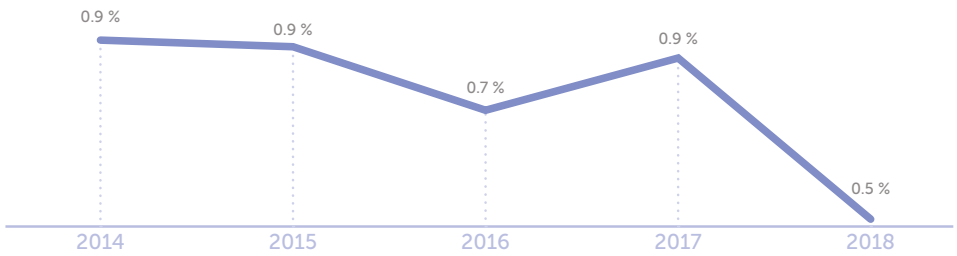
Note: Mobile telephony revenues also include revenues generated by the mobile Internet access service.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 5.
Costa Rica. Total revenue of the telecommunications sector by service, 2014 – 2108
(Annual figures in percentages)



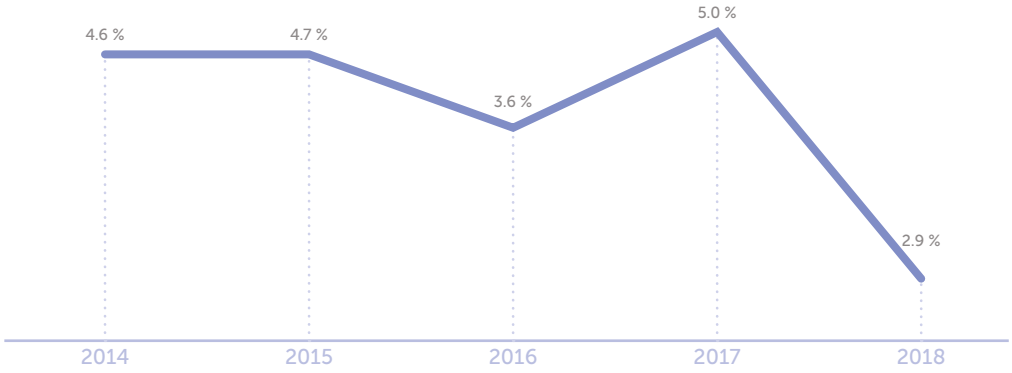
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 6.
Costa Rica. Total investment of the telecommunications sector as GDP[1] proportion, 2014-2018
(Annual figures in percentages)



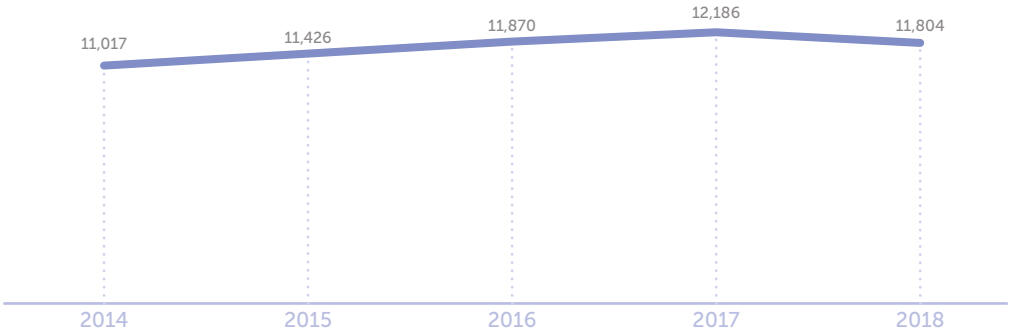
Note: 1/ Gross Domestic Product at current market prices.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 7.
Costa Rica. Total investment of the telecommunications sector as a proportion of the Gross Capital Formation, 2014 – 2018
(Annual figures in percentages)



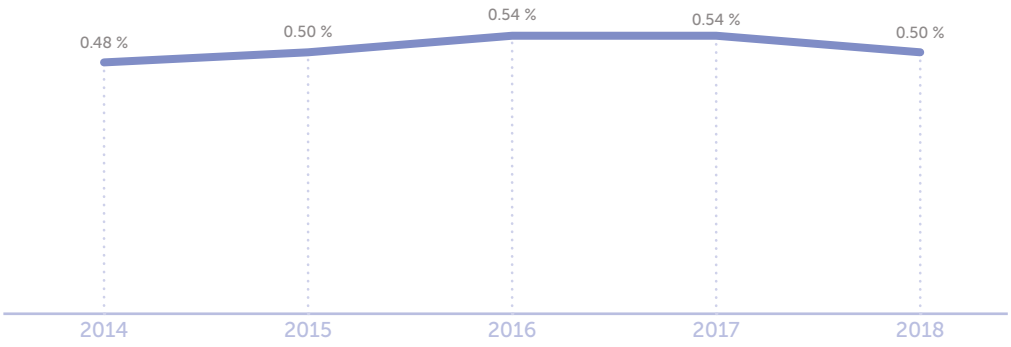
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 8.
Costa Rica. Work force of the teleccomunications sector, 2014-2018
(Annual figures)



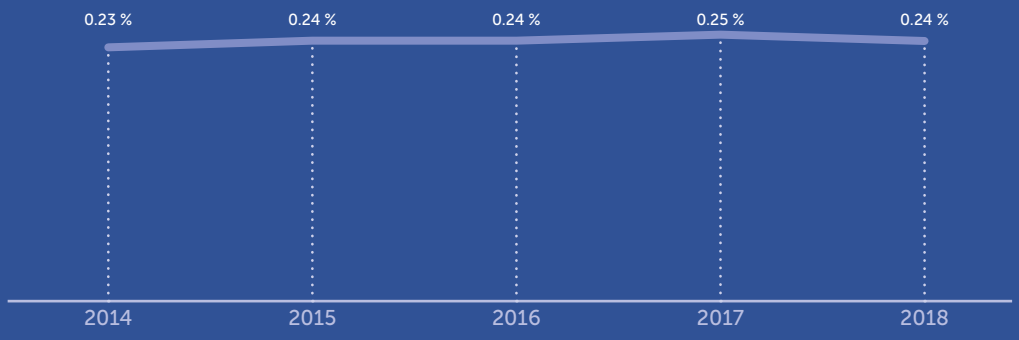
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 9.
Costa Rica. Percentage of the work force of the telecommunications sector regarding the Economically Active Population, 2014 -2018
(Annual figures in percentages)



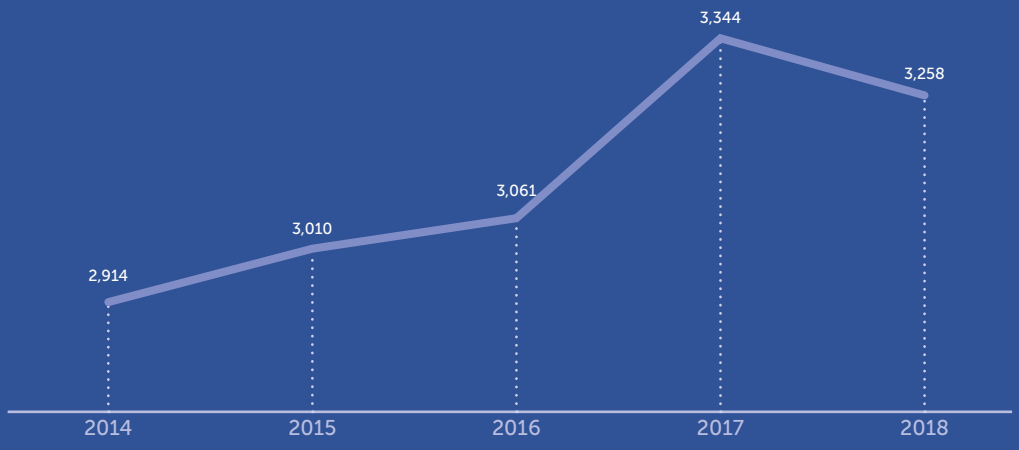
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 10.
Costa Rica. Percentage of the work force of the telecommunications sector regarding the total population, 2014-2018
(Annual figures in percentages)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 11.
Costa Rica. Female workforce of the telecommunications sector, 2014-2018



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 9.
Costa Rica. Number of telecommunications operators and service providers, 2014 - 2018

	2014	2015	2016	2017	2018
Total companies authorized	122	139	135	143	152
Indicators response rate	84 %	88 %	83 %	80 %	80 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 10.
Costa Rica. Percentage distribution of companies included in the 2014 – 2018 sector indicators report by service

	2014	2015	2016	2017	2018
Fixed telephony	94 %	94 %	94 %	90 %	100 %
Mobile telephony	100 %	100 %	100 %	100 %	100 %
Data transfer	98 %	97 %	97 %	55 %	62 %
Subscription TV	100 %	100 %	100 %	97 %	100 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 11.
Costa Rica. Summary of performance indicators for the telecommunications sector in Costa Rica 2014-2018

Indicador	2014	2015	2016	2017	2018
Total revenues (millions of colones) *	718,491	752,164	774,858	807,296	809,363
Total revenues/GDP (percentage)	2.69 %	2.68 %	2.58 %	2.48 %	2.33 %
Total investment/GDP (percentage)	0.93 %	0.90 %	0.67 %	0.86 %	0.5 %
Total human resources employed	11,017	11,426	11,870	12,186	11,804
Total human resources employed/ total economically active population	0.48 %	0.50 %	0.54 %	0.54 %	0.50 %

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Indicator	2014	2015	2016	2017	2018
FIXED TELEPHONY					
Total subscriptions	881,217	859,857	838,346	814,910	774,303
Total subscriptions /100 inhabitants	18 %	18 %	17 %	17 %	15 %
Total subscriptions /100 households	63 %	60 %	57 %	54 %	50 %
Total subscriptions - traditional basic fixed telephony	839,968	804,468	779,972	747,428	695,518
Total subscriptions - traditional basic fixed telephony / 100 inhabitants	18 %	17 %	17 %	16 %	14 %
Total subscriptions - traditional basic fixed telephony / 100 households	60 %	56 %	53 %	50 %	45 %
VoIP total subscriptions	41,249	55,389	58,374	67,482	78,785
Total number of public phones	8,188	5,726	4,731	4,674	4,581
MOBILE TELEPHONY					
Total subscriptions	7,020,412	7,535,599	8,330,664	8,840,342	8,495,585
Prepaid subscriptions	5,598 911	5,951,337	6,468,693	6,795,591	6,285,188
Postpaid subscriptions	1,421,501	1,584,262	1,861,971	2,044,751	2,210,397
Total subscriptions/100 inhabitants	147 %	156 %	170 %	179 %	170 %
Prepaid Subscriptions/Total subscriptions	80 %	79 %	78 %	77 %	71 %
Postpaid Subscriptions/Total subscriptions	20 %	21 %	22 %	23 %	25 %
DATA TRANSFER					
Total subscriptions - Internet access	4,806,217	4,713,075	4,972,171	5,533,005	5,575,821
Total subscriptions - fixed Internet access	515,840	558,656	636,087	744,041	834,784
Total subscriptions – fixed-wireless Internet access	503,347	545,813	625,466	735,833	829,296
Total subscriptions – fixed-wireless Internet access	12,493	12,843	10,621	8,208	5,488
Total subscriptions – mobile Internet access	3,796,619	4,154,419	4,336,084	4,788,964	4,741,037
Total subscriptions - fixed Internet access /100 inhabitants	11 %	12 %	13 %	15 %	17 %
Total subscriptions - fixed Internet access /100 households	37 %	39 %	43 %	50 %	54 %

...Continue

...Continuation

Indicator	2014	2015	2016	2017	2018
Total subscriptions – mobile Internet access/100 inhabitants	80 %	86 %	89 %	97 %	95 %
Total subscriptions – mobile Internet access/ Total subscriptions - mobile telephony	54 %	55 %	52 %	54 %	56 %
Total number of leased line connections	16,286	14,093	16,032	18,486	19,137
SUBSCRIPTION TV					
Total subscriptions	732,546	797,230	821,575	831,907	883,883
Total subscriptions /100 inhabitants	15 %	16 %	17 %	17 %	18 %
Total subscriptions/100 households	52 %	56 %	56 %	56 %	57 %
REFERENCE INDICATORS					
Total population	4,773,130	4,832,234	4,890,379	4,947,490	5,003,402
Gross domestic product at market prices (Millions of current colones)	26,675,006	28,098,969	30,048,726	32,506,356	34,691,057
Total households	**1,399,271**	**1,436,120**	**1,465,259**	**1,496,053**	**1,540,029**

Notes:

* These figures do not include the revenues associated with the subscription television service.

**For 2018 BCCR changed the base GDP calculation using that of 2012.

Source: Sutel, Directorate General for Markets, INEC and BCCR. Costa Rica, 2018.

Table Nº 12.
Costa Rica: Statistics for monopolistic practices of the sector, 2015-2018

Items	2015	2016	2017	2018
MONOPOLISTIC PRACTICES				
Research	**4**	**3**	**8**	**5**
Exofficio	0	0	0	0
Claims	4	3	8	5
Sanctioned practices	**1**	**0**	**0**	**0**
Absolute monopolistic practices	0	0	0	0
Relative monopolistic practices	1	0	0	0
ECONOMIC MERGERS				
Notified	**6**	**3**	**1**	**6**
Authorized	5	3	1	3
Authorized with conditions	0	0	0	3
Denied	1	0	0	0
Sanctioned	0	0	0	0

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Ronny Cordero Blandón,
a firefighter at the Pavas station, west of San José

FIXED TELEPHONY

2018

14 %

less users of **traditional basic telephony**

+10 %

of total users are VoIP

4 VoIP operators carry 73% of fixed voice traffic

Fixed Telephony

Subscriptions

During 2018, the number of subscribers associated to the fixed telephony service (basic traditional and VoIP) showed the same decreasing observed tendency during the last years. Of the 833,974 customers the service had at the end of 2014, by the end of 2018, there were 774,303, as shown in Table Nº 42 of the Annex. Such tendency even accelerated in the last year, to such an extent that the corresponding reduction (40,607 subscribers, which is equivalent to 5 %) is greater than the average of the four previous years (22,102 subscribers, i.e. 3.2 % per year).

Fixed telephony includes both the traditional basic telephony service and the voice over Internet protocol (VoIP) service. Table Nº 42 shows the difference in the behavior of the number of subscribers of both technologies. While traditional basic telephony shows a decrease in subscribers (the number of subscribers decreased from 839,968 in 2014 to 695,518 in 2018, having decreased until 2017 to 747,428), VoIP service showed an increase in customers during the same four-year period, from 41,249 to 78,782 subscribers for the period. Regarding 2018, while the number of VoIP service subscribers increased with 11,303 new subscribers, traditional basic telephony showed a reduction of 51,910 customers. The increase experienced by the VoIP service can be seen in Graph Nº 12.

If we consider, for comparative purposes, the number of subscribers registered quarterly in the fixed voice communications service, during the years 2017 and 2018, we can see that in general the decrease in the total number of subscribers of this service has been persistent during the eight quarters analyzed. Since the reduction of customers is associated with traditional basic telephony, it can be observed that, unlike the trend shown by fixed telephony as a whole, for the VoIP service, the figures show that, with the exception of the second and third quarters of 2018, there has been a continuous growth in the number of subscribers during these last two years, which on average is equivalent to 3.7% quarterly during 2017 and 3.9% during 2018. See Table Nº 43 in the Annex.

As a result of this unequal behavior of the number of subscribers per service, the percentages of participation of both services, within the total number of customers, have varied considerably, which can be seen in the annual perspective both in Table Nº 44 of the Annex and in Graph Nº 12. On the other hand, quarterly, in the last two years, it can be observed that while in the first quarter of 2017 basic telephony had 92.5% of fixed telephony and VoIP subscribers the remaining 7.5%, in the fourth quarter of 2018, these percentages had varied to 89.8% and 10.2%, respectively. See Table Nº 45 of the Annex and Graph Nº 14.

If we analyze the grade of concentration in the fixed telephony market, which includes the services provided through the use of circuit-switching technology and VoIP, we must bear in mind the declaration of the Instituto Costarricense de electricidad (ICE) as the incumbent operator, especially due to the monopoly that still exists in the provision of the service through the first of these technologies. In this sense, the determination of the Herfindahl-Hirschman Index (HHI) for 2018 results in a value of 8,090 points, which does not differ significantly from the calculation (8,771 points) included in resolution RCS-261-2016 of November 23, 2016.

As provided in resolution RCS-261-2016, the HHI as a structural indicator shows that the entry of new competitors to the Costa Rican fixed voice communications market has had a slight impact on the rearrangement of the quotas specifically driven by the dynamism in the VoIP telephony service.

As a result of the behavior analyzed above, the penetration of the traditional basic telephony service in the country, measured as the percentage of total users with respect to the country's total population, shows a decreasing tendency. The reduction observed is 17.6 % in 2014 and 15.1 % in 2017, to 13.9 % in 2018. This means that it went from 176 traditional basic lines per thousand inhabitants to 139 lines per thousand inhabitants and that there was an annual reduction in this indicator of 2 percentage points. See Table Nº 46 of the Annex and Graph Nº 15.

On the contrary, the penetration of voice over the Internet protocol (VoIP) service continues to increase, in such a way that the 8.6 lines per thousand inhabitants at the end of 2014 became 13.6 in 2017 and 15.7 lines per thousand inhabitants in 2018. Thus, in 4 years this indicator practically doubled, reflecting the existing dynamics in the provision and assimilation of the user of this service through VoIP technology. See Table Nº 47 of the Annex and Graph Nº 16.

Graphs Nº 17 and Nº 18 show the distribution by operator of VoIP subscribers and their evolution over the last two years.

In this case, Cabletica, which showed the second highest participation in 2017 (32.9 %) became the operator with the highest number of subscribers (30.1 % in 2018, while Tigo reduced its participation from 33 % in 2017 to 27.5 % in 2018. A similar situation was experienced by Telecable; its shareholding reduced from 15,2 % to 12,4 % during the two-year period under consideration. Telefónica, on the other hand, went from absorbing 9.4 % of users in 2017 to 14.6 % in 2018. At the end of 2018, a total of 19 VoIP fixed telephony providers were active in the market, compared to 15 in 2014.

Fixed telephony also includes public telephony service, so it is important to analyze the number of public telephones available and their evolution over time. The information reflects a decrease in the number of public telephones, which went from 8,188 at the end of 2014 to 4,581 in 2018.

The reduction accentuated from 2013 onwards, so the number of public telephones available in 2018 represents 28 % of those installed in 2012 (16,348). A breakdown by geographical area of the location of these telephones at a national level and their quarterly evolution for the last year shows that 68 % of the devices are located in the metropolitan area (See Table Nº 48 of the Annex).

As mentioned in previous reports, the decrease in the number of public telephones is associated with the population's reduced need for this service, by virtue of the possibility of resorting to other communication options, particularly mobile telephony. See Table Nº 49 of the Annex and Graph Nº 19.

Traffic

Telephone traffic over fixed networks has been decreasing over time. While, 3,414 million minutes were transferred in 2014, by 2018 this traffic had decreased to 2,395 million minutes, equivalent to an average annual reduction of 8.8 %. Considering last year alone, the observed reduction (290 million minutes) represents a greater decrease (10.8 %) than the above-mentioned average reduction. The respective detail is shown in Table Nº 50 of the Annex and in Graph Nº 20. Contrary to the behavior shown by fixed telephony as a whole, primarily because of what happened with traditional

basic telephony, in regards to VoIP telephony service, the corresponding telephone traffic has increased over time with the consequent consolidation of the service, as shown in Table Nº 51 of the Annex, with which Graph Nº 21 is associated. In this sense, VoIP minutes went from 173 million minutes in 2014 to 395 million minutes in 2018, which is equivalent to an average annual growth of 22.9 %.

On the other hand, the growth of telephone traffic generated by VoIP operators in 2018 was 0.4 %. When considering quarterly data, specifically for the eight quarters corresponding to the last two years, it is evident the decreasing behavior shown by telephone traffic in the case of fixed telephony service in general, which has been decreasing repeatedly in each of the quarters analyzed as a result of the reduction of traffic generated through traditional basic telephony networks.

The corresponding data show that while in the first quarter of 2017 the transfer of minutes through fixed telephony reached 696 million minutes, in the first quarter of 2018, this telephone traffic had been reduced to 662 million minutes, a decrease equivalent to an average quarterly reduction of 1.3 %. An exception to this downward tendency is the case of the fourth quarter of 2017, when traffic increased by 1 % compared to the figure shown in the third quarter of the same year (658 million minutes). As for 2018, the observed decrease indicates that for the fourth quarter the minutes transferred reached 546 million minutes, which is equivalent to an average quarterly reduction of 4.7 %. See table Nº 52 in the Annex and Graph Nº 22.

In the VoIP service, the quarterly figures for the 2017-2018 period show an fluctuating behavior, so although there were increases in the fourth quarter of 2017 and in the first quarter of 2018, decreases predominated, this being the case for the second and third quarters of 2017 and the third and fourth quarters of 2018.

While the minutes transferred in the first quarter of 2018 were 12.9 % higher than those recorded in the first quarter of the previous year, the decantation in the fourth quarter was 68.9 % higher than that observed in the fourth quarter of 2017, despite the increase in the number of subscribers. See Table Nº 53 of the Annex and Graph Nº 23.

In relation to the VoIP service, the available information allows to obtain the percentage distribution of telephone traffic by operator. In this sense, the distribution corresponding to 2017 showed that the four operators with the highest traffic concentrated 84.2 % of the minutes transferred. The data for 2018 show a reduction in the proportion of these four operators (American Data, PRD, Millicom and Telefónica), which reaches 73 %. This lower participation of operators associated with higher telephone traffic is mainly related to the reduction in traffic of one of the dominant operators, a reduction which, due to its importance, also explains the lower growth of VoIP traffic during 2018: 0.4% as indicated above. The respective distributions are shown in graphs Nº 24 and Nº 25.

Finally, the average traffic per subscriber in traditional basic telephony in 2014 reached 3,925 minutes, while in 2018 this average had been reduced to 2,886 minutes, which is equivalent to an average annual decrease of 7.4 % for the period. Last year alone, there was a 5.7 % decrease. The opposite is true when it comes to VoIP service, whose average traffic per user has increased from 4,253 minutes in 2014 to 4,921 minutes in 2018, with an average annual increase of 3.7 %, despite a decrease of 15.6 % in the last year.

However, the highest figure does not correspond to 2018, but to 2017 (5,865 minutes), in accordance with the VoIP telephone traffic of that year, which, as

indicated above, corresponds to the highest recorded through this type of connection. In general, the average VoIP traffic exceeds the average traffic registered in the case of traditional basic telephony. See Graph Nº 26.

The discrepancy in the behavior of the average traffic of traditional basic telephony or VoIP, is consistent with the average revenues calculated in the Revenues section.

Revenues

According with the behavior in the numbers of subscribers and telephone traffic, revenues derived from the provision of fixed telephony service in general also show a declining behavior during the period analyzed (2014-2018).

While in 2014 fixed telephony generated 92,311 million colones, in 2018, the corresponding revenues were reduced to 72,565 million colones, that is, a decrease equivalent to 21.4 % in the four-year period under consideration (an average annual reduction of 5.8 %).

The year 2016 was an exception to this downward tendency, when the corresponding revenues (87,511 million) were 1.3% higher than in 2015 (86,363 million). The decrease in revenues accentuated in the 2017-2018 period, beingthe average reduction in those two years of 8.9 % and of 9.1 %, in the last year, alone. See Table Nº 54 in the Annex and Graph Nº 27.

As happened with the VoIP service with the number of subscribers and telephone traffic (analyzed below) and unlike the behavior shown by fixed telephony revenues in general and traditional basic telephony in particular, revenues have increased over time, going from 4,300 million colones in 2014 to 6,231 million colones in 2018. The increase is persistent over time, to such an extent that during the four-year period analyzed the average annual growth reached 9.7 %. It should be noted that last year's growth was 2.4 %. See Table Nº 55 of the Annex and Graph Nº 28.

For comparative purposes, by quarter and considering the last two years, it can be seen that fixed telephony revenues show a quarterly tendency that is also decreasing. The revenues in question decreased from 20,440 million colones in the first quarter of 2017 to 18,848 million colones in the first quarter of 2017 and to 17,338 million colones in the fourth quarter of 2018. These decreases are equivalent to quarterly average reductions of 2 % in 2017 and 2.9 % in 2018. In general, the quarterly data for 2017 are higher than those for the following year. See Table Nº 56 in the Annex and Graph Nº 29.

For its part, VoIP service revenues for the eight quarters between 2017 and 2018 do not show a definite tendency over time. Indeed, these revenues tended to decrease in the second quarter of 2017 (1,476 million colones) compared to those of the previous quarter (1,546 million colones for a quarterly reduction of 4.5 %), with increases in the following two quarters (2.2 % in the third quarter and 3.2 % in the fourth quarter of 2017).

Quarterly revenues in 2018 were stable, ranging from 1,550 million colones in the first quarter to 1,570 million colones in the second quarter and 1,558 million colones in the fourth quarter. In percentage terms, the average variations were null; in other words, the reductions observed in certain quarters were compensated by the resulting increases in other quarters. See Table Nº 57 in the Annex and Graph Nº 30.

The available information, of revenues and the number of subscribers, allows to obtain the average revenues that each user generates for these operators (ARPU).

When considering both fixed telephony in general and traditional basic telephony together, the corresponding calculations show very similar average annual revenues

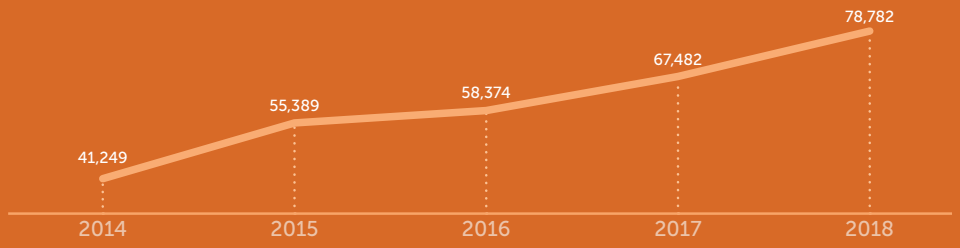
per subscriber for the first four years analyzed (2014-2017). The corresponding value in those years fluctuated between 98,000 and 106,000 colones during that period with an average annual reduction of 0.8 % and 4.4 % in the last year.

In 2018, while the average revenues of fixed telephony service as a whole were 93,717 colones, that of traditional basic telephony reached 95,373 colones. In the case of this type of connection, the average annual tendency is a decrease of 0.3 % for the 2014-2018 period and 3.4 % in 2018. See Table Nº 58 of the Annex, which also includes the resulting figures in the case of the VoIP service.

For VoIP, on the other hand, revenues per subscriber have shown a downward tendency, to such an extent that from a value of 104,368 colones in 2014 it went on to 79,091 colones in 2018, i.e. a decrease of 24.2 % in the period. Annually the average reduction is 6.7 % growth, being 12.3 %in the last year. See Graph Nº 31.

The available information allows obtaining the average revenue per minute both for the traditional basic telephony service and for VoIP. The resulting values, included in Table Nº 59 of the Annex, show that, except for 2017, there is a sustained decrease in the average price paid by VoIP service users, which is explained by the loss of relevance of the international telephony service (decrease in both traffic and average price per minute) and because the increase in the number of customers has not been proportional to the traffic generated by each of them, coupled with a reduction in the average price per minute, which is also explained by greater competitive dynamism in this segment. The average price fell from 25 colones in 2014 to 16 colones in 2018. In the case of traditional basic telephony, the resulting average price shows a growing tendency, going from 27 colones to 33 colones in the same five-year period. The dominance of the latter means of connection within the fixed telephony service has the effect of bringing the average prices of the service as a whole closer to those of traditional basic telephony. See Graph Nº 32.

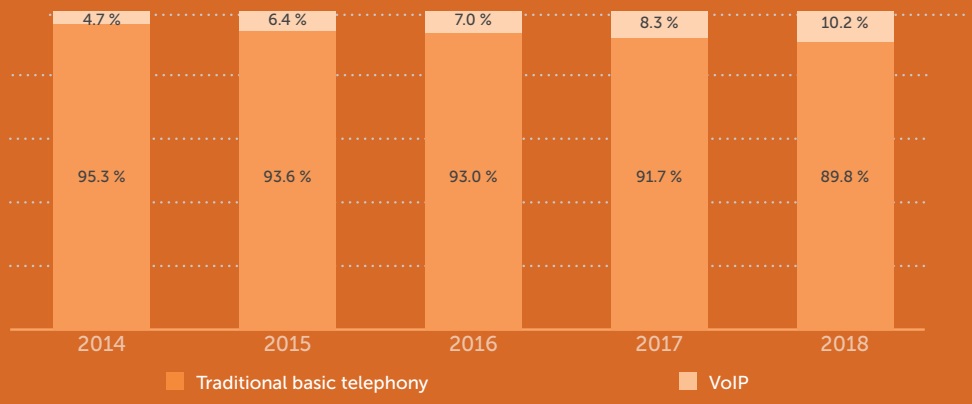
Graph Nº 12.
Costa Rica. VoIP subscribers, 2014 – 2018
(Figures at the end of each year)



The number of VoIP users continues to grow and now exceeds 10 % of the total number of fixed telephony customers.

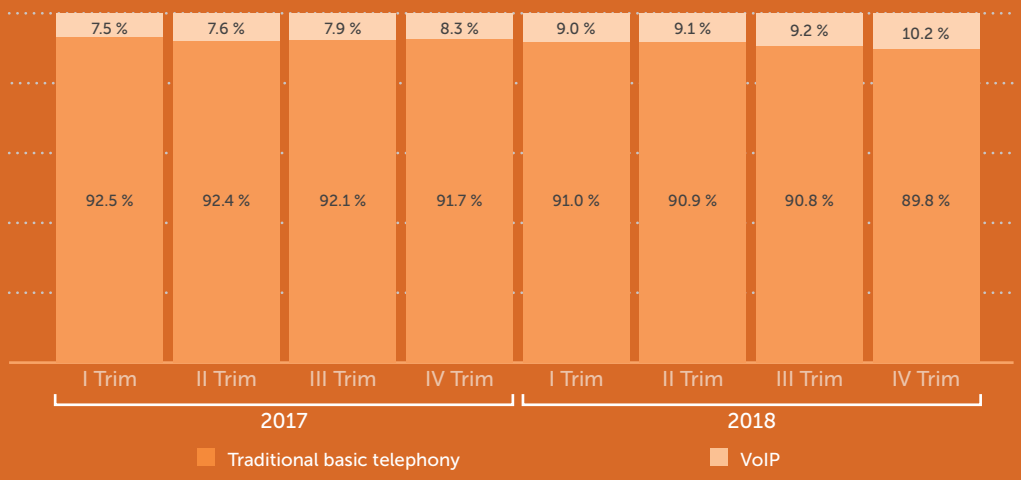
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 13.
Costa Rica. Percentage distribution of traditional basic telephony and VoIP subscriptions, 2014 – 2018
(Figures at the end of each year)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

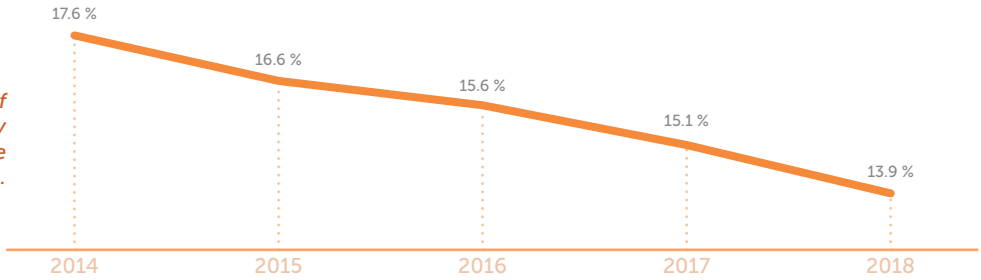
Graph Nº 14.
Costa Rica. Distribution of percentage traditional basic telephony and VoIP subscriptions, 2017 – 2018
(Figures at the end of each quarter)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

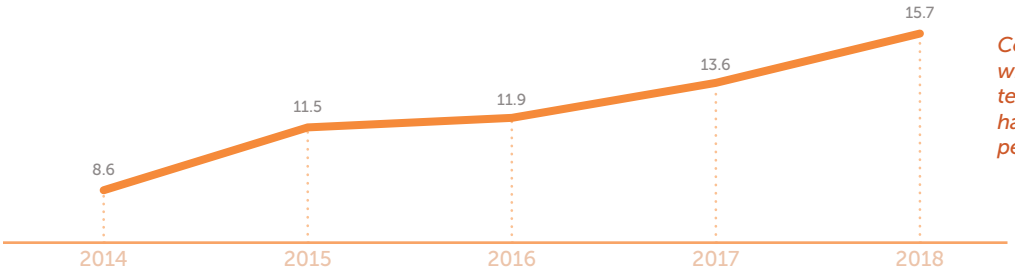
Graph Nº 15.
Costa Rica. Penetration of traditional basic telephony, 2014 – 2018
(Connections regarding total population and figures in percentages)

A decreasing number of users of the traditional basic telephony service reduced service penetration to 13.9 % in 2018..



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

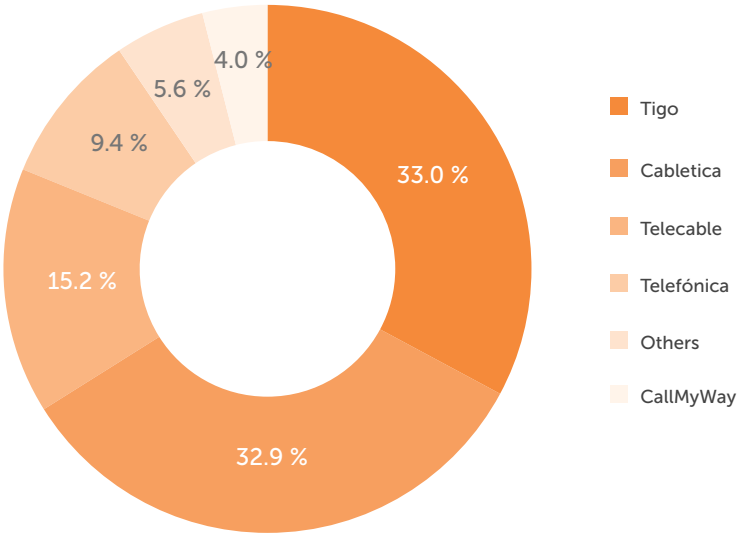
Graph Nº 16.
Costa Rica. Penetration of VoIP service, 2014 – 2018
(Connections for every thousand inhabitants)



Contrary to what happens with traditional basic telephony, the VoIP service has experienced growth in penetration.

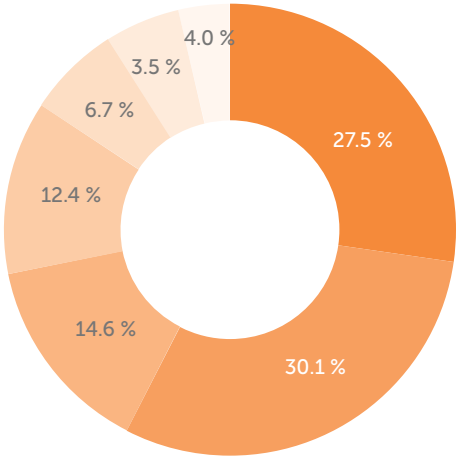
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 17.
Costa Rica. Distribution by operator of VoIP subscribers, December 2017.
(Figures in percentages)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 18.
Costa Rica. Distribution by operator of VoIP subscribers, December 2018.
(Figures in percentages)

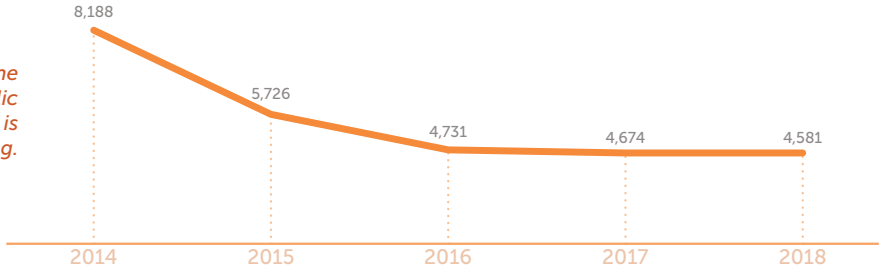


According to the number of subscribers, the VoIP service market is dominated by 4 operators: Tigo, Cabletica, y Telecable and Telefónica

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 19.
Costa Rica. Public telephones, 2014 – 2018
(Figures at the end of the year)

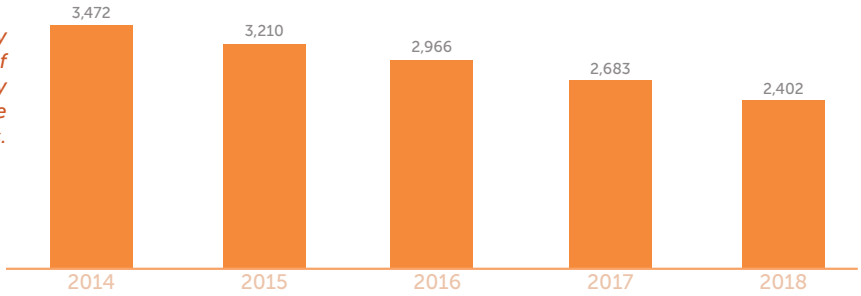
In Costa Rica, the availability of public telephones is decreasing.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

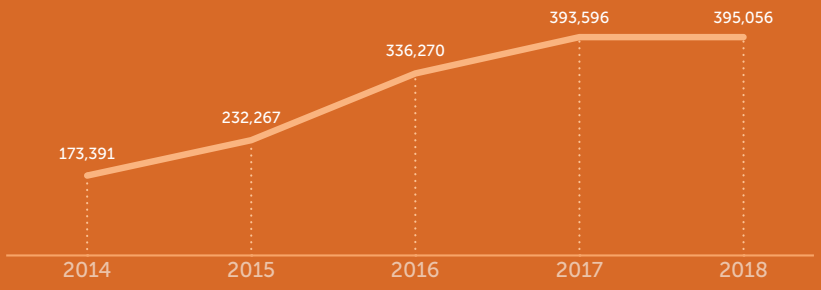
Graph Nº 20.
Costa Rica. Fixed telephony traffic, 2014 – 2018
(Millions of minutes per year)

In line with tendency observed with the number of subscribers, fixed telephony traffic has decreased in the last four years.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

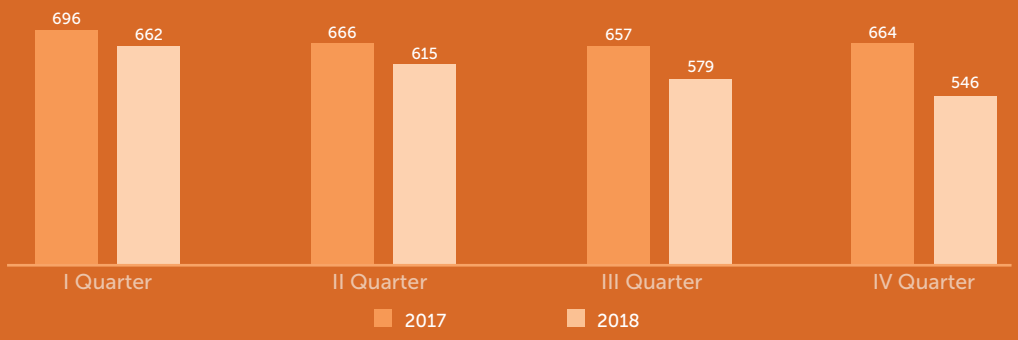
Graph Nº 21.
Costa Rica. VoIP traffic, 2014 – 2018
(Millions of minutes per year)



VoIP traffic tended to stabilize in 2018, after continuous growth.

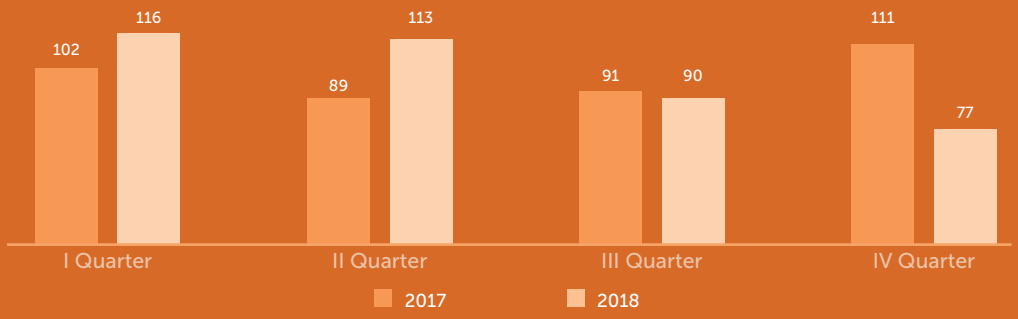
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 22.
Costa Rica. Fixed telephony traffic, 2017 – 2018
(Quarterly figures in millions of minutes)



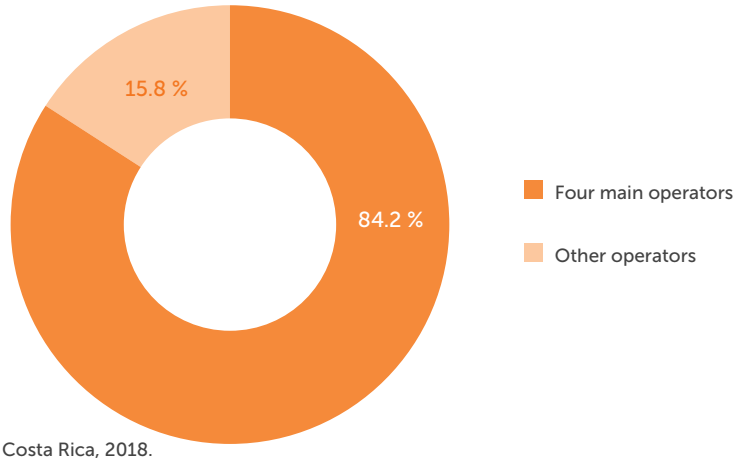
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 23.
Costa Rica. VoIP traffic, 2017 – 2018
(Quarterly figures in millions of minutes)



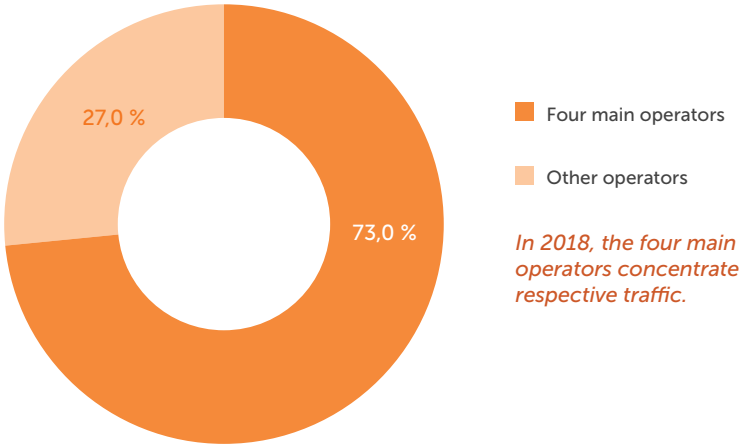
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 24.
Costa Rica. Percentage distribuition of VoIP traffic by provider, 2017



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 25.
Costa Rica. Percentage distribuition of VoIP traffic by provider, 2018

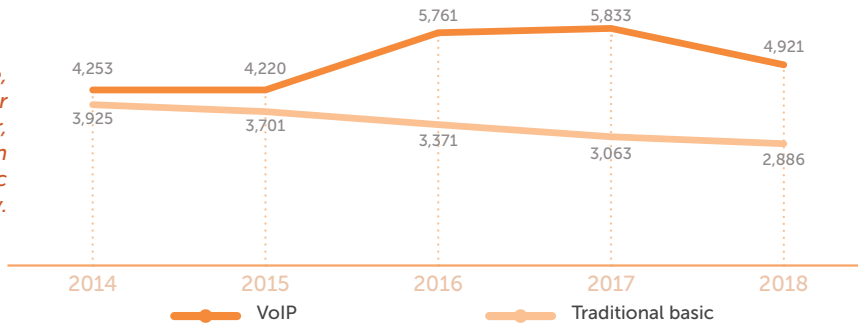


In 2018, the four main VoIP operators concentrate 73 % of the respective traffic.

Source: Sutel, Directorate General for Markets, Costa Rica, 2018.

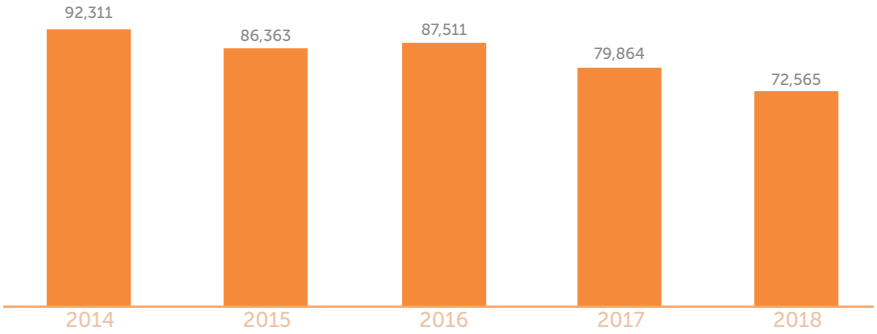
Graph Nº 26.
Costa Rica. Average traffic per fixed telephony subscriber by connection type: traditional basic and VoIP, 2014 – 2018
(Figures in minutes)

In the case of VoIP service, the average traffic per subscriber is higher, compared to that shown by traditional basic telephony.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 27.
Costa Rica. Fixed telephony revenues, 2014 – 2018
(Figures in millions of colones)

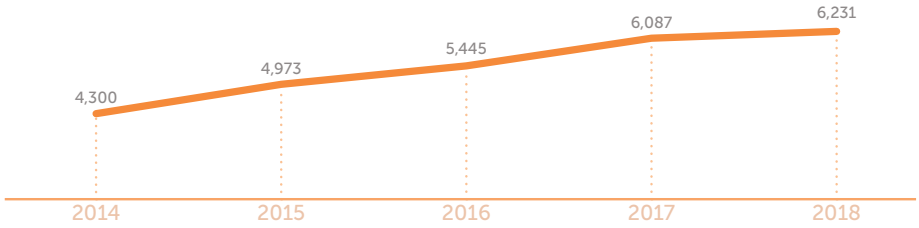


The reduction in the number of subscribers and traffic in fixed telephony have led to a reduction of the corresponding revenues over time.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

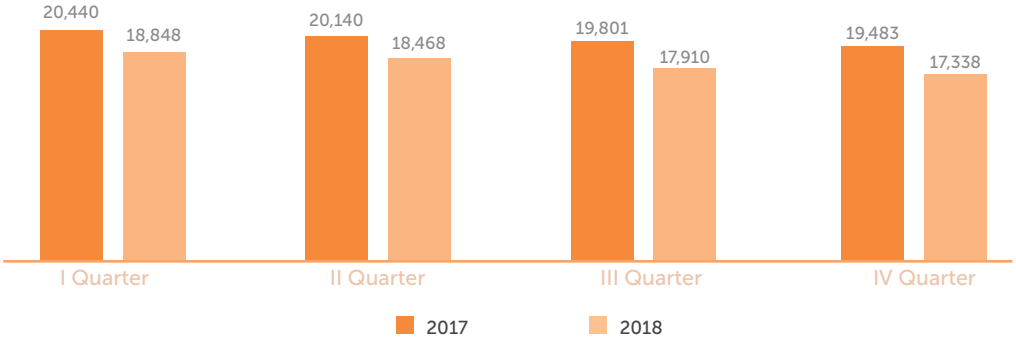
Graph Nº 28.
Costa Rica. VoIP telephony revenues, 2014 – 2018
(Figures in millions of colones)

Since the market opened, VoIP telephony revenues have shown continued growth.



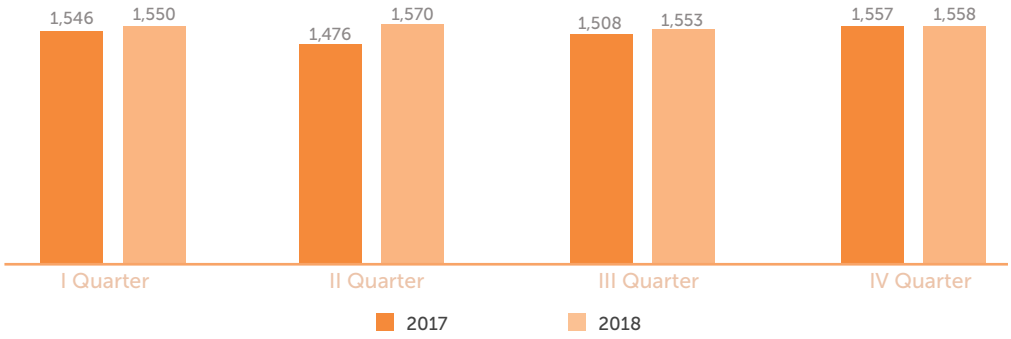
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 29.
Costa Rica. Fixed telephony revenues, 2017 – 2018
(Quarterly figures in millions of colones)



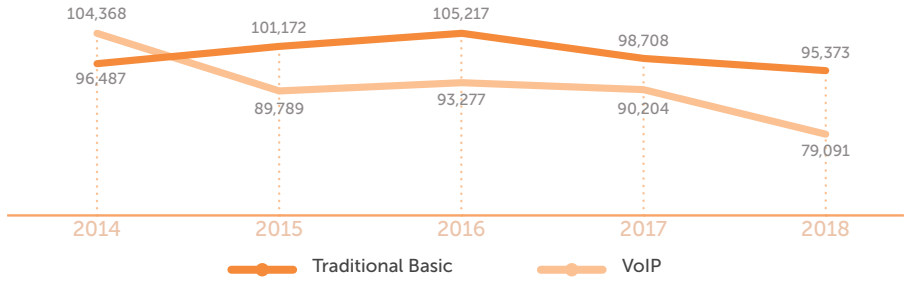
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 30.
Costa Rica. VoIP telephony revenues, 2017 – 2018
(Quarterly figures in millions of colones)



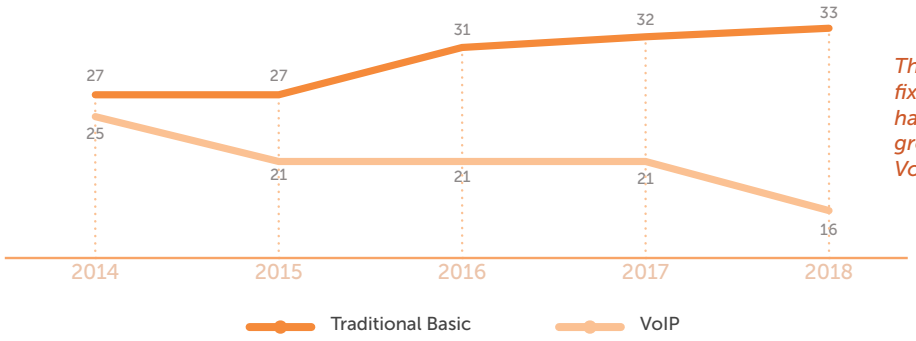
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 31.
Costa Rica. Average revenue per fixed telephony subscriber by connection type: traditional basic and VoIP, 2014 – 2018
(Annual figures in colones)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 32.
Costa Rica. Average revenue per minute fixed telephony by connection type: traditional basic and VoIP, 2014 – 2018
(Figures in colones per minute)



The average revenue per fixed telephony subscriber has been reduced, with a greater decrease in the VoIP service.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Pablo Víquez,
horse trainer on the slopes of Poás Volcano in Poasito,
Alajuela.

MOBILE TELEPHONY

Postpaid subscriptions grow 8 %

3
prepaid subscriptions for each postpaid

170 %
mobile penetration

Average of postpaid minutes is **4 times** the prepaid

Mobile Telephony

Subscriptions

At the end of 2018, 8,495,585 subscriptions were registered (see Graph N° 33), representing a 4 % decrease compared to the previous year (8,840,342). This downward behavior is recorded for the second time since the beginning of Sutel's measurements in 2010 (the first occurred in 2014, with a 1 % reduction).

This behavior is consistent with the global situation of the country's telecommunications sector, which has a level of maturity in which the internal competitive dynamics before the achieved business volume becomes one of the most relevant growth tools. In other words, these are markets in which the volume of subscriptions does not constitute the differentiating element but rather the added value offered to end users in terms of satisfying their needs.

Mobile telephony penetration in 2018 was 169.8 %, which is 8.9 percentage points below that of 2017 (the year in which the highest number of subscriptions were registered) and similar to 2016, showing little variability, as a result of the market's maturity (see Graph N° 33).

It is important to observe the consumer's movement in terms of payment methods (see Graphs N. 34, N° 36 and N° 37), since the postpaid modality increases its participation until closing 2018 with 26 % (the highest since 2012, see Annex N° 61). On the other hand, the prepaid modality registered a complementary 74 %, maintaining its downward tendency that started in 2013 when it represented 83 % of the total subscriptions (see Annex N° 61).

At a quarterly level it is observed that the growth of postpaid subscriptions has been maintained since the II quarter of 2017 (see Graph N° 35).

Regarding the market's distribution by operator, Kölbi absorbed 53.6 % followed by Movistar with 26.6 %, Claro with 19.2 % and virtual operators that together closed with 0.6 %. Kölbi and Movistar increased their participation compared to 2017 (see Graphs N° 38 and N° 39).

The above participations result in the HHI[33], Herfindahl-Hirschman Index reaching 3,954 points in 2018 (see Graph N° 40).

Traffic

Voice minute traffic dropped 8 % compared to 2017 (see Graph N°41), mainly due to the reduction in the number of subscriptions and also to the fact that consumers use this service less and less to make calls (see Graph N° 43). As an example of the change in the habits of users that are not only due to changes in the competitive dynamics of operators (packages, promotions, among others), but also to the use of other means for voice transmission, we have for example that the consumption of minutes per subscriber went from 64 minutes per month in 2017 to 62 minutes in 2018. This difference is even more accentuated if we compare the figures of 2018 with those of 2014, when an average of 107 minutes per month per user were registered. This leads to the assumption that the user could be selecting other alternatives to communicate by voice, such as applications such as WhatsApp and Skype. However, an important fact that marks 2018 is that the ratio between postpaid and prepaid traffic reaches its highest ratio with

[33] The HHI for 2016 (year when the mobile telecommunications service was declared in competition conditions) was of 3,891 points.

3.9 minutes compared to 3.5 minutes in 2017, this figure contrasts with 2014, which closed with a ratio of 2,2. In other words, for each prepaid minute almost 4 of the postpaid modality are consumed (even though the participation of postpaid subscriptions is one third of prepaid). In absolute terms in 2018 an average postpaid consumer consumes 137 minutes monthly while prepaid 35 in the same period.

As for the destination of the calls (see Graph N° 44), the behavior remains similar since 2014, where the traffic generated in calls to mobiles on net prevails with 50.43 %, followed by off net mobile with 27.84 %, fixed numbers with 17,43 % and international calls 4.29 %.

International call traffic increased by 8 % in 2018 while voice roaming traffic grew 25 % compared to 2017, despite mobile applications that exist as possible substitutes. (see Graphs N° 45 and N° 46). This can be supported by the commercial instruments that operators use in order to generate greater profitability from their networks, such as promotional packages with minutes to other countries charged at local rates.

Finally, SMS messaging traffic has shown a downward tendency of 34 % per year since 2014 (-29 % compared to 2017), while multimedia messaging (MMS) practically disappeared from the mobile telephony market in 2018 (see Graphs N° 47 and N° 48). This translates into average monthly consumption per user of 47 SMS and 29 MMS (see Graph N° 49).

In general terms, total consumption (measured in minutes) decreased 8 % with respect to 2017, supported by a decrease of 4 % of postpaid and 15 % of prepaid, resulting in an increase in the gap in minutes per user per month between these modalities (3.9 postpaid minutes for each prepaid minute).

Revenues

Mobile telephony revenues including outbound and inbound national, international voice, SMS, MMS, (excludes roaming and mobile data), show a downward tendency since 2015 (-2 % per year on average).

However, 2018 presented its biggest annual reduction with 4 % compared to 2017 reaching 333,466 million colones, after a sustained decrease in the consumption of voice minutes since 2015 (see Graph N° 50) This is observed when analyzing in 2018 the revenues per quarter that were always below that recorded in the same period of 2017 (see Graph N° 51).

This behavior is congruent with the reduction of subscribers presented in 2018 and the decrease in the prices of this market of 3.38 percentage points with respect to the closing of 2017 (see price index of mobile telecommunications Graph N° 144, in the prices and commercial offers section).

A fact that characterizes mobile telephony revenues is that the share of voice revenues is the component that contributes the most with 97.1 %, and SMS and MMS messaging 2.9 % (see Graph N° 52). The measurement of revenue per user shows that a subscription contributes approximately 3,271 colones per month, of which only 94 colones is from messaging and the rest from voice (this calculation excludes revenue from mobile data). It is important to point out that, in spite of the reduction registered, this average value per user remained practically similar to 2017 (see Graph N° 53).

Voice roaming revenues increased by 5 % as a result of a 25 % increase in traffic. While roaming revenue from messaging, decline since 2017 to an average of 18 % per year, reaching its lowest figure of 4,037 million colones in 2018 (see Graphs N° 54 and N° 55).

If mobile telephony revenue is added to mobile data revenue in order to estimate the total revenue generated by the mobile network, for the first time there is a decrease of -0.3 % compared to 2017, recording an amount of 553,661 million colones. This is due to the fact

that data revenues, although they increased by 6 % in the last year, present a deceleration (see details in the mobile Internet section), together with the decrease in voice-related revenues (see Graph N° 56).

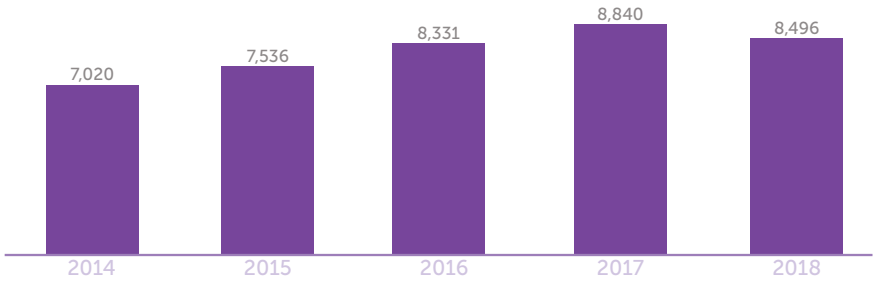
Mobile data continues to grow in importance, from 37 % in 2017 to 40 % in 2018, while voice drops from 61 % to 58 % and messaging remains at 2 %. It is important to indicate that the totality of the mobile network revenue is collected mainly by the postpaid modality that represented 66 % in 2018. This behavior has been increasing since 2014 year in which they represented 43 % (see Graph N° 57). This is reflected when analyzing the average monthly revenues of a postpaid user that contributes 13,746 colones per month, while a prepaid 2,506 colones, that is, 5.48 colones postpaid per user per month are generated for each colon in the revenues of the mobile network associated to prepaid (see Graph N° 58).

Portability

The year 2018 presented the second largest growth of successful portabilities since its beginning in 2014 (see Graph N° 59), with an increase of 65,776 compared to 2017, 17.5 % more.

With these data, the increasing use is reaffirmed for the benefit of the user by having the option of moving with his number to the operator that best satisfies his preferences and needs, as well as reinforcing the existing competitive dynamics in the mobile service in general.

Graph Nº 33.
Costa Rica. Subscriptions to mobile telephony service, 2014 – 2018.
(Annual figures in thousands)

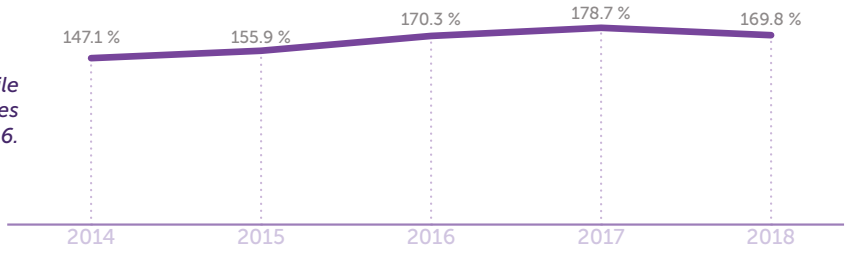


Subscriptions decreased 4 % compared to 2017, something that had not occured since 2014.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

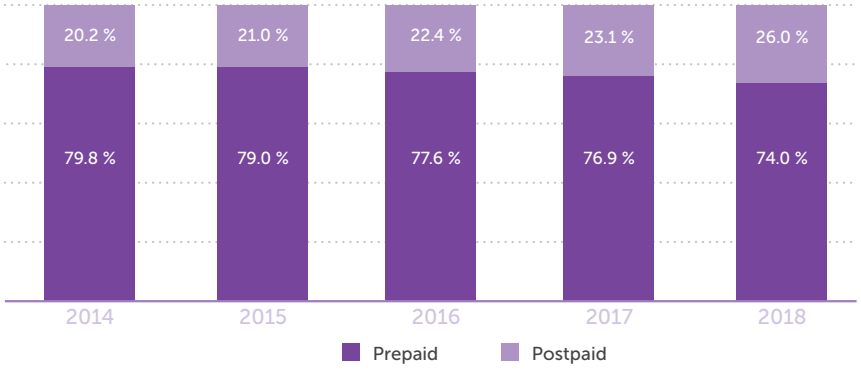
Graph Nº 34.
Costa Rica. Subscriptions to mobile telephony service per each 100 inhabitants, 2014 – 2018
(Annual figures in percentage)

In 2018, mobile penetration reaches levels similar to 2016.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

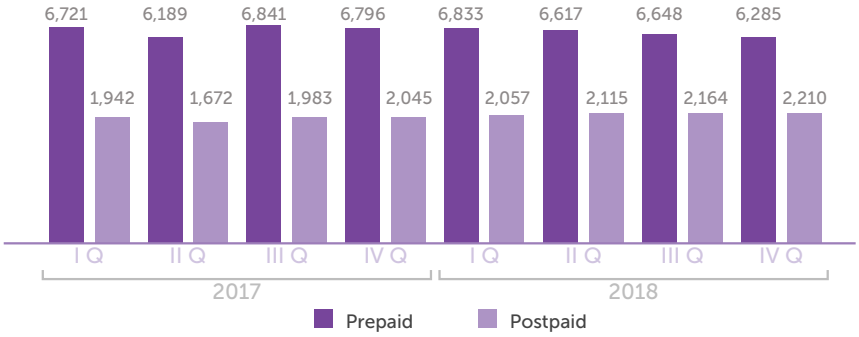
Graph Nº 35.
Costa Rica. Subscrition distribuition to mobile telephony service per form of payment, 2014 – 2018.
(Figures in annual percentage)



The postpaid modality shows its highest participation in the mobile telephony market since 2014.

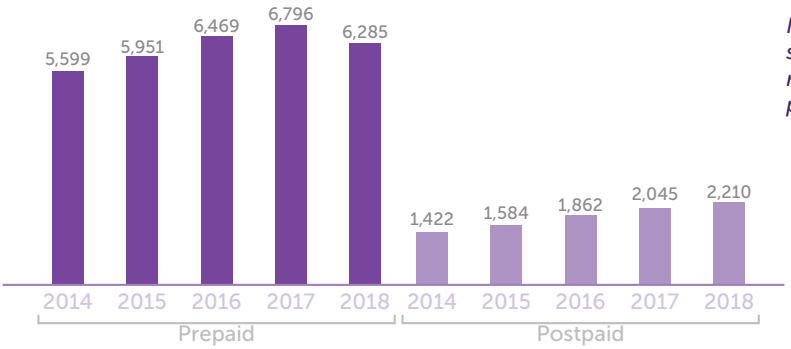
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 36.
Costa Rica. Subscriptions to mobile telephony service per form of payment, 2017 and 2018.
(Quarterly figures in thousands)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 37.
Costa Rica. Subscriptions to the mobile telephony service per form of payment, 2014 – 2018
(Annual figures in thousands)

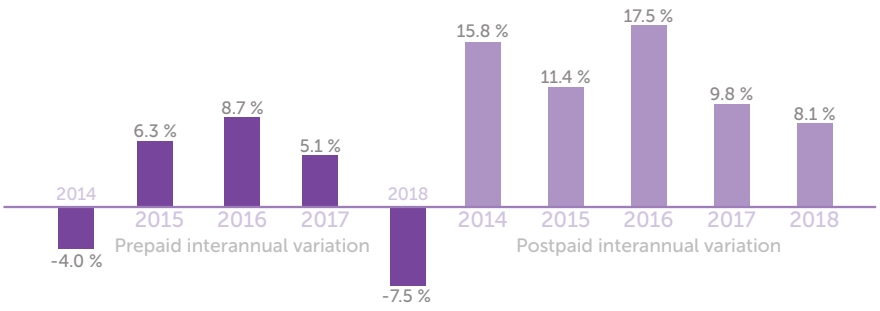


In 2018, 2.8 prepaid subscriptions are recorded for every postpaid subscription.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

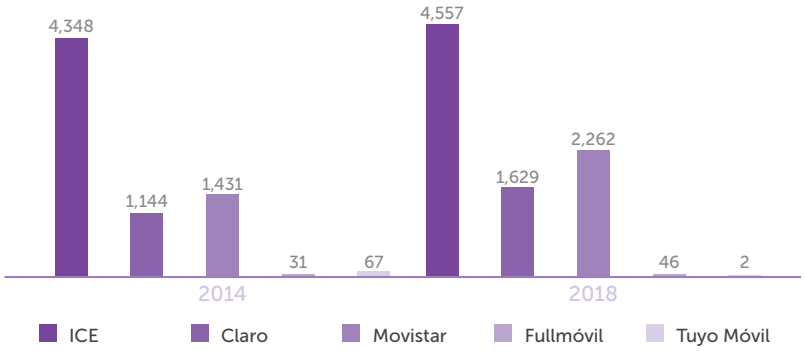
Graph Nº 38.
Costa Rica. Annual growth rate of subscritions to mobile telephony service, per form of payment, 2014 – 2018
(Annual figures in percentages)

In 2018, prepaid subscriptions showed a 7.5 % reduction compared to 2017, on the contrary, postpaid increased 8.1 %.



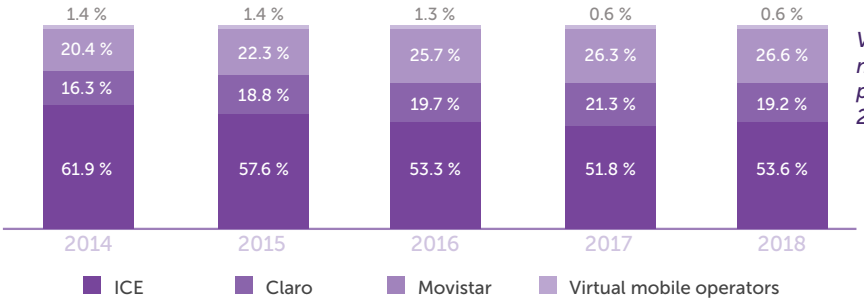
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 39.
Costa Rica. Subscriptions to mobile telephony service per operator, 2014 and 2018
(Annual figures in thousands)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

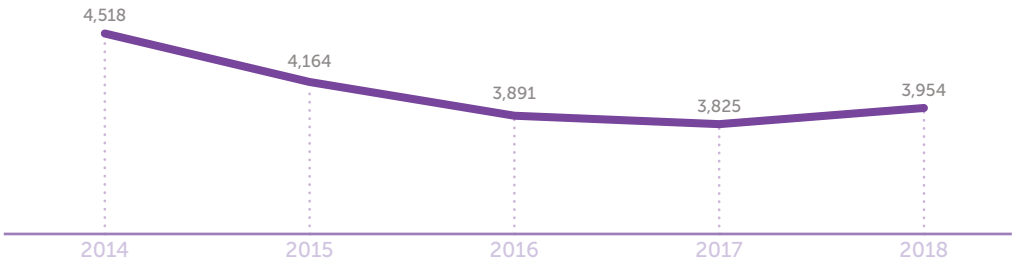
Graph Nº 40.
Costa Rica. Distribuition of subscriptios to mobile telephony by service per operator, 2014 -2018
(Annual figures in percentages)



Virtual mobile operators maintained their participation compared to 2017.

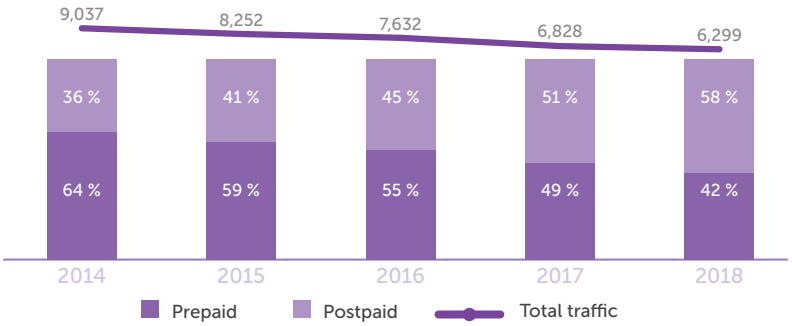
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 41.
Costa Rica. Evolution of the HHI per year, 2014 -2018
(Annual figures in percentages)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

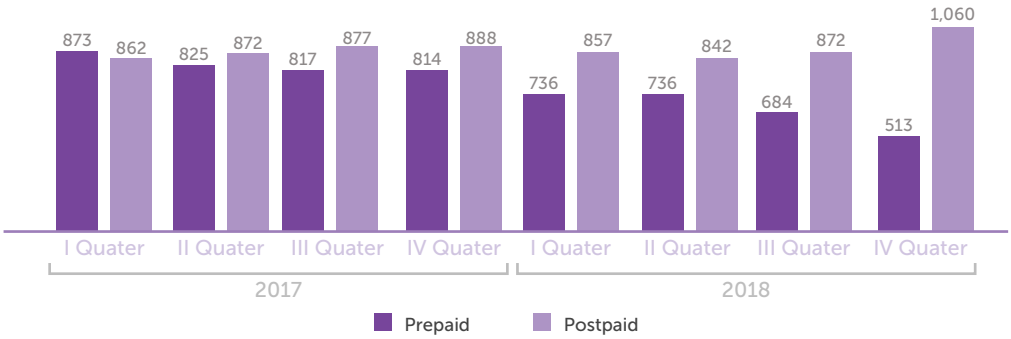
Graph Nº 42.
Costa Rica. Total traffic of mobile[1] telephony service and its percent distribution per form of payment, 2014 – 2018
(Figures in millions of minutes and percentages)



In 2018, postpaid voice traffic reaches its highest participation since 2014.

Note: [1/]Only includes national and international voice minutos, excludes roaming.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

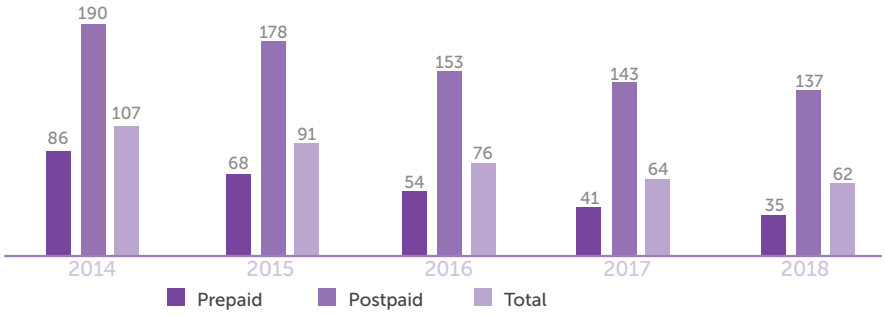
Graph Nº 43.
Costa Rica. Total traffic of mobile telephony service per form of payment, 2017 and 2018.
(Quarterly figures in millions of minutes)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

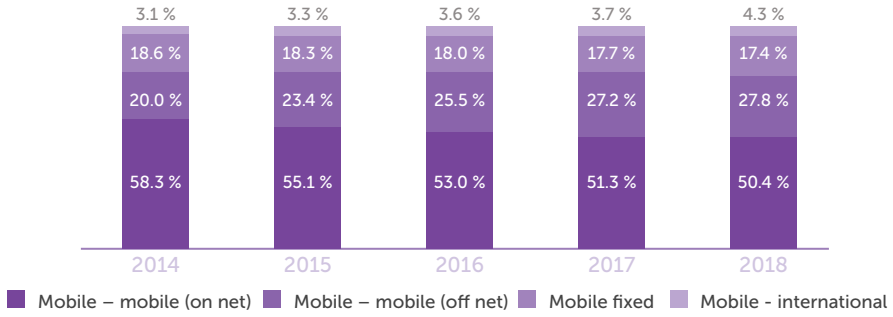
Graph Nº 44.
Costa Rica. Monthly average voice traffic per subscriber per form of payment, 2014 – 2018
(Annual figures in minutes per month per subscriber)

In 2018, a postpaid average subscriber consumes 3.9 times more than a prepaid average subscriber.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 45.
Costa Rica. Distribution of total voice traffic associated to the mobile telephony service by destination[1], 2014 - 2018
(Annual figures in percentages)

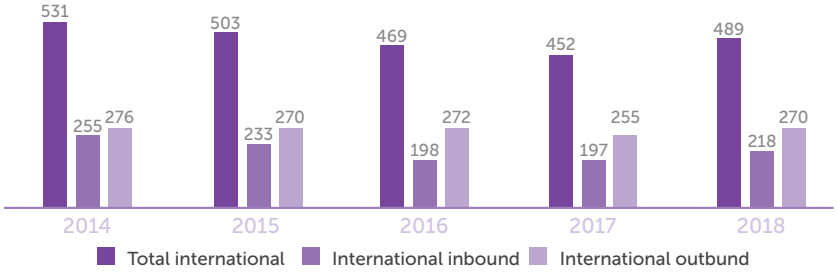


The mobile traffic with on net destination reaches its lowest participation since 2014 (50.4 %)

Nota: [1]/Only includes national and international voice minutes, excludes roaming.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

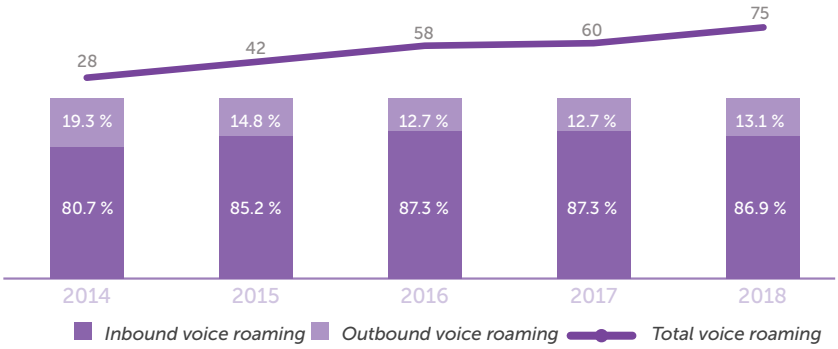
Graph Nº 46.
Costa Rica. Total International traffic associated to the mobile telephony service, 2014 – 2018
(Annual figures in millions of minutes)

The total international traffic increased 8 % compared to 2017.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 47.
Costa Rica. Total and percent distribuition of voice roaming traffic associated to the mobile telephony service, 2014- 2018
(Annual figures in millions of minutes and percentages)

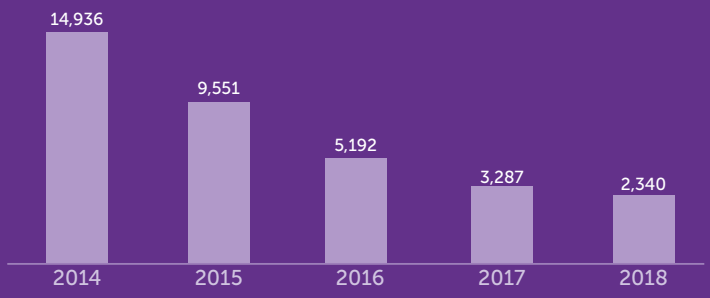


Behavior of voice roaming traffic increases 28 % every year since 2014.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

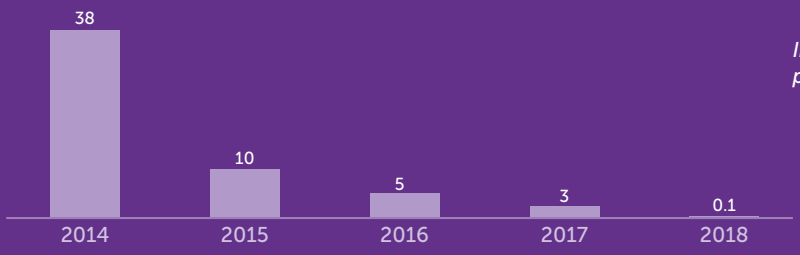
Graph Nº 48.
Costa Rica. Total SMS traffic 2014- 2018
(Annual figures in millions of messages)

SMS Traffic decreased 28,8 % compared to 2017.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

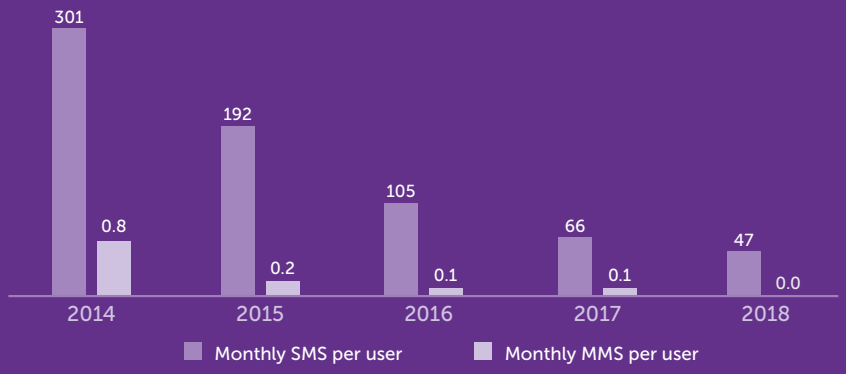
Graph Nº 49.
Costa Rica. Total MMS traffic, 2014 - 2018
(Annual figures in million of messages)



In 2018, the MMS traffic practically stops.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

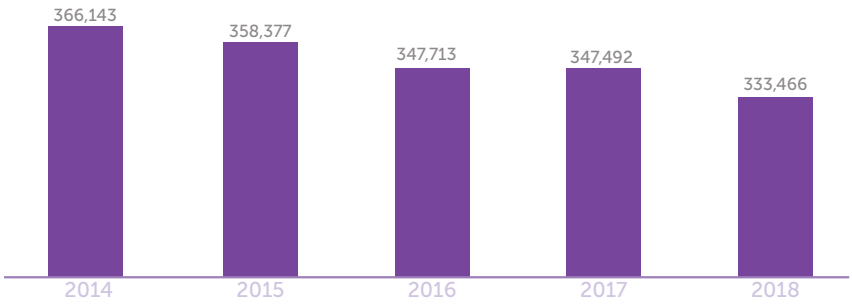
Graph Nº 50.
Costa Rica. Monthly average traffic per user by type of messaging, 2014 – 2018
(Figures in number of messages)



In 2018, the average amount of monthly consumption per user in SMS decreased by 24 % compared to 2014.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

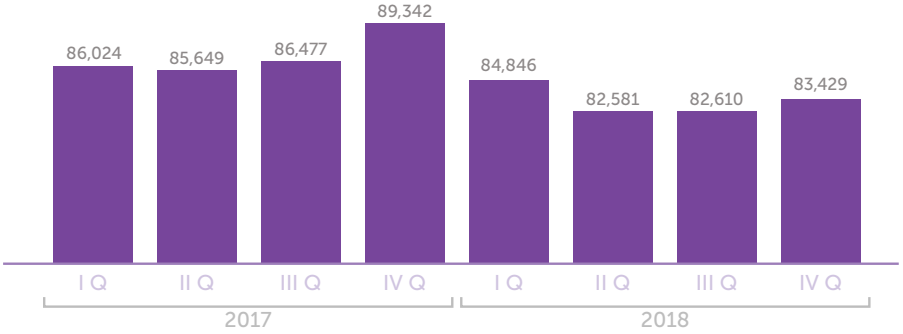
Graph Nº 51.
Costa Rica. Total revenues of the mobile telephony service[1], 2014 – 2018
(Annual figures in millions of colones)



The income from mobile telephony decreased 4 % compared to 2017.

Nota: [1]/Does not include mobile data or roaming.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

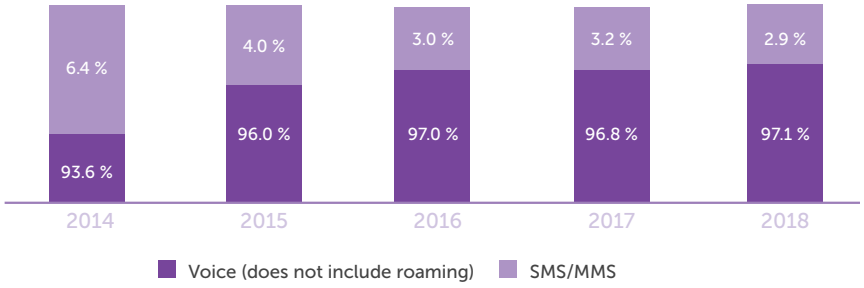
Graph Nº 52.
Costa Rica. Total revenues from the mobile telephony service[1], 2017 – 2018
(Quarterly figures in millions of colones)



Nota: [1]/Does not include mobile data or roaming.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 53.
Costa Rica. Distribution of the total revenues associates to the mobile telephony service by component, 2014 – 2018
(Annual figures in percentages)

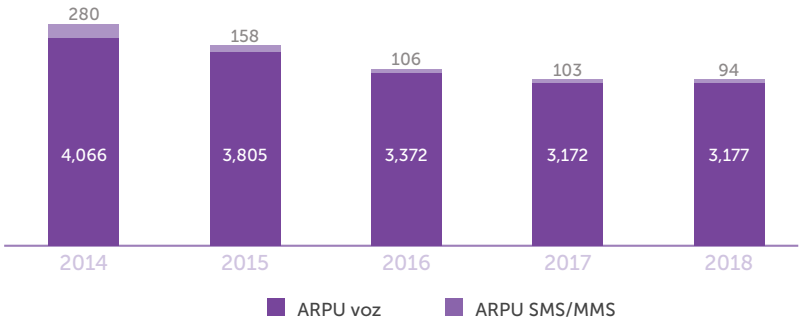
The participation of the components in the revenues from mobile telephony remain the same since 2015.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

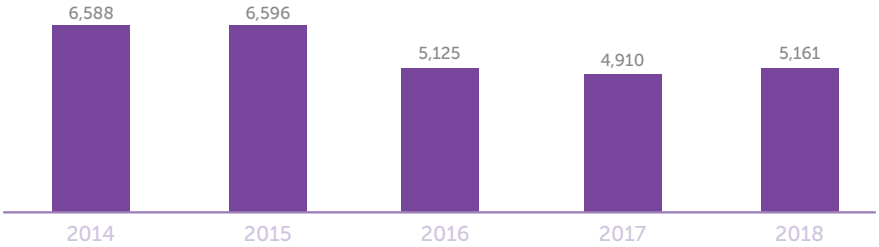
Graph Nº 54.
Costa Rica. Monthly average revenues per mobile telephony service subscriber[1], by component, 2014 – 2018.
(Figures in colones)

The monthly average revenues from voice per mobile telephony service user practically remained the same through 2017, while that from SMS/MMS reaches its lowest level since 2014.



Nota: 1/Includes income from mobile voice, messaging and mobile data; does not include roaming.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 55.
Costa Rica. Total revenues from voice roaming, 2014 – 2018
(Annual figures in millions of colones)

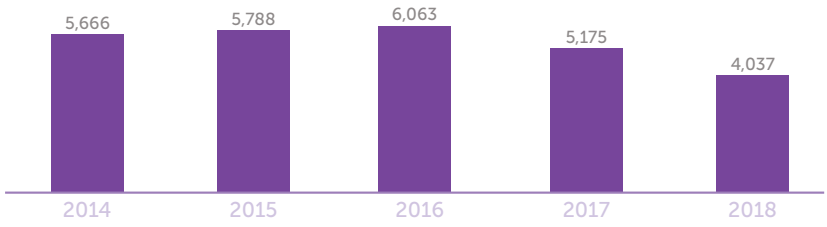


The revenues from voice roaming increased 5 % compared to 2017.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

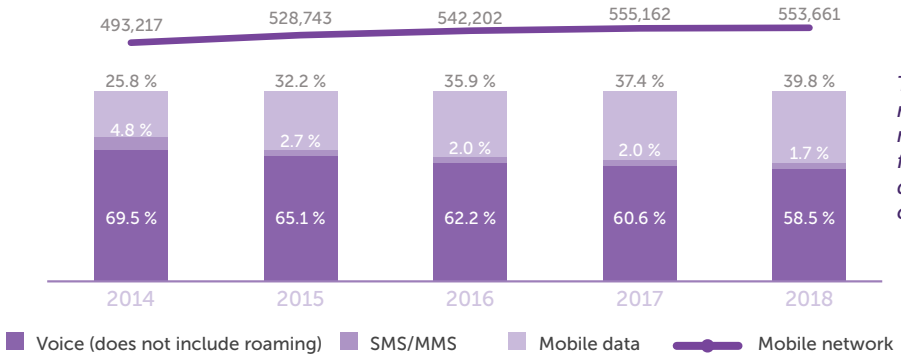
Graph Nº 56.
Costa Rica. Total revenues from SMS/MMS roaming and data, 2014 – 2018
(Annual figures in millions of colones)

The revenues from SMS/MMS roaming and data reach their lowest level since 2014.



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 57.
Costa Rica. Distribution of total revenues associated to the mobile network service by component, 2014 – 2018
(Annual figures in percentages and millions of colones)

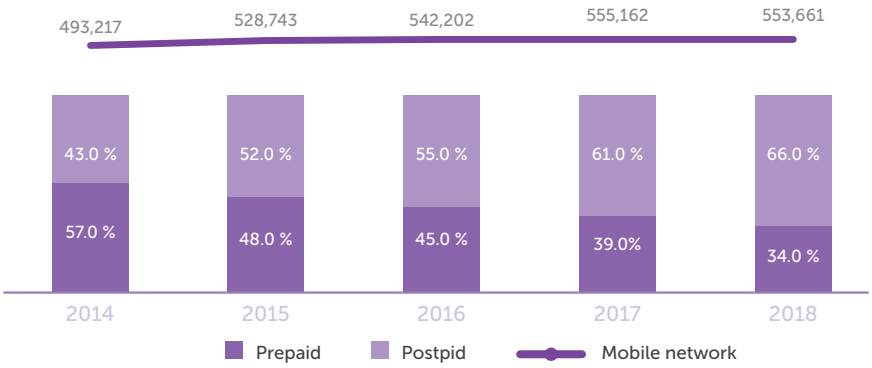


The monthly average revenues per user in mobile network undergo for the first time a decrease (-0.3 % compared to 2017).

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 58.
Costa Rica. Distribution of the total revenues associated to the mobile network[1], per form of payment, 2014 – 2018
(Annual figures in percentages)

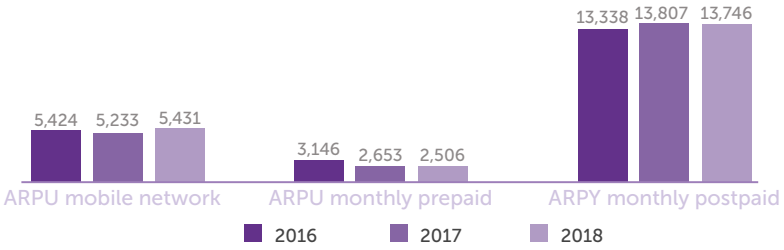
Postpaid reaches its highest participation in revenues from mobile network during the last five years (66 %).



Nota: [1]/Includes income from voice, messaging and mobile data; does not includes roaming.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

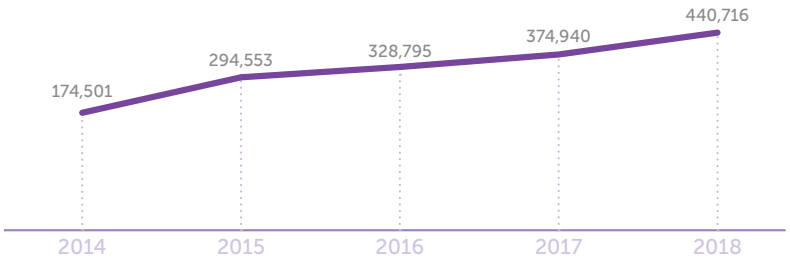
Graph Nº 59.
Costa Rica. Monthly average revenues per mobile network subscriber[1] per form of payment, 2016 – 2018
(Figures in colones)

The revenues from prepaid subscriber in the mobile network reach their lowest level since 2016 (2,506 colones).



Nota: [1/]The average revenue per subscriber (ARPU), includes revenues from incoming and outgoing mobile voice at a national and international level, national and international SMS/MMS and mobile data, excludes revenues from roaming (voice, SMS/MMS and data)..
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

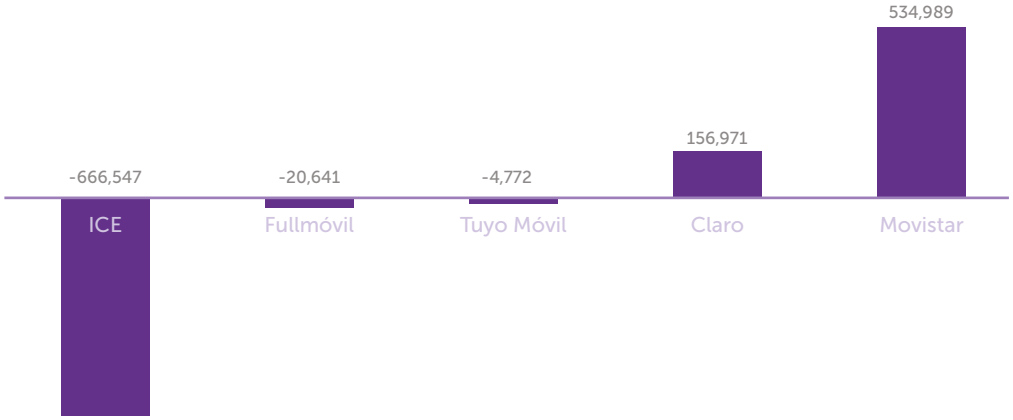
Graph Nº 60.
Costa Rica. Successful annual porting[1] 2014 – 2018
(Annual figures)



2018 showed the second highest increase in successful porting (17.5 %) since 2014.

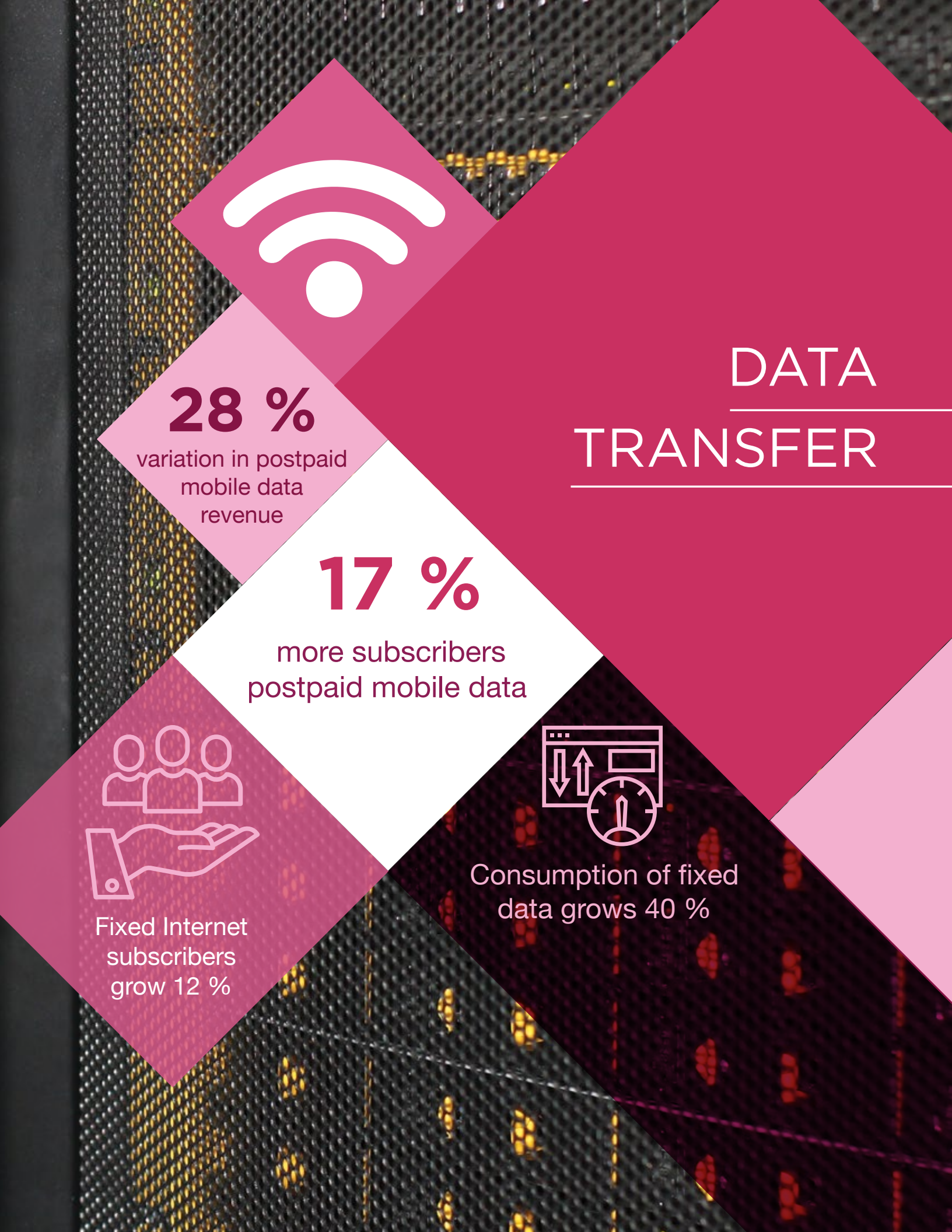
Nota: [1/]Successful portings: number of portings that were finally activated in the new operator's network.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Gráfico Nº 61.
Costa Rica. Net porting[1] by operator, December 2013 – December 2018.
(Accummulated figures)



Nota: [1/]Net porting: numbers imported minus the numbers exported.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

CODISA Data Center, Llorente de Tibás.



DATA TRANSFER

28 %
variation in postpaid mobile data revenue

17 %
more subscribers postpaid mobile data

Fixed Internet subscribers grow 12 %

Consumption of fixed data grows 40 %

Data Transfer

Mobile Internet

Subscriptions

The number of Internet users through mobile devices has been increasing since the liberalisation and subsequent appearance of new competitors in the market that, by expanding their offer, manage to dynamize the market and capture a greater number of users. Graph Nº 62 shows the annual trend, where the percentage variation between 2017 and 2018 is 1.5 %, closing 2018 with 4,858,940 mobile subscriptions and a compound growth rate of 6.4 % between 2014 and 2018.

Graph Nº 63 presents a quarterly comparison for the years 2017 and 2018, showing that, except for the change between the first quarter of 2017 and the first quarter of 2018 (9.5 %), the variations for each quarter are moderate (3.3 %) between the second quarters, 2.5 % between the third quarter each year, and 1.5 % for the fourth quarter.

Graph Nº 64 shows the change by payment mode and access device between 2017 and 2018. In relative terms, there was a change of -6.6 % in total prepaid users, an increase of 16.7 % in postpaid and 0.2 % in datacard.

For a better understanding of these variations, Graph Nº 65 shows the percentage distribution of subscriptions by access device and payment mode, distinguishing the mechanisms normally offered to the public: mobile Internet and Internet by USB devices (datacard), where mobile Internet can be acquired under a prepaid mode until the available data runs out (prepaid), or through plans that are paid monthly (postpaid).

Access via USB devices does not exceed 2.5 % of total mobile network subscriptions. On the other hand, at the end of 2018, it is observed that the percentage of mobile Internet customers in postpaid reaches 38.9 % and the percentage of prepaid customers decreases at the end of the year to 58.7 %.

Graphs from Nº 66 to Nº 68 shows market shares per operator, per access device and payment mode. As for accesses using a USB device, Graph Nº 66 shows that only Claro CR Telecomunicaciones and the Instituto Costarricense de Electricidad commercialize this service variant, and that by the end of 2018 this last company absorbs 82.1 % of users.

In the case of prepaid mobile Internet users, (see Graph Nº 67)) the company Telefónica de Costa Rica covers 44.8 % of users at the end of 2018, followed by the Instituto Costarricense de Electricidad y with 39.2 % of total subscriptions.

In the postpaid mode, the Instituto Costarricense de Electricidad covers 63.8 % of subscriptions at the end of 2018 (see Graph Nº 68), remaining at the forefront of the mobile Internet market in this payment mode, with market shares above 60 % in the four quarters of 2018.

The variation of the market concentration index (HHI) is presented (see Graph Nº 69 and Nº 70). In the case of postpaid mobile Internet, it dropped from 2017 to 2018 to 4756 points (see Graph Nº 69), lower than the value also recorded in 2016 (reference year for the declaration of competition in the mobile telecommunications market). Similarly, in the case of the prepaid modality (see Graph Nº 70), there is an increase from 2017 to 2018, going from 3,576 points to 3,751 points, lower than that registered in 2016 (3,909 points).

Finally, it is interesting to show two measurements that complement the follow-up of the mobile telephony service. Thus, Graph Nº 71 shows a sustained increase in the penetration of the mobile Internet service from 2014 to 2017 and that in 2018 it recorded a decrease of 2 percentage points over the previous year, to stand at 94.8 % (see Graph Nº 71). The other relevant measure refers to the proportion of mobile Internet subscribers compared to total mobile telephone subscriptions, a value that amounts to 55.8 % in 2018, the highest value since 2014 (see Graph Nº 72).

Traffic

The amount of data traffic that is transferred over the mobile network is shown annually in Graph Nº 73. However, the year-over-year percentage change has been decreasing, for example, from 2015 to 2016 the increase was 63.1 %, from 2016 to 2017 it was 10.5 % and from 2017 to 2018 it is 4.5 %. This suggests that data consumption per user on the mobile network has been stabilizing after an explosion in demand at the beginning of the period, although the impact of other variables must also be deepened to corroborate the causes of the slowdown shown by the mobile data market.

With regard to the performance of mobile data traffic by quarter, for the 2017-2018 period it can be seen that the variations from one period to another do not maintain any specific tendency, -13.4 % between the first quarter of each year, 3.0 % between the second quarter of each year, 12.7 % between the third quarter, and 19.1 % between the fourth quarter of each year (see Graph Nº 74).

The percentage distribution of traffic by access device and payment method shows that data consumption through datacards, which is a dedicated product that is not accompanied by voice, represented 8.4 % of the total data transferred in 2018, very close to the 9.4 % consumed by users with prepaid access during the fourth quarter of 2018. 82.2 % of the total data transferred in the mobile network towards the end of 2018 was by subscribers under the postpaid mode, where the Instituto Costarricense de Electricidad is the market agent with greater participation (see Graph Nº 75).

Finally, a consumption estimate per subscriber is presented (see Graph Nº 76). The figures of Gigabyte (GB) per user for the period from 2014 to 2018 go from 0.853 GB per user in 2014 per month, to 2.478 GB per user in 2018 per month. It is important to note that from 2016 to 2018 this estimate has only varied by 0.073 GB per user and from 2014 to 2018 by 1.62 GB per user.

Revenues

This variable shows a growing trend for the 2014-2018 period, showing figures above 220 billion colones in 2018, representing a variation between 2017 and 2018 of 6.0 %, as well as a compound annual growth rate of 15 % for the period between 2014 and 2018 (see Graph Nº 77).

Regarding the performance of each quarter for 2017 and 2018 (see Graph Nº 78), it is observed that the variations are moderate for the first three quarters, 4.3 % between the first quarter of each year, 1.1 % for the second quarter and 6.8 % for the third quarter; however, the variation between the fourth quarter of each year exceeds two digits, reaching 12.0 %.

When analyzing the percentage distribution of revenues per access device and payment mode for the 2017-2018 period (see Graph Nº 79), it can be seen that for accesses by USB devices, in 2018 the revenue was 163 million higher than in 2017 (1.9 %).

On the other hand, the revenues received from using the Internet through mobile phone is divided between prepaid and postpaid services and it can be observed that the total of customers under the postpaid mode generated revenues of 126,667 million colones at the end

of 2018, 27.7 % more than 2017, thanks to a dynamic offer that manages to capture users through plans that allow them to choose the one that best fits their data consumption. Meanwhile, the prepaid customer base at the end of the year generated 84,823 million colones, a decrease of -15.1 % compared to 2017.

When analyzing the percentage distribution of revenues by device and payment method for 2018, it can be observed that Internet accesses using datacards generate between 3.7 % and 4.2 % of revenues (see Graph Nº 80). Likewise, it can be observed how between the first quarter and the fourth quarter the portion of revenues in the prepaid mode decreases from 44.7 % to 35.5 %. While in the postpaid mode the proportion increases towards December 2018, closing the year with 60.8 % of revenues, congruent with that observed in Graph Nº 79.

To conclude reviewing the revenues variable, Graph Nº 81 shows an estimate of the average monthly revenues received per traffic unit. In this case, the value of each year is approximated by averaging revenues and traffic in the same way. Thus, from 2014 onwards, revenue per traffic is reduced, probably due to the increase in data consumption, associated economies of scale, and the competitive dynamics reflected in prices, going from 3,272 colones per GB transferred in 2014 to 1,524 colones per GB in 2018. Represents an average annual reduction of 17.4 % over the period.

As for the average revenue per user according to the access device and payment mode (see Graph Nº 82), only the fourth quarter of 2018 shows that a user with a prepaid service generates an average of 2,399 colones per month. This is only 39 % of what a postpaid user generates per month, being that, for the fourth quarter of 2018, this value is 6,194 colones per month. In datacard, it is estimated for the same period that a user generates about 5,987 colones per month.

Fixed Internet

Subscriptions

Fixed Internet subscriptions, both residential and business, show steady growth for the 2014-2018 period. According to the gathered information (see Graph Nº 83), annual growth rates start increasing to two digits for the 2015 to 2016 period, where the variation was 13.9 %, then the variation between 2016 and 2017 is calculated at 17%, the highest of the period. It should be noted that it is in this period that the declaration of effective competition of the residential fixed Internet service is published, which liberalizes the market and guarantees operators a regulatory framework that encourages supply. The tendency continues with a 12.2 % growth between 2017 and 2018. The year 2018 closes with a total of 834,784 subscriptions.

This growing trend can also be seen in Graph Nº 84, which shows that between each quarter of 2017 and 2018 there was an increase in the number of users of the fixed Internet service.

When analyzing the percentage distribution by technology for fixed Internet subscriptions (see Graph Nº 85), it is observed that at the end of 2018 wireless technologies represent 0.7 % of total subscriptions; accesses over optical fiber 2.4 %, connections over xDSL 33 % and finally 63.9 % of the total corresponds to users with connections over coaxial cable.

The percentage distribution of subscriptions per contracted speed (data transfer rate) (see Graph Nº 86) shows that at the end of 2018 52.8 % of subscriptions had contracts with speeds between 2 Mbps and 10 Mbps, 23.6 % with speeds above 10 Mbps, 23.1 % with speeds below 2 Mbps and up to 512 Kbps, and only 0.6 % with speeds below 512 Kbps.

The growth registered since the beginning of the year stands out, when only 9.1 % of subscribers were in the speed range above 10 Mbps. Thus, at the end of the 4th quarter,the

participation of subscribers in this speed range increased by more than 13 percentage points, with which it is evident that the providers of this service, as an output of greater competition and the dynamism after the declaration of effective competition, have used speed as a differentiation element of their commercial offer.

Another interesting indicator is the distribution of market shares for service providers active in the fixed access Internet market. In this respect, there are 4 operators leading the market with market shares above 17 % (see Graph Nº 87), the Grupo ICE covers 35.9 % of subscriptions, followed by Cabletica with 20.1 %, Tigo with 20.0 % and Telecable with 18.3 %.

The rural electrification cooperatives in San Carlos and the Los Santos area cover 1.8 % and 1.4 % respectively, leaving the remaining 2.4 % of the market for the remaining active operators.

Based on the previous information when analyzing the level of market concentration (HHI) for the 2014 - 2018 period (see Graph Nº 88), it is observed that this indicator goes from 3,256 points in 2014 to 2,437 points in 2018, showing a decrease each year. At the end of 2018, a total of 48 operators were offering this service throughout the country.

Fixed Internet penetration calculated per 100 inhabitants reached 16.7 % in 2018, 1.7 percentage points more than in 2017 and 5.9 percentage points more than in 2014 (see graph Nº 89). When considering penetration per 100 households, by the end of 2018 it had reached 54.2 % (4.5 percentage points more than in 2017 and 17.3 percentage points more than in 2014, as can be seen in Graph Nº 89).

Graph Nº 90 shows the cantonal map of Costa Rica and the distribution of fixed Internet subscriptions by canton, where the darkest colors are equivalent to a greater number of users per canton. For example, the darkest tone represents cantons with more than 34,800 users (and up to 70,100 users). According to the map, only 5 cantons exceed this threshold: San José, Desamparados, Alajuela, Heredia and Cartago. It can also be seen that there are 11 cantons with the lowest number of subscribers: less than 1800), namely, Hojancha and Nandayure in Guanacaste; Guatuso, Los Chiles, Valverde Vega and San Mateo in Alajuela; Turrubares, Dota and León Cortés Castro in San José and the cantons of Alvarado and Jiménez in Cartago.

A similar map can be seen in Graph Nº 91, where the largest number of operators per canton is represented by darker colors. We can see the coincidence with the previous map where the cantons with more users are those with 15-25 operators available offering fixed Internet service.

Finally, Graph Nº 92 shows the operators with more than 9 cantons covered for business and residential fixed Internet services. In summary, only the ICE appears with 81 cantons covered; however, it should be noted that the companies offering wireless services appear in this graph with a significant number of cantons where they have presence, mainly in areas of irregular geography where fixed wired networks do not go through.

Also noteworthy is the number of cantons covered by the other three market leaders: Tigo which has a presence in 65 cantons, Cabletica in 60, and Telecable in 33.

Traffic

The fixed Internet service shows sustained growth of data traffic for the 2014-2018 period.

In 2018, 865,777 TB were transferred over the country's fixed networks (see Graph Nº 93), a 39.6 % increase compared to 2017 and 525 % compared to 2014. This reflects how data consumption becomes one of the favorite products of Costa Rican users.

The quarterly variation of this indicator for 2017 and 2018 (see Graph Nº 94) shows that the period-to-period variation reaches two figures in all of them, 28.5 % between each first quarter, 36.9 % between each second quarter, 49 % between third quarters and 42.6 % between each fourth quarter.

The percentage distribution of traffic by technology (see Graph Nº 95), shows that at the end of 2018 wireless and fiber technologies represent 8.9 % of the total traffic generated, while 11.2 % is generated by users of xDSL and finally the customers of coaxial cable networks, where three of the leading companies in the market compete, consume 79.9 % of the data.

To conclude this section, Graph Nº 96 presents an estimate of the monthly average traffic per user by technology. These values are generated from the contributions made by operators in 2018 and are appreciated on a quarterly basis. During the fourth quarter of 2018, it is estimated that, every month, subscribers of services over XDSL consume approximately 35 GB, while users of HFC networks transfers about 129 GB per month. The rest of the available technologies transfers together over the network, for the last quarter of 2018, about 296 GB per month, probably because services over optical fiber are included in this group.

Revenues

The growth shown by the fixed Internet service in terms of subscriptions is reflected in the revenues received by the companies in the 2014-2018 period.

Between 2017 and 2018, a variation of 15.7 % is registered, accumulating in 2018 total revenues for 147,524 million colones (see Graph Nº 97). This behavioris also reflected in the quarterly tendency for the 2017-2018 period, where when comparing the variation from one period to another, two digits growth is observed in each of them, reflecting the dynamizing effect of the increase in supply and free competition between market agents (see Graph Nº 98).

When analyzing the percentage distribution of revenues by technology, it is observed that at the end of 2018 wireless technologies represent 3.1 % of the total revenues generated in that period, optical fiber customers 12.5 %, the revenues received by xDSL users 40.8 % and finally 43.7 % of the total revenues for coaxial cable services (see Graph Nº 99).

Considering the percentage distribution of revenue per contracted speed (see Graph Nº 100), at the end of 2018, 42.2 % of the revenue generated corresponded to contracts with speeds between 2 Mbps and 10 Mbps; 29.3 % of the revenue for speeds above 10 Mbps, 16.6 % with speeds below 2 Mbps and up to 512 Kbps, and 11.8 % with speeds below 512 Kbps.

To conclude the review of the revenue variable, the monthly average revenue per traffic unit for the period 2014 to 2018 is shown in Graph Nº 101. According to the data provided by operators in this period, it is possible to estimate this value, calculating 650.3 colones per GB in 2014, a value that decreases by 46 % in 2015, and from that date it drops to 166.4 colones per GB in 2018.

Wholesale fixed Internet

Connections

The number of companies offering wholesale fixed internet service fluctuates between 7 and 11 operators between 2015 and 2018 (see Graph Nº 102), while the number of wholesale connections reaches to 357 connections in 2018, with a percentage change of 7.2 % compared to 2017 (see Graph Nº 103).

Graph Nº 104, shows the variation for each quarter of 2017 and 2018, showing the dynamics that characterize wholesale services, where some variations are upwards, and

others, as in the third quarter, are downwards (-12 %).

The percentage distribution by technology for wholesale Internet connections (Graph Nº 105), shows that at the end of 2018 DWDM services generated 5.6 % of subscriptions, microwave connections 12.0 %, while connections over PON, AON and SDH technologies covered 82.4 % of the total.

In relation to the above, Graph Nº 106 ghows the percentage distribution by contracted speed where, at the end of 2018, it is observed that contracted services of more than 2 Mbps and less than 100 Mbps cover 73.1 % of the total, speeds equal to or less than 2 Mbps cover 12.0 %, speeds greater than 100 Mbps and less than 600 Mbps cover 7.6 % and finally 7.3 % correspond to connections of more than 600 Mbps. The market shares of the service providers involved (Graph Nº 107), show that the main provider is UFINET with 77.2 % of the market.

Revenues

Graph Nº 108, shows the total revenue generated by wholesale connections for the period 2014-2018, where in 2018, it can be seen that in 2018 4,187 million colones were received, a percentage variation of -11 % with respect to 2017, and a variation of 14 % for the whole period.

Graph Nº 109, shows the variation for each quarter of 2017 and 2018, where there is a downward tendency in revenues, with negative percentage variations from period to period in the last three quarters of each year (-5.9 %, -24.7 % and -20.0 % respectively).

The percentage distribution of the revenues from wholesale connections by technology indicates that at the end of 2018 the revenues from DWDM services represented 44.8 %, while the portion corresponding to microwave links is 2.7 %, leaving 52.5 % of the revenues to PON, AON and SDH technologies (see Graph Nº 110).

Finally, at the end of 2018, Graph Nº 111 shows that services at more than 2 Mbps and less than 100 Mbps generate 15.8 % of the total revenues from wholesale connections, speeds equal to or less than 2 Mbps comprise 1.8 %, speeds greater than 100 Mbps and less than 600 Mbps 14.7 % and finally 67.7 % is generated through connections at more than 600 Mbps.

Finally, an estimate is made of the monthly average revenues during 2018 per connection by speed ranges; this is represented in Graph Nº 112.

This graph, based on what operators reported in 2018, shows the revenues in thousands of colones for speeds below 100 Mbps, speeds between 100 Mbps and 600 Mbps and speeds above 600 Mbps.

Although it is known that the commercial offer of these services is not standard and that they may vary for each specific contract, it is only analyzed the fourth quarter of 2018, where a significant difference is observed for the range with higher speeds, close to 8,777,000 colones per month per connection; in the range between 100 Mbps and 600 Mbps, 1,839,000 colones per month per connection is calculated, and finally, for speeds below 100 Mbps, 195,000 colones per month are estimated for each connection.

Leased lines

Connections

Graph Nº 113 shows the evolution in the number of companies participating in this service, a value that fluctuates from 2014 to 2018, with 37 service providers closing this last year.

The number of connections on dedicated lines for the 2014-2018 period closed in 2018

en 19 at 19,137 connections (see Graph Nº 114), a figure 5.6 % higher than in 2017 and a compound percentage change of 1.1 % compared to 2014.

The quarter-over-quarter change is shown in Graph Nº 115. The 2018 period to period variations: 7.6 %, 6.7 %, -5.9 % and 5.6 % between the first, second, third and fourth quarters respectively.

To detail this service, it is of interest to show the number of connections divided by market type, for this purpose at the end of 2018 according to Graph Nº 116, 77.9 % corresponded to the retail market and 22.1 % to the wholesale market.

Without distinguishing the type of market, Graph Nº 117, shows the percentage distribution by technology. At the end of 2018, VPN connections represent 47,8 %, digital links 38,4 % and the sum of data frames, ports, legacy lines and dark fiber 13,9 %.

If the connection speed is considered, 47.5 % corresponds to speeds equal to or less than 2 Mbps, 33.8 % to speeds between 2 Mbps and 10 Mbps and the remaining 18.8 % to speeds greater than 10 Mbps and to connections with speeds that were not specified by the operators (see Graph Nº 118).

Finally, the percentage distribution of connections per operator at the end of 2018 (Graph Nº 119) shows that the highest market share is for ICE with 47.7 %, followed by UFINET with 20.5 %.

Revenues

The revenues generated by connections to leased lines in 2018 reaches a total of 44,139 million, a percentage variation of -1.5 % compared to 2017 and -2 % compound compared to 2014. (see Graph Nº 120).

The variation for each quarter of 2017 and 2018 is represented in Graph Nº 121, which shows the dynamics of this service. It should be noted that only the variation between each second quarter is positive.

Graph Nº 122 shows the distribution of revenues by market type, with 76.1 % for the retail market and 23.9 % for the wholesale market at the end of the year.

The percentage distribution by technology, without distinguishing whether the connections are wholesale or retail, shows that VPN revenues represent 54.7 %, while revenues generated by digital links represent 40.9 % and the sum of data frames, ports, legacy lines and dark fiber 4.4 % (see Graph Nº 123).

Finally, Graph Nº 124 presents the percentage distribution of revenues by connection speeds, where when looking at fourth quarter data, 16.7 % correspond to speeds equal to or less than 2 Mbps, 28.3 % to speeds between 2 Mbps and 10 Mbps, 21.2 % for speeds between 10 Mbps and 100 Mbps, 26.2 % of revenues for speeds above 100 Mbps and 7.6 % of revenues are recorded for unspecified speeds by operators.

To conclude, an estimate is made of the monthly average revenue by speed range, although it is well known that the contracts in this service respond to each commercial relationship of the operator with each of its customers.

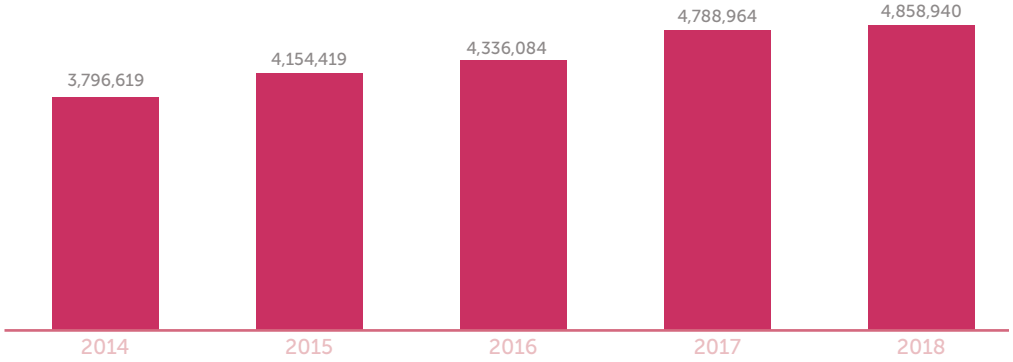
Graph Nº 125 presents this approximation to quantify how revenue is distributed per connection and by contracted speed. The figures are expressed in thousands of colones, and data reported as “unspecified speeds” are included in the category of speeds below 10 Mbps.

In summary, taking the fourth quarter of the year, at speeds greater than 100 Mbps, average revenue per connection of 2.8 million colones

per month is estimated. It is important to clarify that it is not known how high above 100 Mbps such connections are.

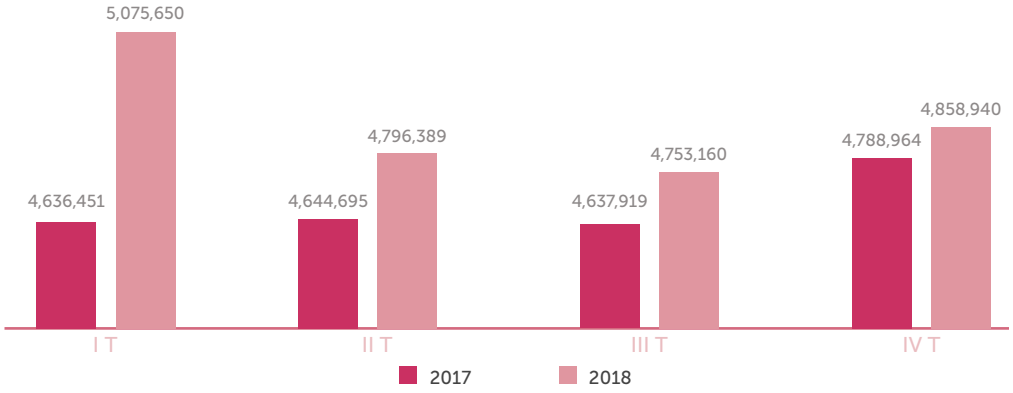
For the range of 10 Mbps to 100 Mbps a monthly average per connection of about 500 thousand colones is calculated, and for the range below 10 Mbps, about 130 thousand colones per month.

Graph Nº 62.
Costa Rica. Subscriptions, Internet access on mobile network, 2014-2018
(Annual Figures)



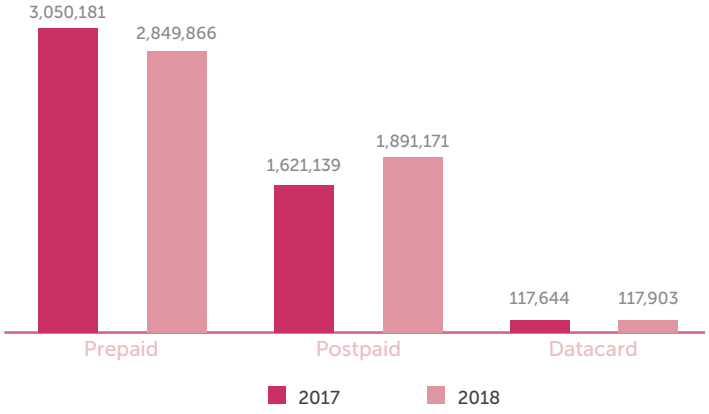
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 63.
Costa Rica. Subscriptions, Internet access on mobile network, 2017-2018
(Quarterly figures)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

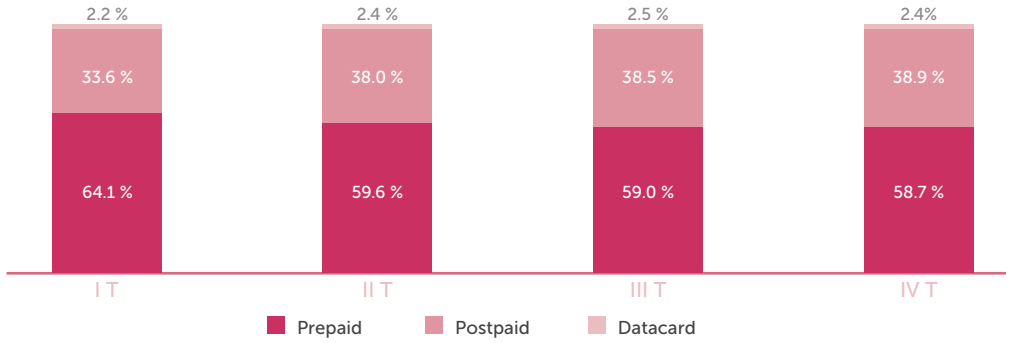
Graph Nº 64.
Costa Rica. Subscriptions, Internet access on mobile network, compared by payment mode and access device, 2017 – 2018
(Annual figures)



Postpaid subscriptions vary by 16.7 % from 2017 to 2018

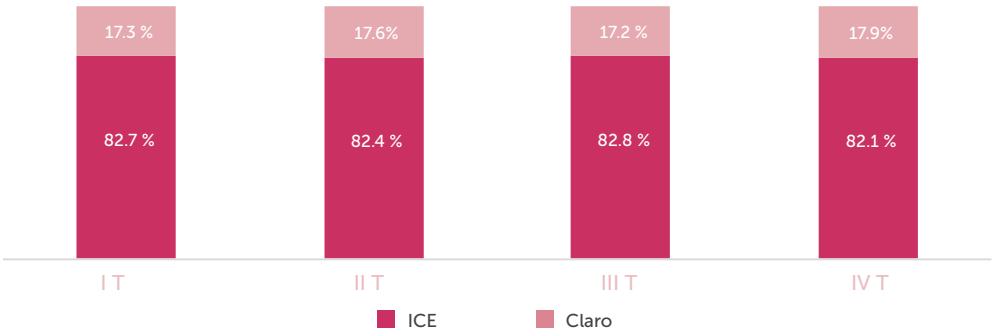
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 65.
Costa Rica. Subscriptions, Internet access on mobile network, compared by payment mode and access device, 2018
(Quarterly figures in percentage)



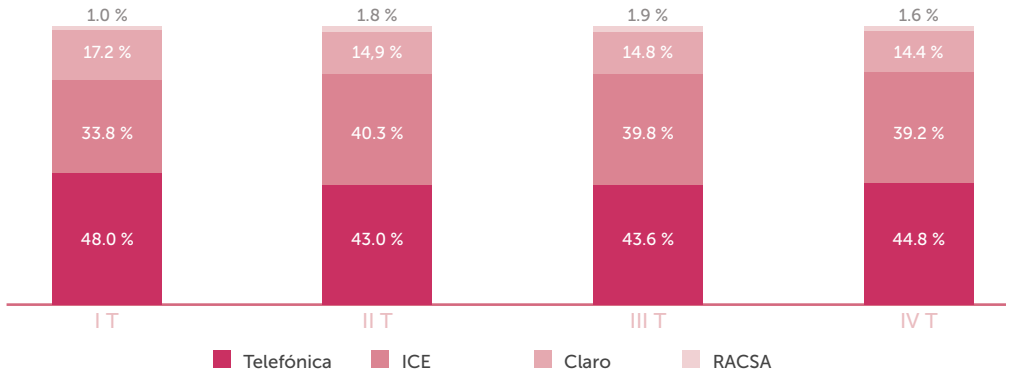
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 66.
Costa Rica. Subscriptions, Internet access on mobile network. Percentage distribution per operator, datacards, 2018
(Quarterly figures in percentage)



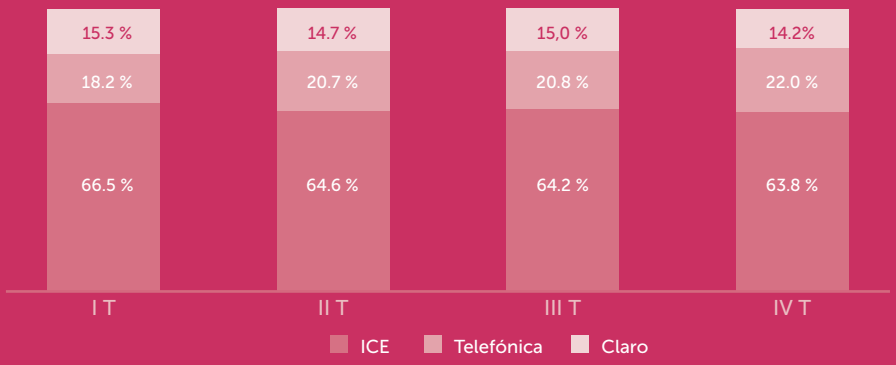
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 67.
Costa Rica. Subscriptions, Internet access on mobile network. Percentage distribution per operator, prepaid, 2018
(Quarterly figures in percentage)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

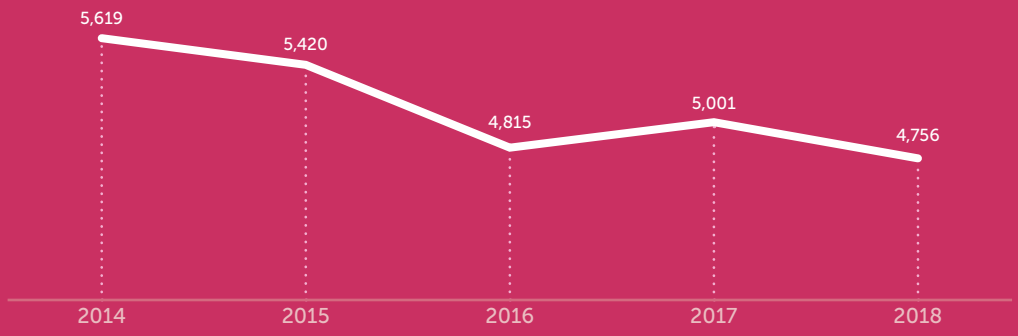
Graph Nº 68.
Costa Rica. Subscriptions, Internet access on mobile network.
Percentage distribution per operator, postpaid, 2018
(Annual figures in percentage)



ICE has the largest market share in postpaid mode with 63.8 % at the end of 2018.

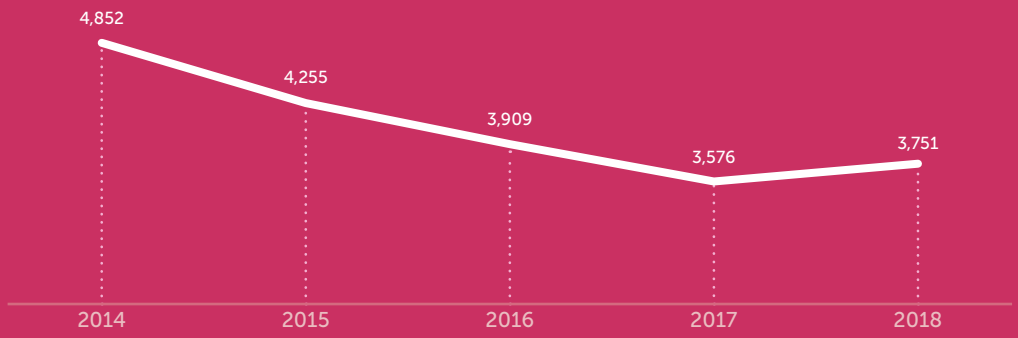
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Gráfico Nº 69.
Costa Rica. HHI evolution, Internet access on mobile network, postpaid, 2014 – 2018
(Annual figures)



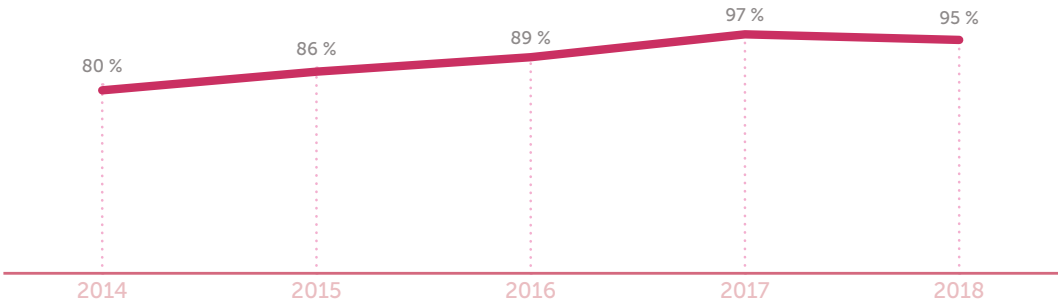
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 70.
Costa Rica. HHI evolution, Internet access on mobile network, prepaid, 2014 – 2018
(Annual figures)



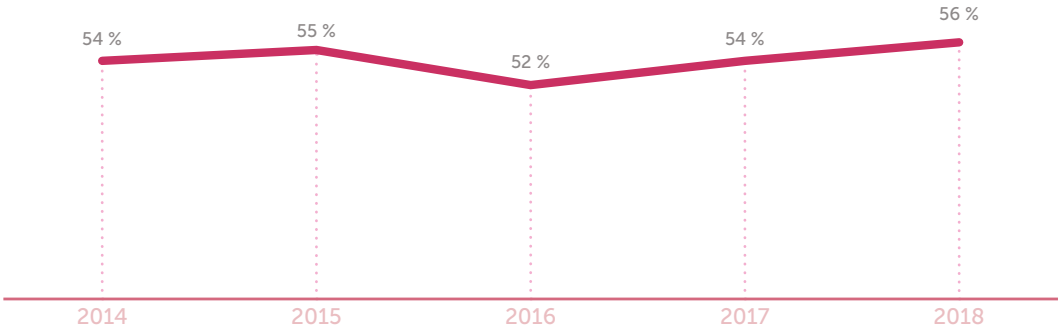
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 71.
Costa Rica. Subscriptions, mobile Internet access. Penetration per 100 inhabitants, 2014 - 2018
(Figures in percentages)



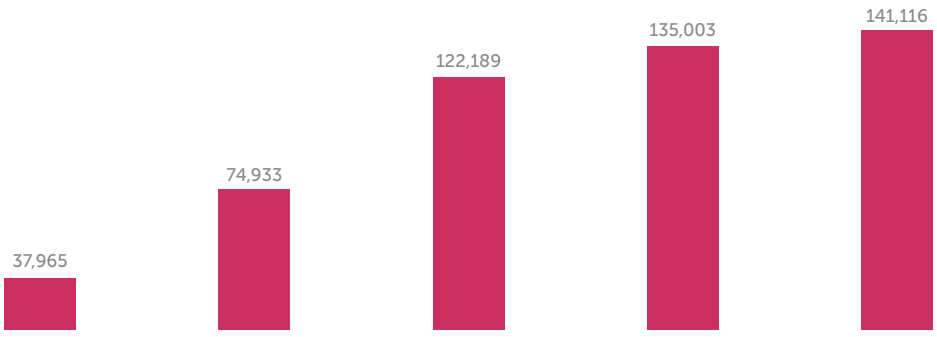
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 72.
Costa Rica. Subscriptions, Internet access on the mobile network. Ratio of subscriptions between mobile Internet and mobile telephony, 2014 – 20
(Annual figures in percentages)

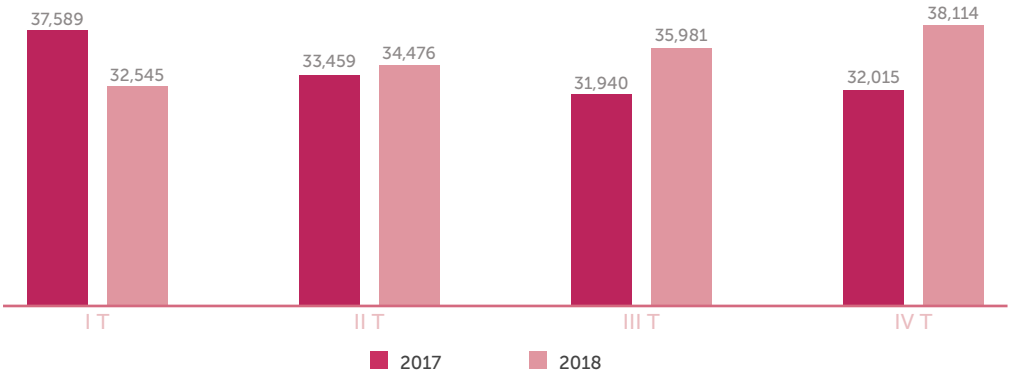


Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 73.
Costa Rica. Traffic, Internet access on the mobile network, 2014 – 2018
(Annual figures in terabytes)

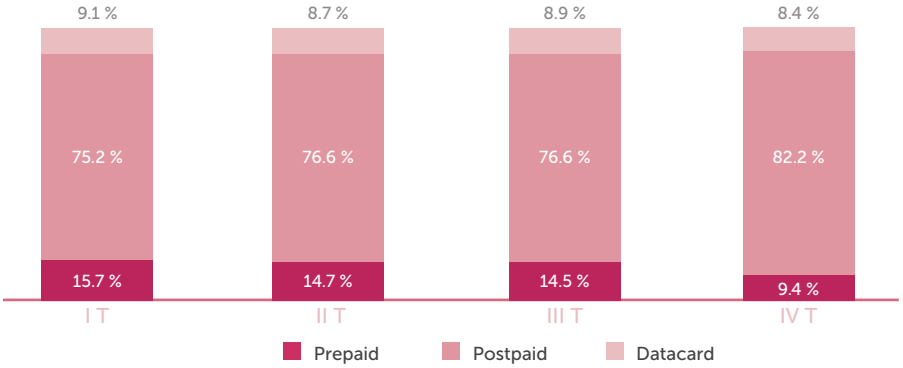


Graph Nº 74.
Costa Rica. Traffic, Internet access on the mobile network, 2017 – 2018
(Quarterly figures in terabytes)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

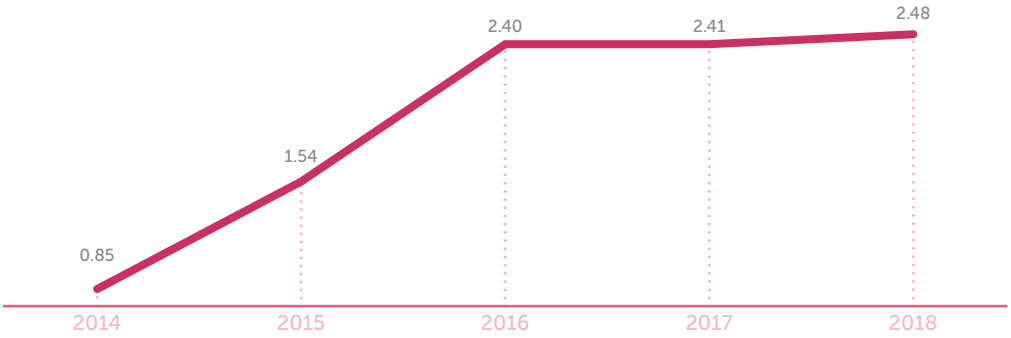
Graph Nº 75.
Costa Rica. Traffic, Internet access on the mobile network. Percentage distribution by payment mode and access device, 2018
(Quarterly figures in percentages)



In the postpaid mode, revenues vary by 27.7%.

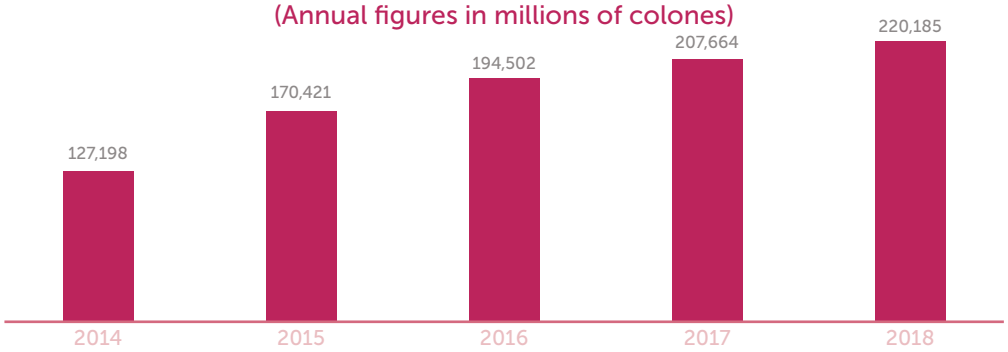
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Gráfico Nº 76.
Costa Rica. Monthly average traffic per user, Internet access on mobile network. 2014 – 2018
(Figures in gigabytes per user)



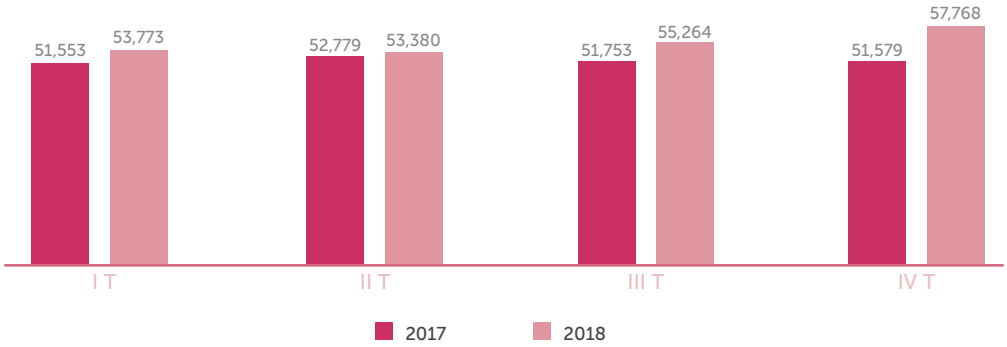
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 77.
Costa Rica. Revenues, Internet access on mobile network, 2014 – 2018
(Annual figures in millions of colones)



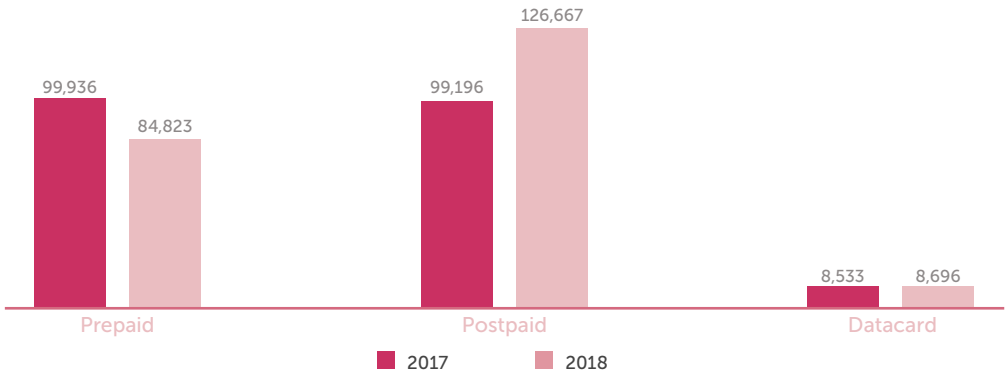
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 78.
Costa Rica. Revenues, Internet access on mobile network. 2017 – 2018
(Quarterly figures in millions of colones)



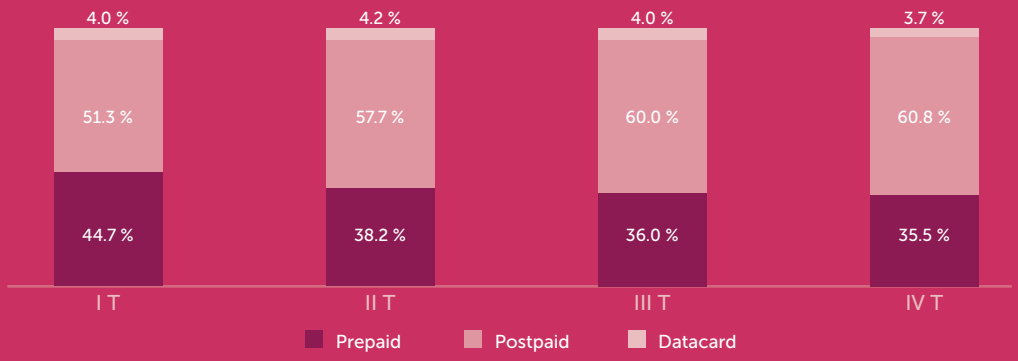
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 79.
Costa Rica. Revenues, Internet access on mobile network, compared by payment mode and access device. 2017 – 2018
(Annual figures in millions of colones)



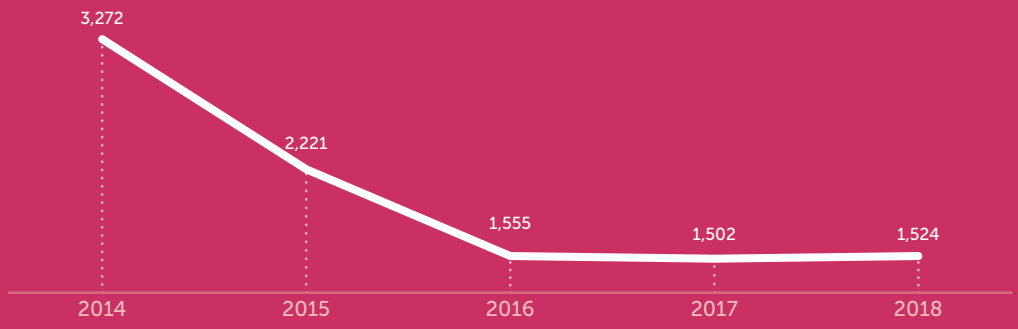
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 80.
Costa Rica. Revenues, Internet access on mobile network.
Percentage distribution by payment mode and access device, 2017 – 2018
(Quarterly figures in millions of colones)



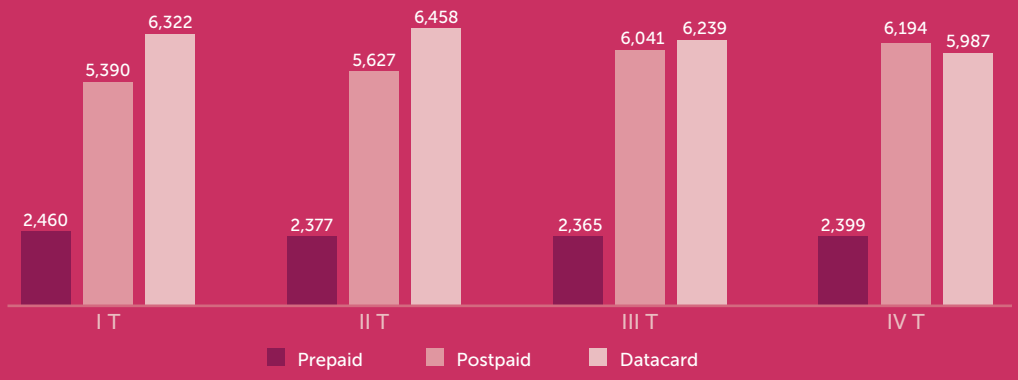
Source: Sutel, General Directorate forMarkets, Costa Rica, 2018.

Graph Nº 81.
Costa Rica. Monthly average revenues perceived per traffic unit,
Internet access on mobile network. 2014 - 2018
(Figures in colones by Gigabyte)



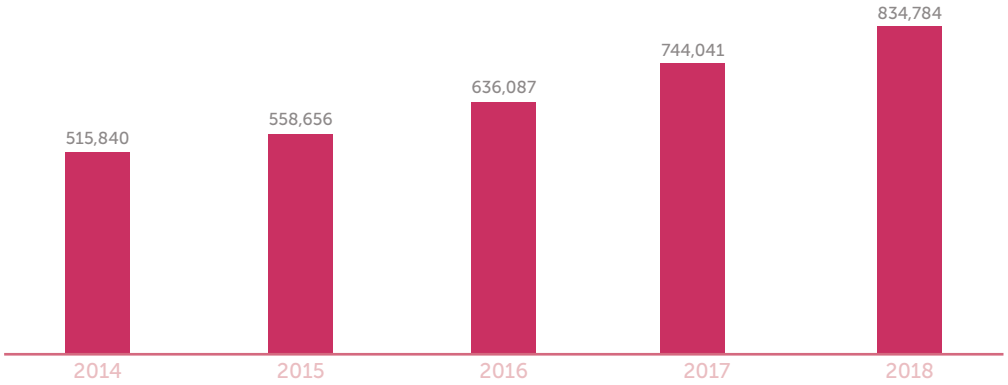
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 82.
Costa Rica. Monthly average revenues perceived by access device and payment mode,
Internet access on mobile network. 2014 – 2018
(Quarterly figures in colones)



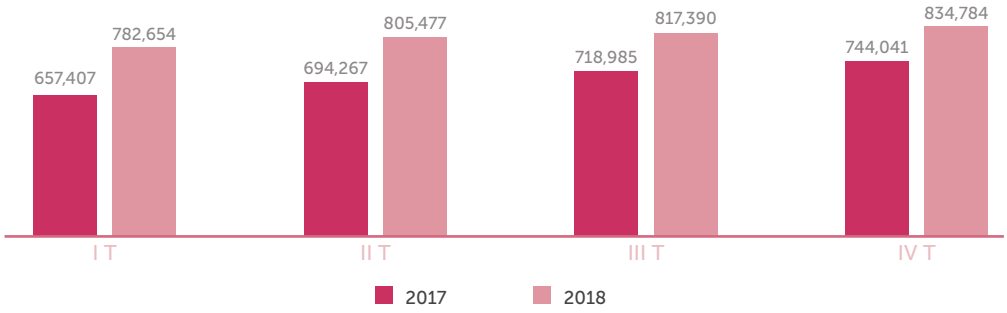
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 83.
Costa Rica. Subscriptions, Internet access on fixed network, 2014 – 2018
(Annual figures)



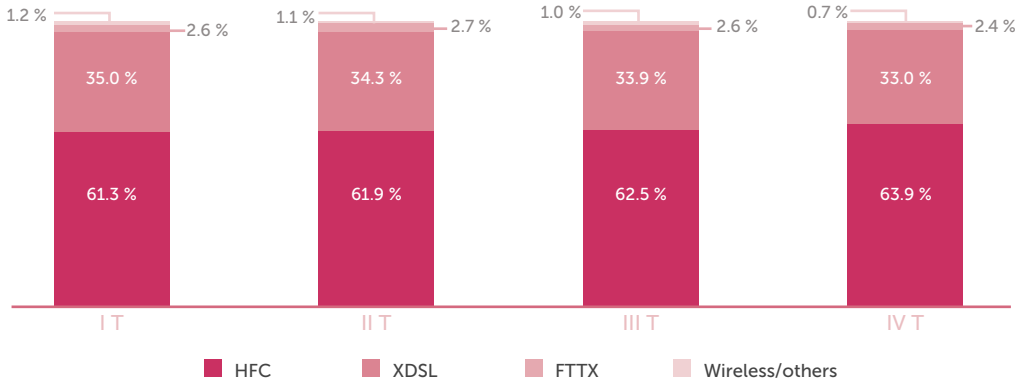
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 84.
Costa Rica. Subscriptions, Internet access on fixed network, 2017 – 2018
(Quarterly figures)



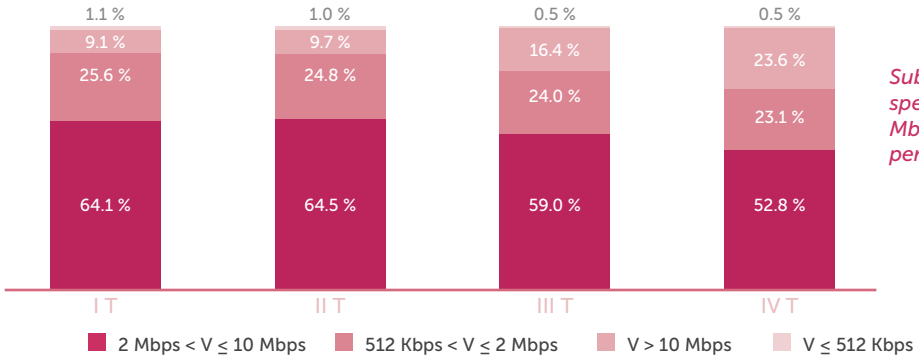
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 85.
Costa Rica. Subscriptions, Internet access on fixed network. Percentage distribution by technology, 2018
(Quarterly figures in percentage)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

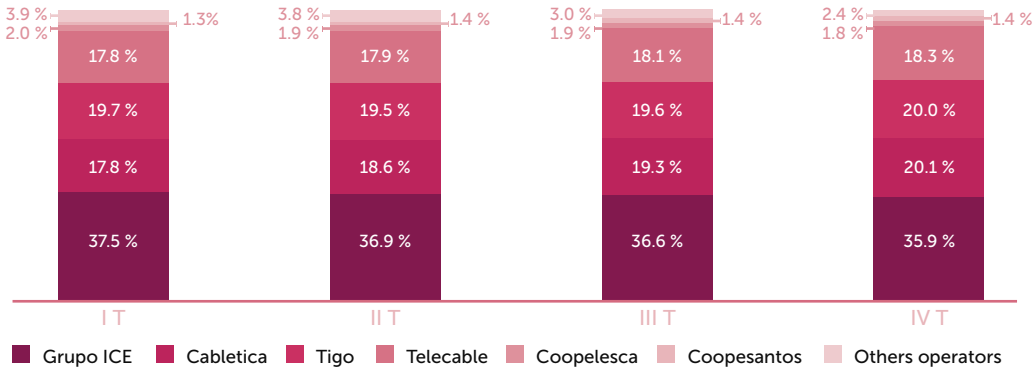
Graph Nº 86.
Costa Rica. Subscriptions, Internet access on fixed network. Percentage distribution by speed contracted, 2018
(Quarterly figures in percentage)



Subscriptions with speeds greater than 10 Mbps increase by 14.5 percentage points.

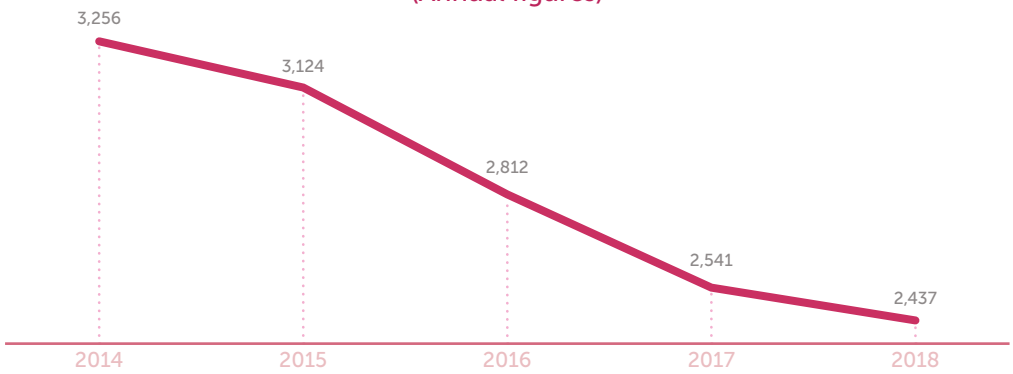
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 87.
Costa Rica. Subscriptions, Internet access on fixed network. Percentage distribution by operator, 2018
(Quarterly figures in percentage)



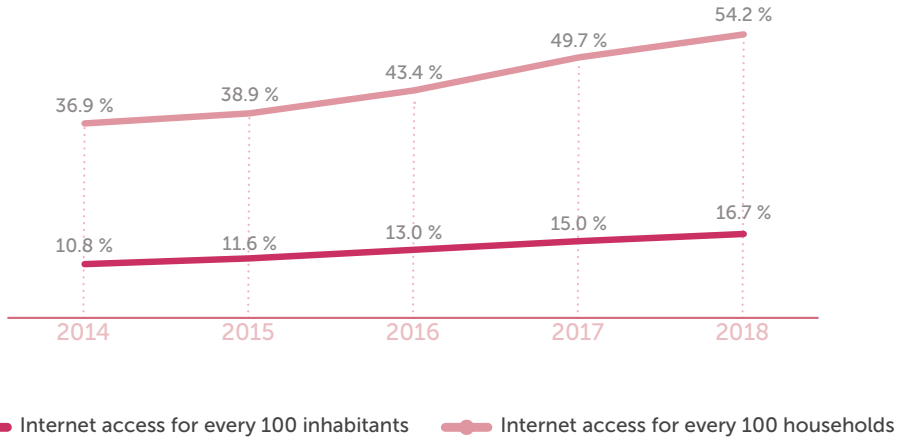
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 88.
Costa Rica. HHI evolution, Internet access on fixed network, 2014 – 2018
(Annual figures)



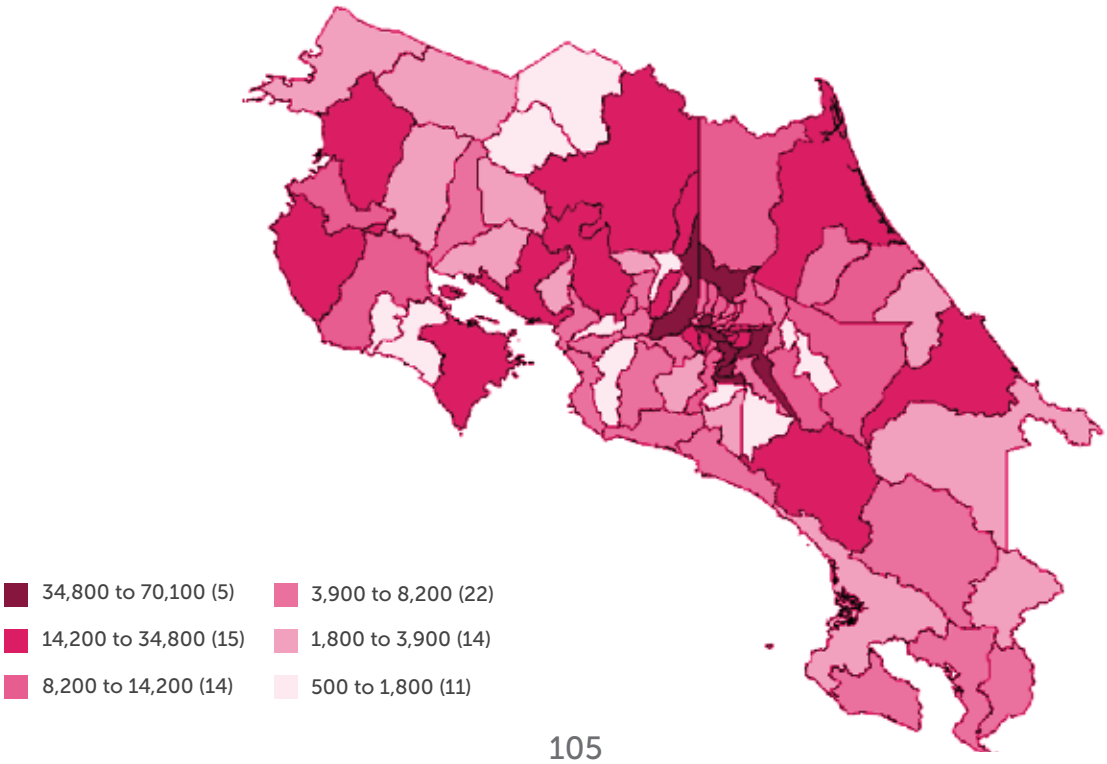
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 89.
Costa Rica. Subscriptions, Internet access on fixed network. Ratio per 100 inhabitants and per 100 households, 2014 – 2018
(Annual figures in percentage)

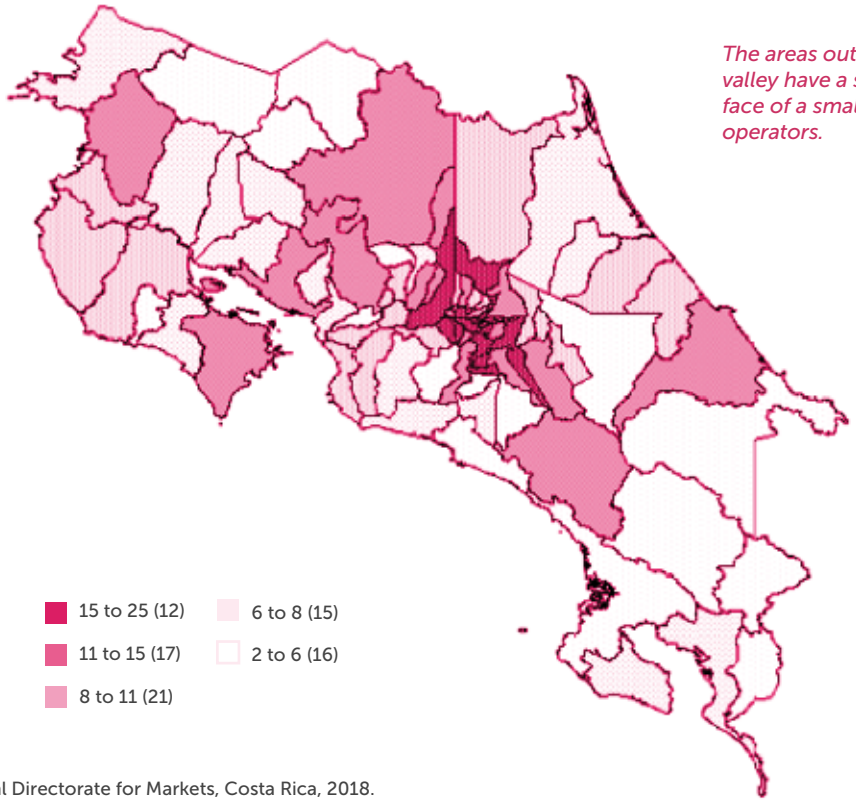


Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 90.
Costa Rica. Subscriptions, Internet access on fixed network. Heat map for distribution by canton, 2018



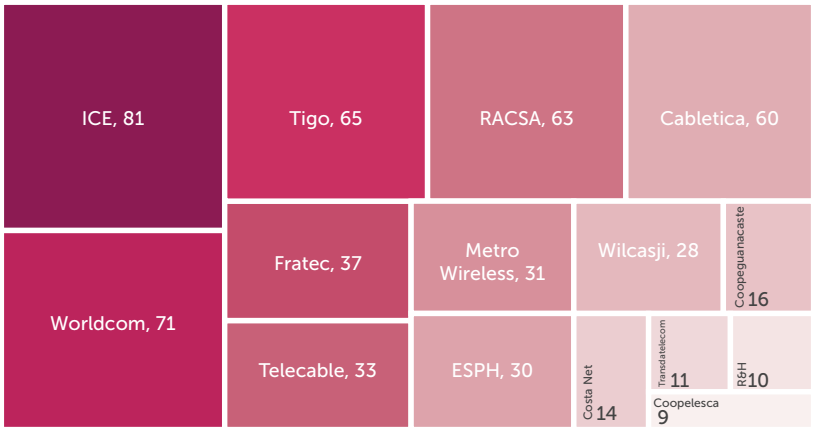
Graph Nº 91.
Costa Rica: Subscriptions, Internet access on fixed network. Heat map for the number of operators by canton, 2018



The areas outside the central valley have a smaller offer in the face of a smaller presence of operators.

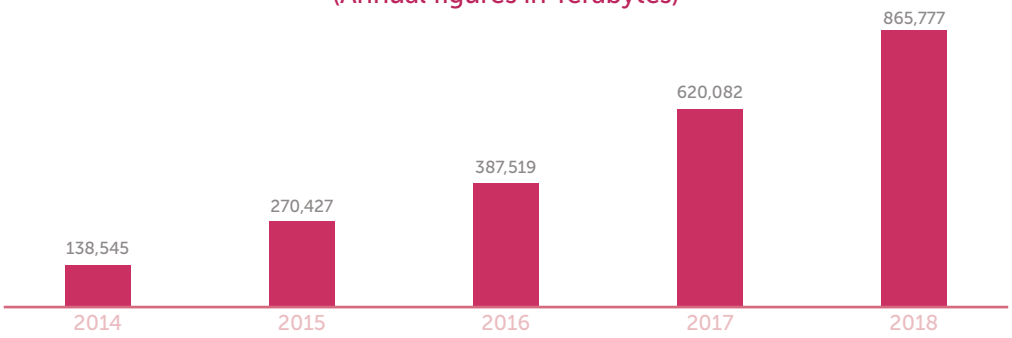
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 92.
Costa Rica: Subscriptions, Internet access on fixed network. Distribution of the number of cantons served by operator, 2018.



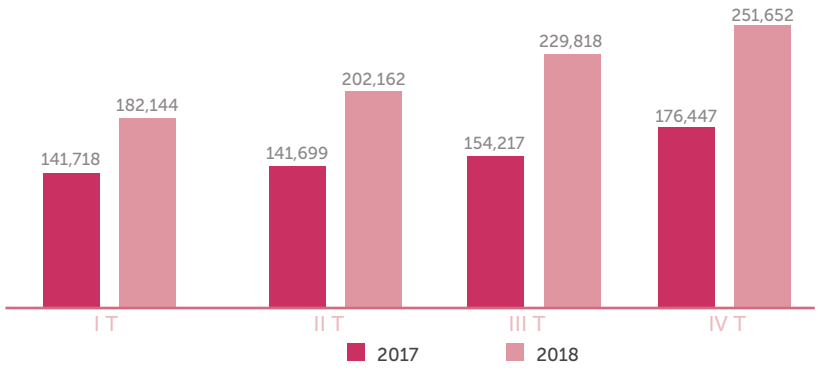
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 93.
Costa Rica. Traffic, Internet access on fixed network, 2014 – 2018
(Annual figures in Terabytes)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

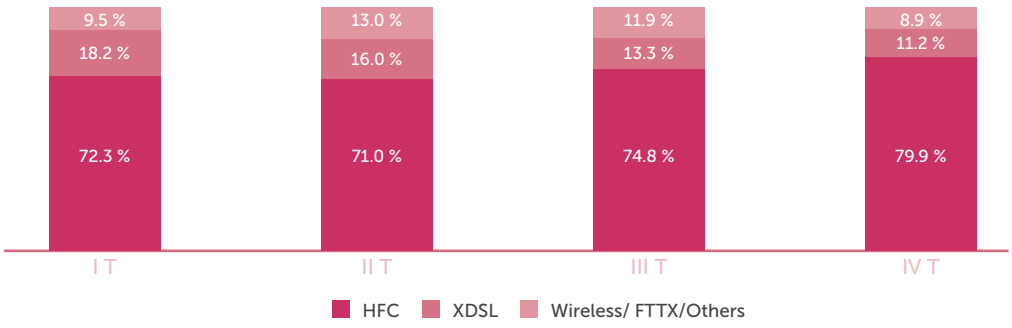
Graph Nº 94.
Costa Rica. Traffic, Internet access on fixed network, 2017 – 2018
(Quarterly figures in Terabytes)



When comparing each quarter of 2017 and 2018, there is an increase in revenues

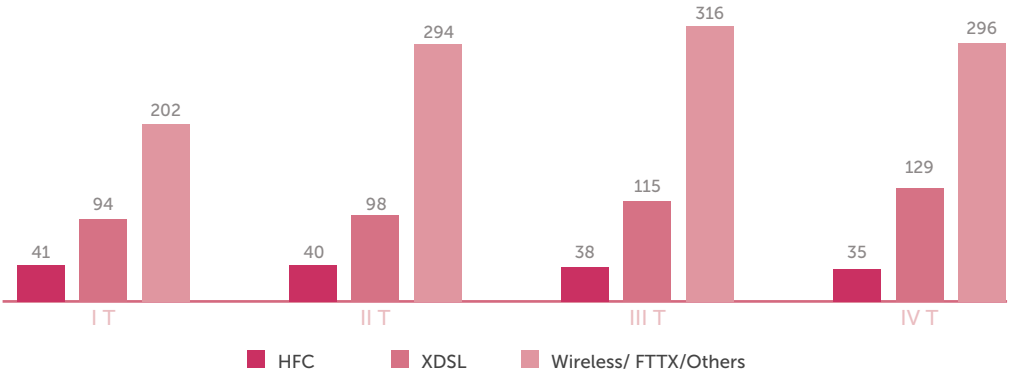
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 95.
Costa Rica. Traffic, Internet access on fixed network. Percentage distribution by technology, 2018
(Quarterly figures in percentage)



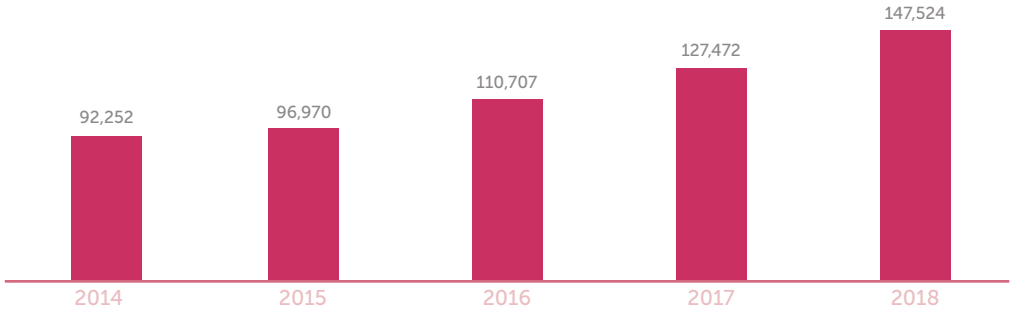
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 96.
Costa Rica. Traffic, Internet access on fixed network.
Monthly average of Gigabytes per user by technology, 2018
(Quarterly figures)



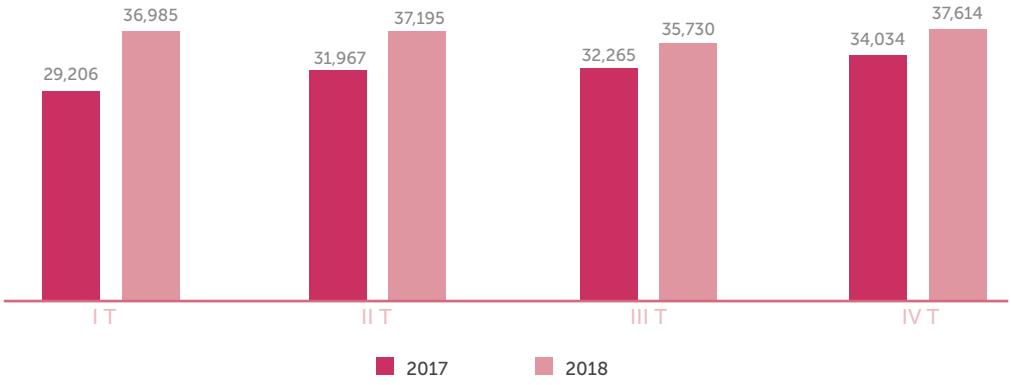
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 97.
Costa Rica. Revenues, Internet access in fixed network, 2014 – 2018
(Annual figures in millions of colones)



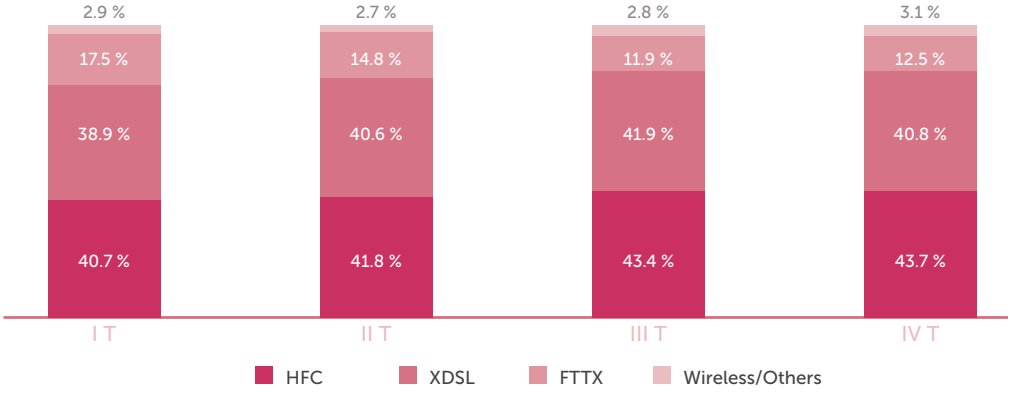
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 98.
Costa Rica. Revenues, Internet access on fixed network, 2017 – 2018
(Quarterly figures in millions of colones)



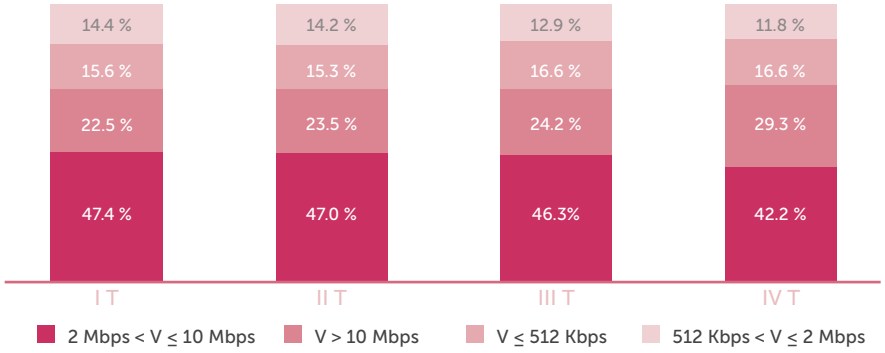
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 99.
Costa Rica. Revenues, Internet access on fixed network. Percentage distribution by technology, 2018
(Quarterly figures in percentage)



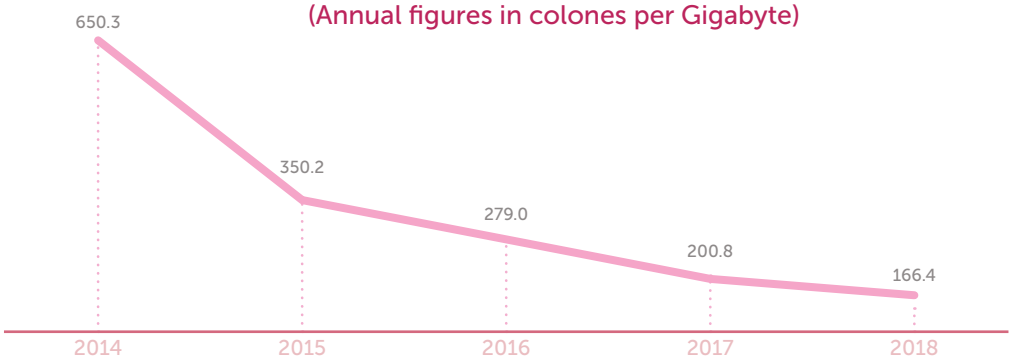
Source: Sutel, General Directorate of Markets, Costa Rica, 2018.

Graph Nº 100.
Costa Rica. Revenues, Internet access in fixed network. Percentage distribution by contracted speed, 2018
(Quarterly figures in percentage)



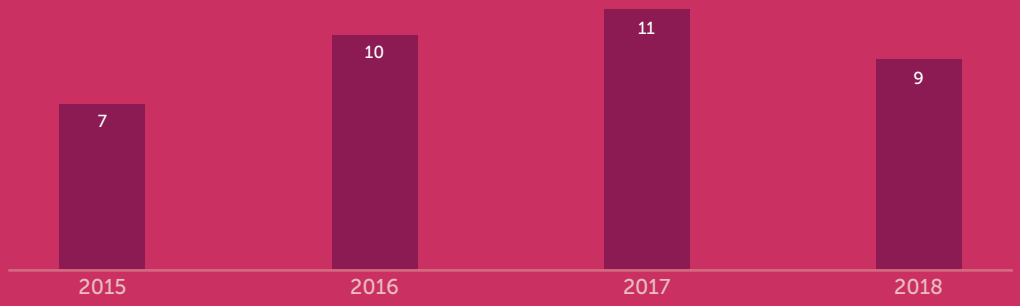
Source: Sutel, General Directorate of Markets, Costa Rica, 2018.

Gráfico Nº 101.
Costa Rica. Revenues, Internet access on fixed network. Monthly average per amount of traffic
(Annual figures in colones per Gigabyte)



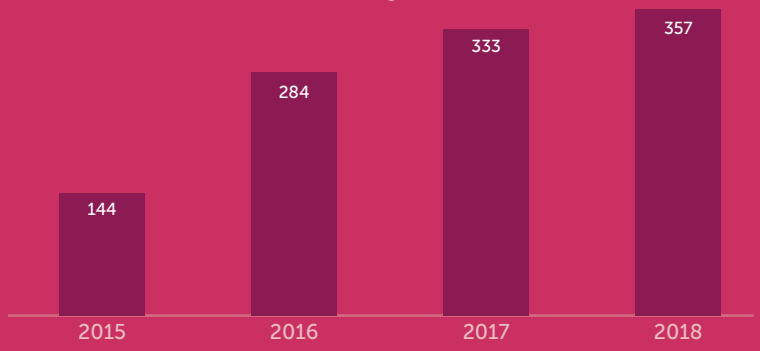
Source: Sutel, General Directorate of Markets, Costa Rica, 2018.

Graph Nº 102.
Costa Rica. Number of participating companies, wholesale Internet access, 2015 – 2018
(Annual figures)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

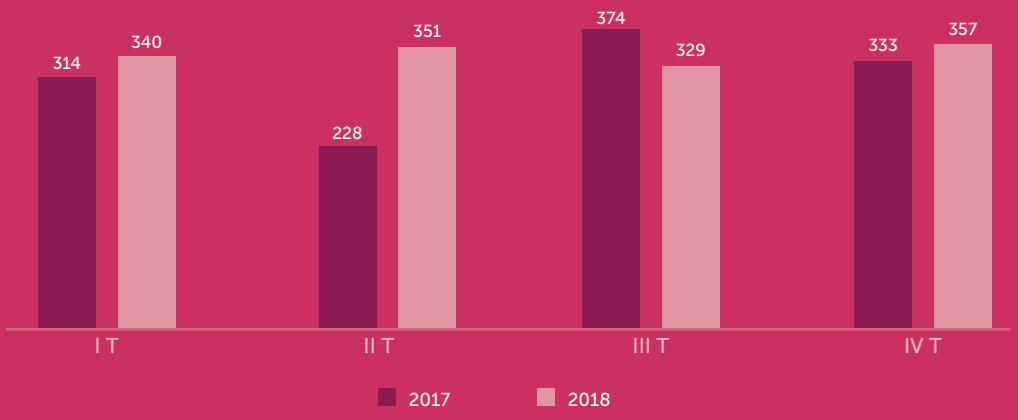
Graph Nº 103.
Costa Rica. Connections, wholesale Internet access, 2015 – 2018
(Annual figures)



In 2018 there are 24 more wholesale connections than in 2017.

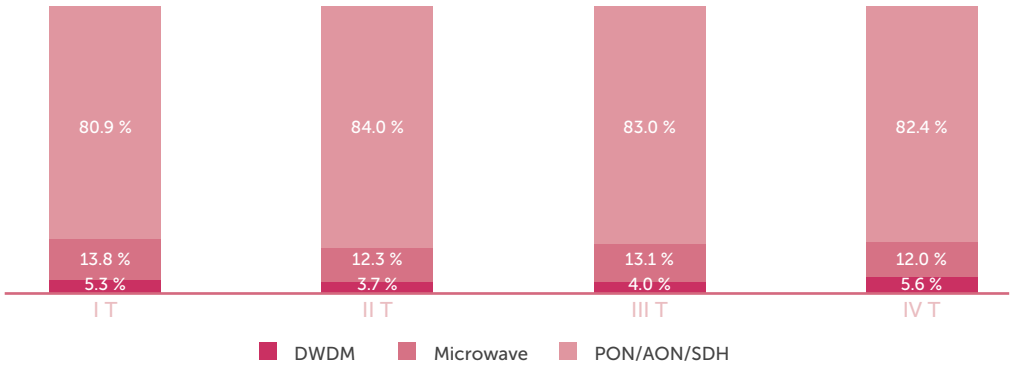
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 104.
Costa Rica. Connections, wholesale Internet access, 2017 – 2018
(Quarterly figures)



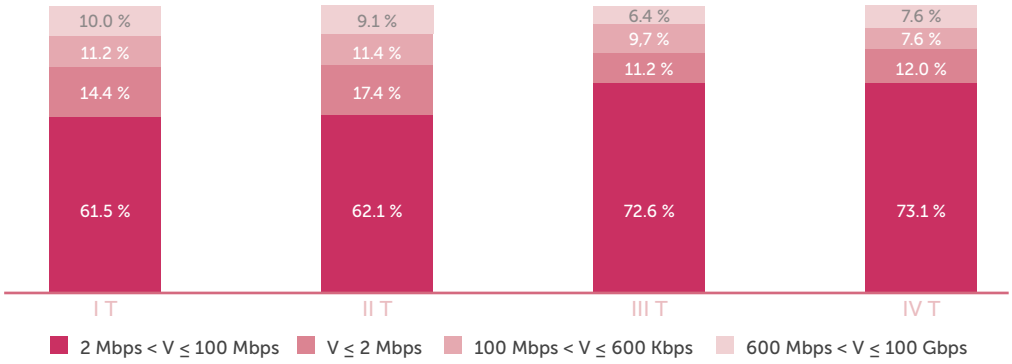
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 105.
Costa Rica. Connections, wholesale Internet access.
Percentage distribution by technology, 2018
(Quarterly figures in percentage)



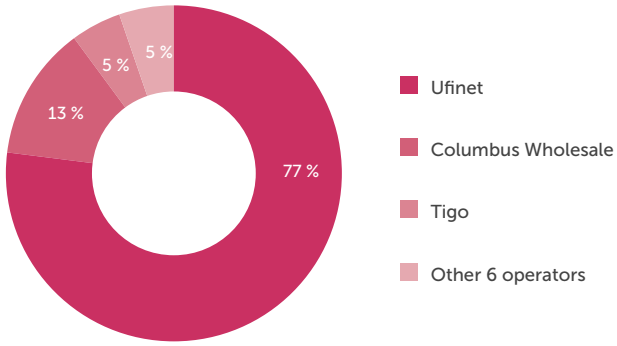
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 106.
Costa Rica. Connections, wholesale Internet access.
Percentage distribution by contracted speed, 2018
(Quarterly figures in percentage)



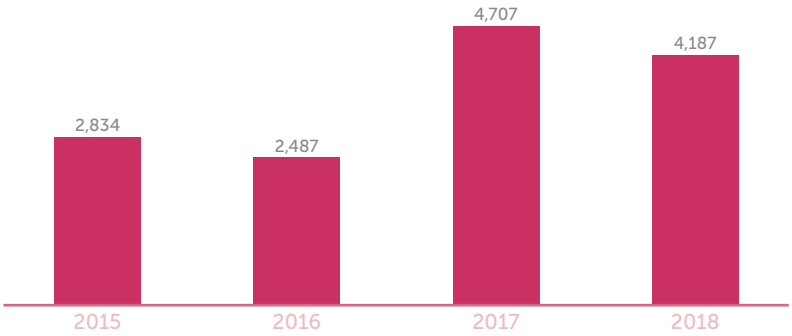
Source: Sutel, General Directoratefor Markets, Costa Rica, 2018.

Graph Nº 107.
Costa Rica. Connections, wholesale Internet access.
Market share per service provider, 2018
(Figures in percentage)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

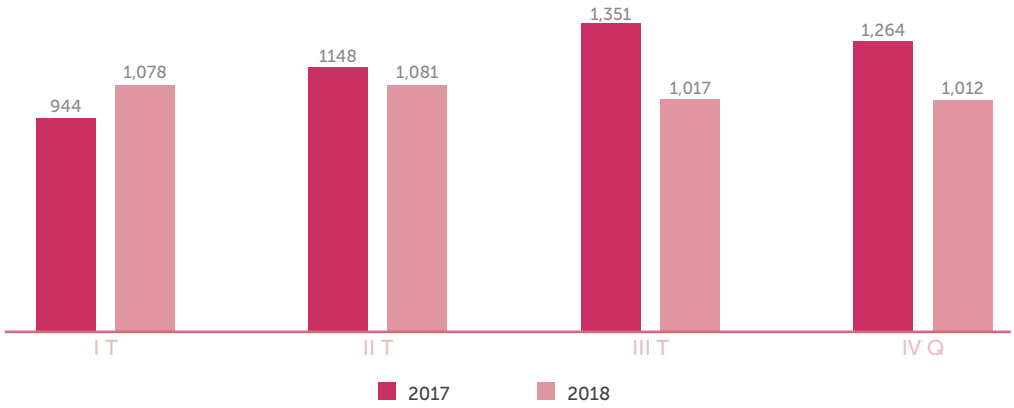
Graph Nº 108.
Costa Rica. Revenue, wholesale Internet access, 2014 – 2018
(Annual figures in millions of colones)



Wholesale revenues vary -11 % despite increase in subscriptions.

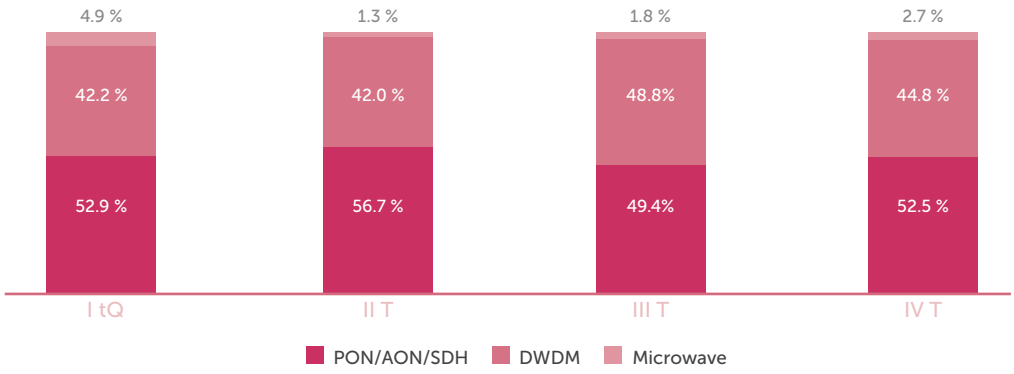
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 109.
Costa Rica. Revenue, wholesale Internet access, 2017 – 2018
(Quarterly figures in millions of colones)



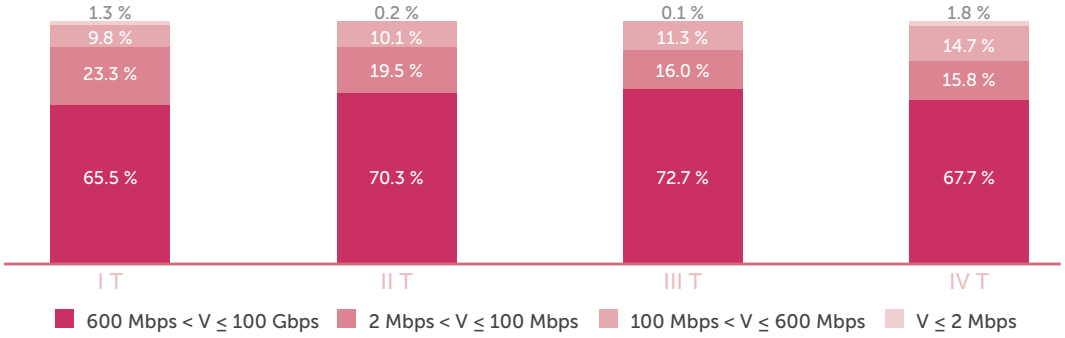
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 110.
Costa Rica. Revenue, wholesale Internet access. Percentage distribution by technology, 2018
(Quarterly figures in percentage)



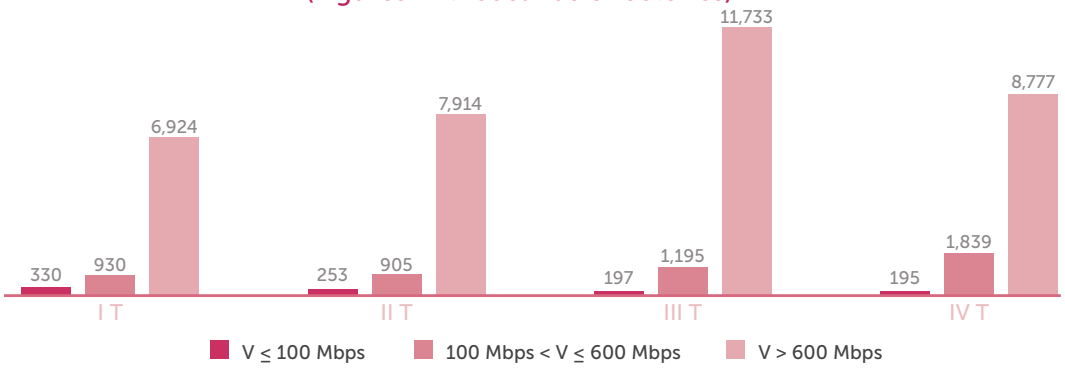
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 111.
Costa Rica. Revenue, wholesale Internet access.
Percentage distribution by contracted speed, 2018
(Quarterly figures in percentage)



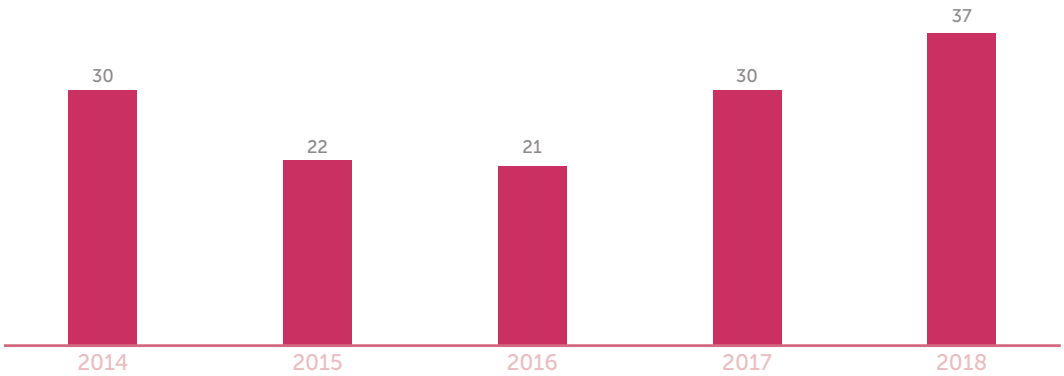
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 112.
Costa Rica. Revenue, wholesale Internet access.
Monthly average per connection by contracted speed, 2018
(Figures in thousands of colones)

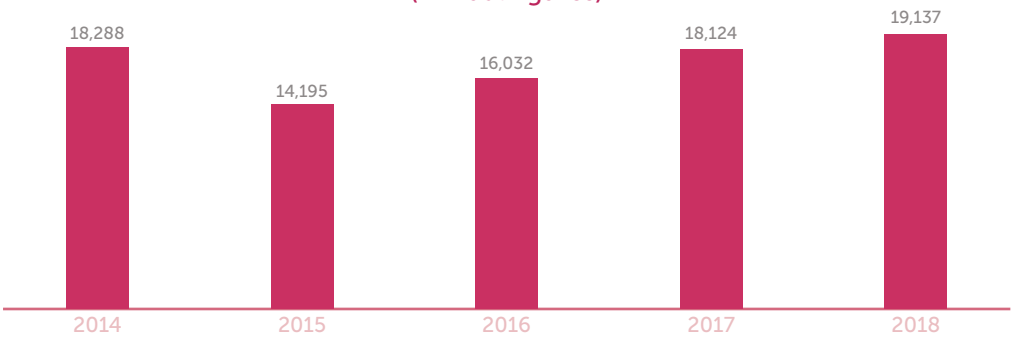


Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 113.
Costa Rica. Number of market participants, leased lines, 2014 - 2018
(Annual figures)

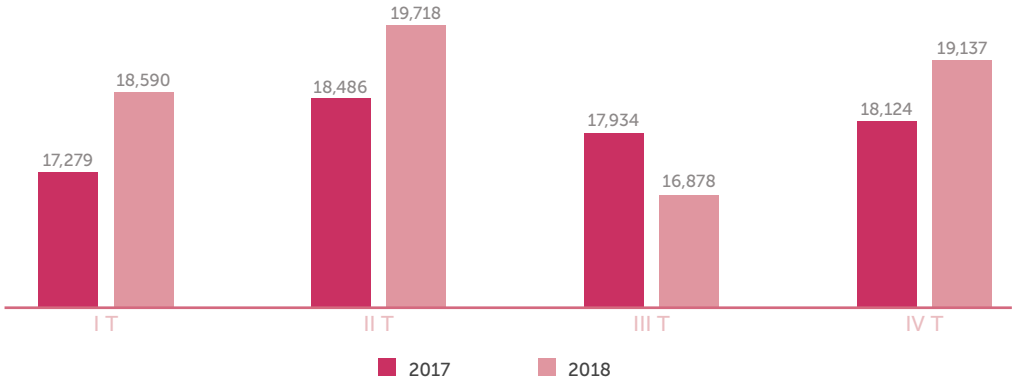


Graph Nº 114.
Costa Rica. Connections, leased lines, 2014 - 2018
(Annual figures)



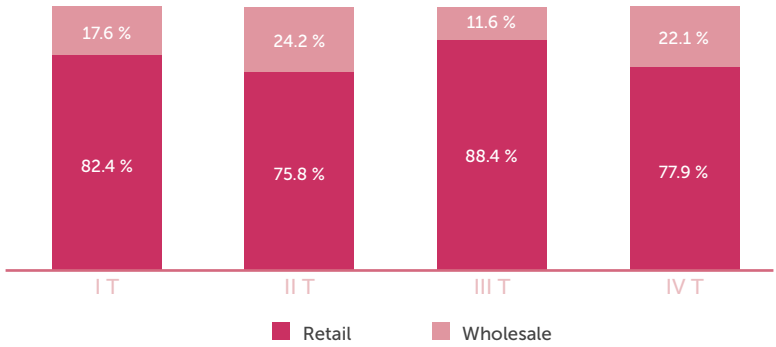
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 115.
Costa Rica. Connections, leased lines, 2017 - 2018
(Quarterly figures)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

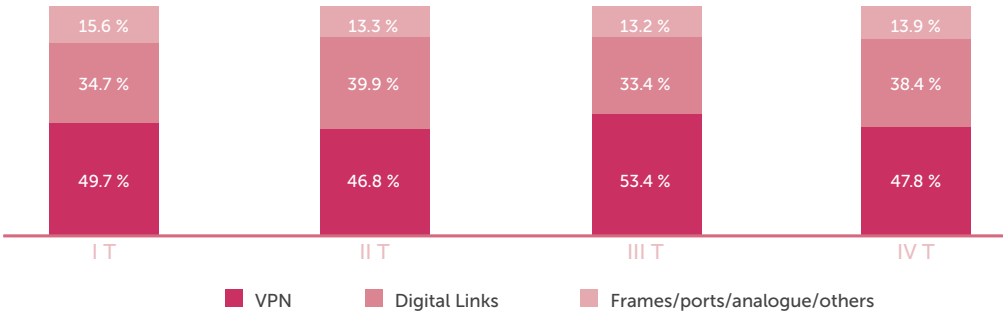
Graph Nº 116.
Costa Rica. Revenues, leased lines. Percentage distribution by market type, 2018
(Quarterly figures in percentage)



77,9 % of dedicated links correspond to retail connections.

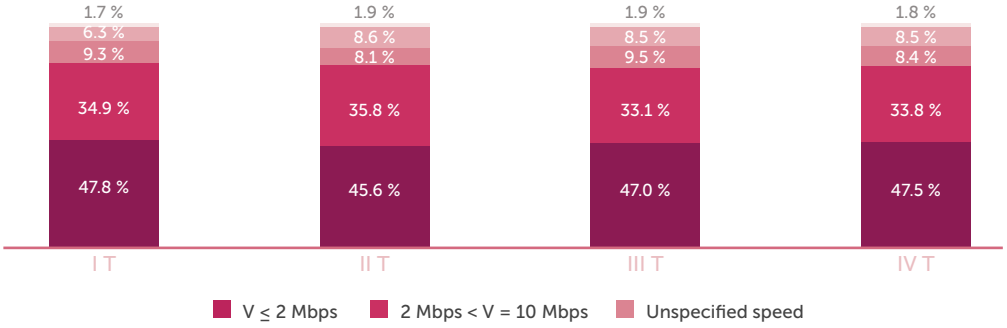
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 117.
Costa Rica. Connections, leased lines. Percentage distribution by technology, 2018
(Quarterly figures in percentage)



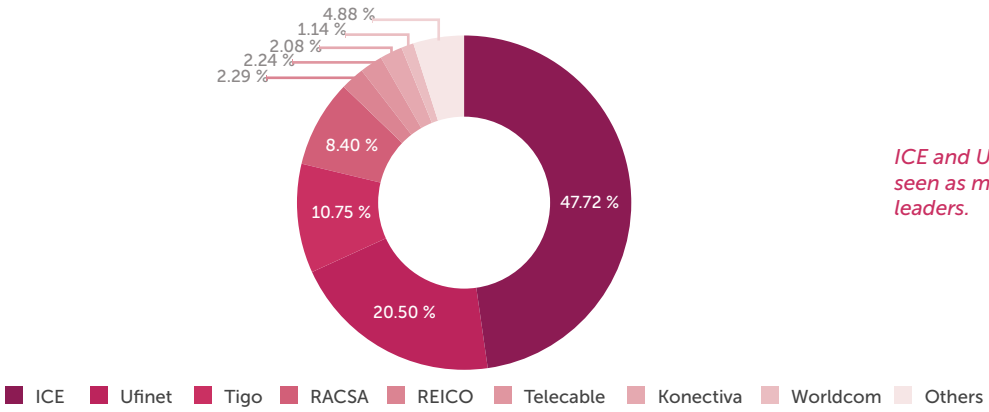
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 118.
Costa Rica. Connections, leased lines.
Percentage distribution by contracted speed, 2018
(Quarterly figures in percentage)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

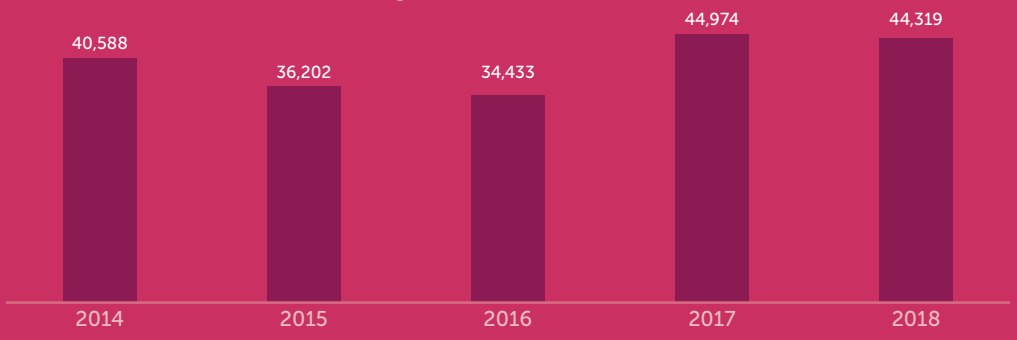
Graph Nº 119.
Costa Rica. Connections, leased lines. Market share per service provider, 2018
(Figures in percentage)



ICE and UFINET are seen as market leaders.

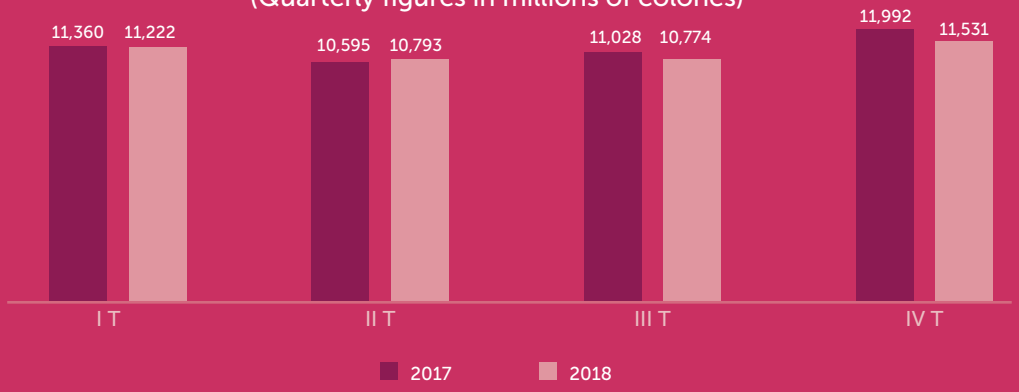
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 120.
Costa Rica. Revenues, leased lines, 2014 - 2018
(Annual figures in millions of colones)



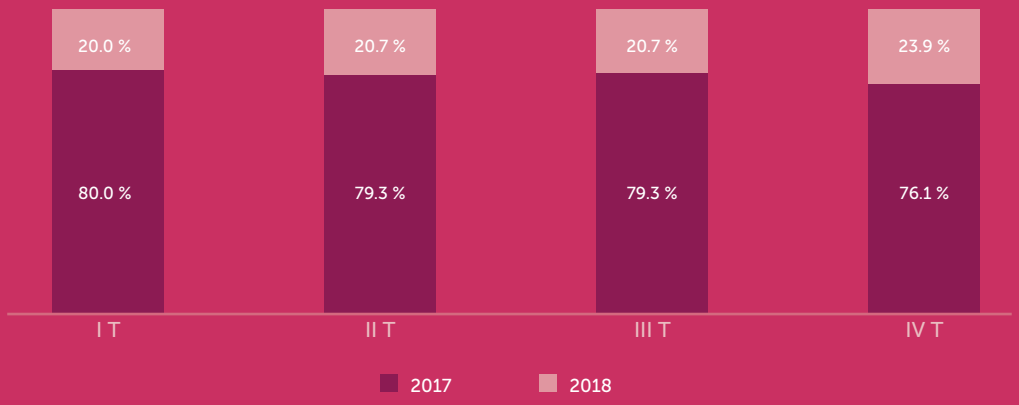
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 121.
Costa Rica. Revenues, leased lines, 2017 - 2018
(Quarterly figures in millions of colones)



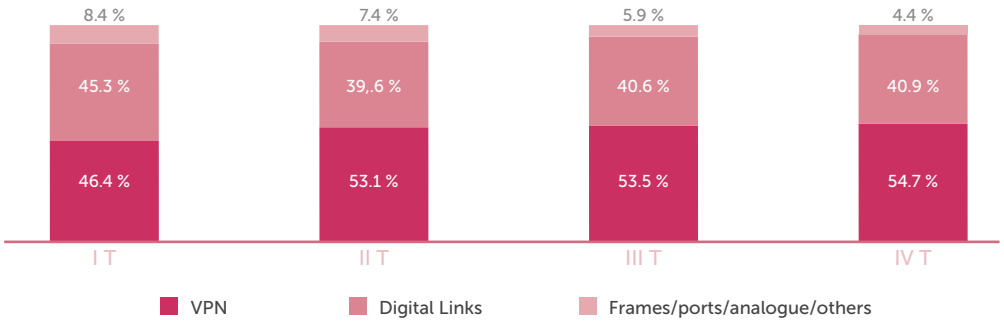
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 122.
Costa Rica. Revenues, leased lines. Percentage distribution by market type, 2018
(Quarterly figures in percentage)



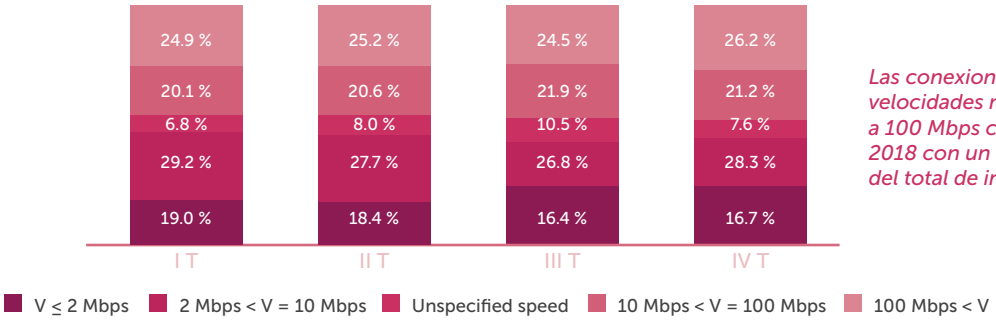
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 123.
Costa Rica. Revenues, leased lines. Percentage distribution by technology, 2018
(Quarterly figures in percentage)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

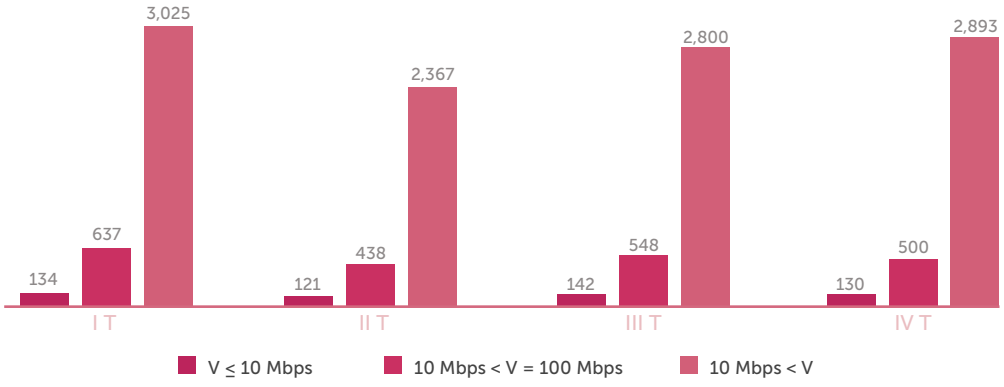
Graph Nº 124.
Costa Rica. Revenues, leased lines. Percentage distribution by contacted speed, 2018
(Quarterly figures in percentage)



Las conexiones con velocidades mayores a 100 Mbps cierran el 2018 con un 26,2 % del total de ingresos.

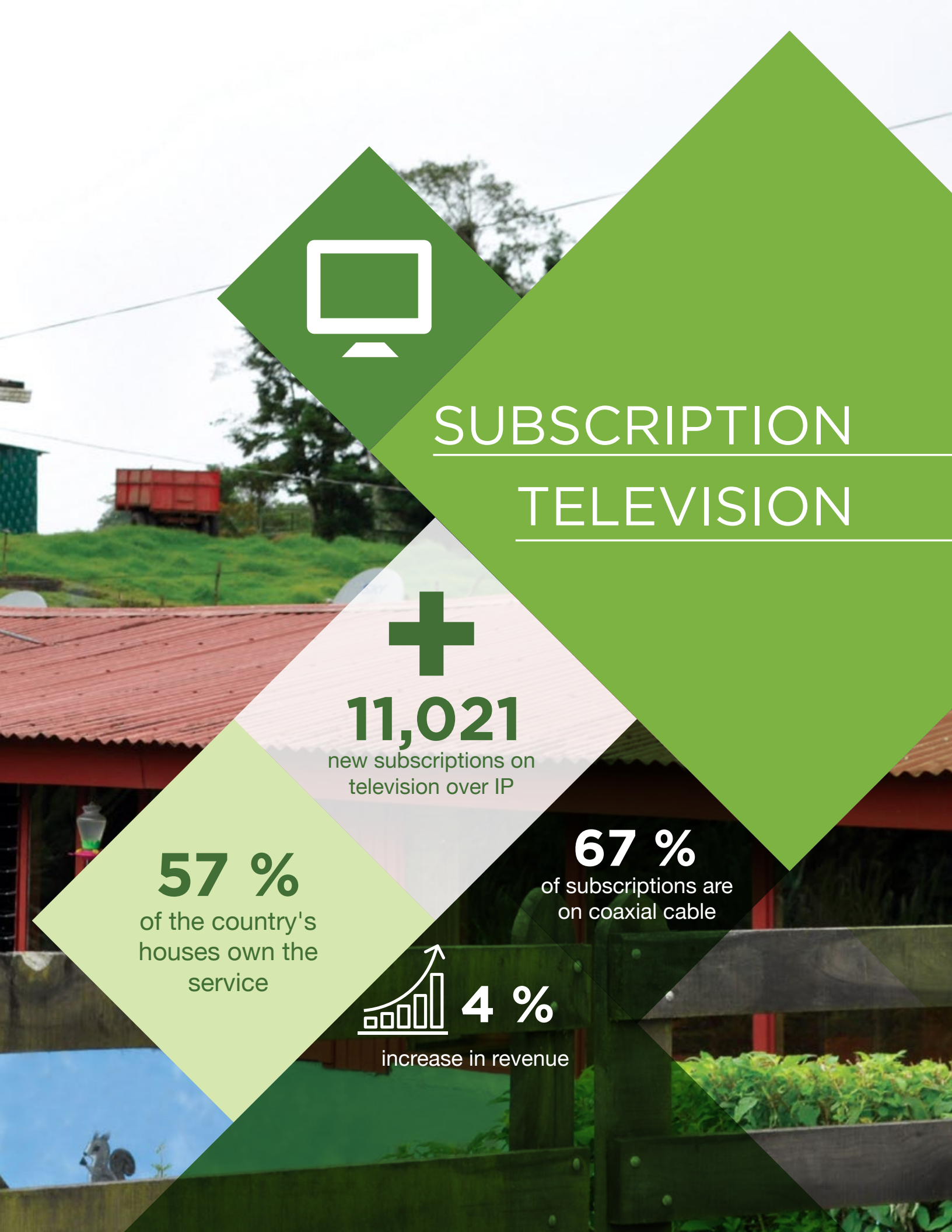
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Gráfico Nº 125.
Costa Rica. Revenues, leased lines. Monthly average per connection by speed, 2018
(Figures in thousands of colones)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Poasito, community located on the slopes of Poás Volcano in Alajuela



SUBSCRIPTION TELEVISION

11,021
new subscriptions on television over IP

67 %
of subscriptions are on coaxial cable

57 %
of the country's houses own the service

4 %
increase in revenue

Subscription Television

As of December 2018 the commercial offer available for subscription television includes 31 providers that offer the service under the following modalities: cable subscription television (25 providers), wireless subscription television including satellite and microwave (5 providers) and finally, 2 companies that deliver via Internet Protocol television (IPTV)[34].

Subscriptions

The total number of subscriptions to this service for 2018 amounts to 883,883, which means 51,976 more compared to 2017 for a 6 % increase over the previous year and the highest percentage increase in the last two years (24,345 subscriptions or a 3 % growth for 2016 and 10,332 new subscriptions in 2017 with 1 % growth).

This is shown in graph Nº 126, which denotes that subscription television maintains its growing tendency and thus generates, for this last year, an average growth of 5 % between 2014 and 2018.

In terms of year-to-year performance disaggregated on a quarterly basis, and comparing 2017 with 2018 particularly on the subject of subscriptions, constant growth rates present a slight growing tendency of around one per cent during this period. Thus, the quarterly performance indicated in previous reports is reversed: the first two quarters of each year present a rate of growth higher than the third and fourth quarters.

During the fourth quarter of 2018, 51 976 new subscriptions were registered with regards to the same period of 2017, which represents the largest increase in the number of subscriptions at quarterly level in this period (see graph Nº 127).

In relation to 2018 subscriptions by type of access technology, the service through coaxial cable continues to be predominant, with 67 %, followed by satellite television with 29 %, and finally television over IP and multipoint with the remaining 4 % (see graph Nº 128).

An analysis of the 2014-2018 period shows an important transformation in the service and the evolution of technology, particularly because there is a drop in the market share of cable service and there is again an increase of one point in the supply of subscription television over IP and Multipoint (see graph Nº 129).

This growing tendency has been registered since 2016 as a consequence of the increase in subscriptions to IP service. For example, in 2017 and 2018, this service modality reported an increase of 7,443 and 10,763 users respectively for each year (47 % and 46 % respectively) (see table Nº 13).

Finally, there is the percentage increase corresponding to the service offered via satellite, which for 2018 is one point lower than in 2017 but always reflecting positive figures in its variation.

In the specific case of television service over IP, the fact stands out that for the period 2017 - 2018 this service modality continues growing for the second consecutive year, specifically 50% for this last year, which represents 11,021 new subscriptions, thus being the service option with the highest percentage increase for 2018 (see table Nº 13).

As far as the penetration of subscription television, this indicator presents an increase and reaches a value of 18 %, evidencing that the growth in the total subscriptions to the service is higher than the demographic growth

[34] This total amounts to 32 because a telecommunications service provider can offer it under several modalities.

of the country. Similarly, the relationship between the total number of subscriptions to the subscription television and the number of homes by 2018 show that for this year in the country there are 57 subscriptions to the service for every hundred home, a value that represents one point of the value registered in 2017 (see graphics Nº 130 and Nº 131).

As for the level of market concentration associated with subscription television —Herfindahl-Hirschman Index (HHI)[35]— according to calculations for the 2014 – 2018 period, the lowest value of the period is recorded in 2018. (See graph Nº 132).

Regarding the measurement of the tenure of subscription television at homes, derived from the National Household Survey (ENAHO, in Spanish), we can see that 70.6 % of households (1,087,716) have access to subscription television in some modality. This means a 5 % growth rate with respect to 2017 and, in absolute terms, a total of 55 891 households more than the previous year.

It is important to point out the reduction in the gap from 29 points in 2017 to 26 points in 2018, between homes that have this service and those that do not. Likewise, and consequently, the decrease in the percentage of homes with access to open television which registered an average annual rate of decrease of 6 % from December 2014 to December 2018 (see graph Nº 133).

With regards to the breakdown of the total number of subscriptions to the service of television by canton, map Nº 1[36] shows the penetration of the service in the cantons in relation to their population[37]; note those cantons with the highest penetration percentages. Among them, the canton of Garabito, in the province of Puntarenas, stands out with 53.05 %. In contrast, the canton of Jiménez, within the province of Cartago, has approximately eight subscriptions per 100 inhabitants (see table Nº 14).

The competitive dynamics in these two cantons in particular shows that by December 2018, six companies generated 13 123 subscriptions to Paid TV in the canton of Garabito and in the case of Jiménez, the 1258 subscriptions are offered by seven companies.

Revenue

As for the revenue generated by the provision of subscription television service, these continue to show the growing trend, so that by 2018 it reached the sum of 155,126 million colones which represents a growth rate compared to 2017 of 4 %, equivalent to 6,619 million colones. Furthermore, taking 2014 as a reference year, revenue in this service with respect to 2018 presents an annual growth rate of 6 % (see graph Nº 134).

In relation to the tendency of revenue disaggregated by quarter, it can be inferred that the average quarterly revenue for 2018 is 38,782 million colones, 1,655 million colones more than 2017. Specifically, comparing the average quarterly variation rate for the years 2017 and 2018, this is 1 %, a value that is the same for the period 2016 – 2017 (see graph Nº 135).

The analysis of the composition of revenue according to access technology shows two important aspects. The first refers to the fact that the indicator of revenue generated by technology confirms the preponderance of the service provided by coaxial cable, because by 2018 this service modality represents 70 % of total income, followed by satellite service with 26 %, and the rest of the technologies that represent 4 % (see graph Nº 136).

[35] Ver definición en apartado de Metodología.
[36] The map presents a cantonal segmentation of five categories, grouping the same number of cantons in them.
[37] National Institute of Statistics and Censuses. District population estimates and projections by sex and age groups, 2011 - 2050.

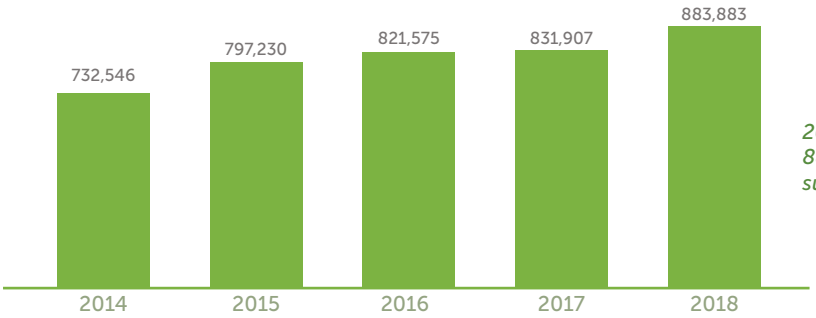
Secondly, it emphasizes that the distribution in the 2014-2018 period reflects the technological recomposition of the supply and demand of this market both at the subscriptions and revenue level, because cable television shows a gradual percentage decrease going from 74 % in 2014, to 69 % in 2018 (five percentage points less of participation during the last five years). Satellite technology and other technologies (IPTV and MMDS-multipoint channel) are the ones that promote this decrease as the former goes from 25 % in 2014 to 27 % in 2018. The other technologies, but mainly IPTV, increased their percentage share in 2018 by 4 %, triggered by the beginning of the commercialization of this modality by the only two suppliers in 2017. See graph Nº 137.

Additionally, and particularly in the period 2017 - 2018, table Nº 15 complements the aforesaid, so that it can be seen that the constant experienced by coaxial cable television derives from the stability in the revenue generated under this modality and an increase in the revenue of the rest of technologies: IPTV and MMDS-multipoint multichannel.

On the other hand, in relation to the average revenue per subscriber for the service in 2018, it totals 14,625 colones (251 colones less than in 2017). This represents a decrease of 2%.

The average revenue per subscriber according to access technology, on the other hand, continues to present a diverse trend; for example, the revenue from cable service in the period 2017 - 2016, decreases approximately 182 colones, as well as the satellite and IPTV modalities that decrease 457 and 324 colones respectively. Multichannel multipoint mode increases by about 536 colones. See graph Nº 138 and Table Nº 16.

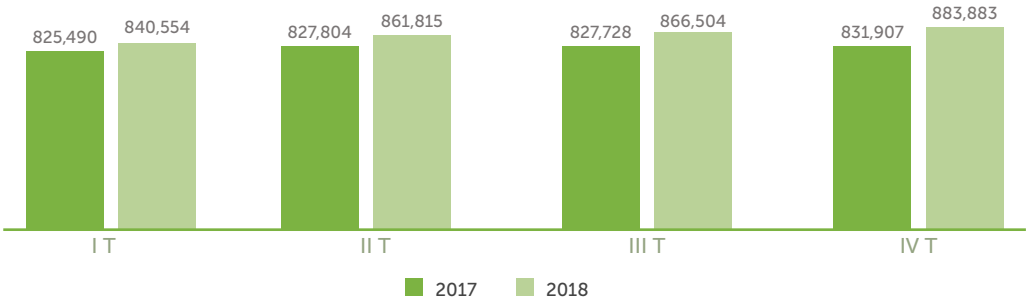
Graph Nº 126.
Costa Rica. Total Pay-TV Subscriptions, 2014 - 2018
(Annual figures)



2018 reported a total of 883,883 subscriptions to subscription TV.

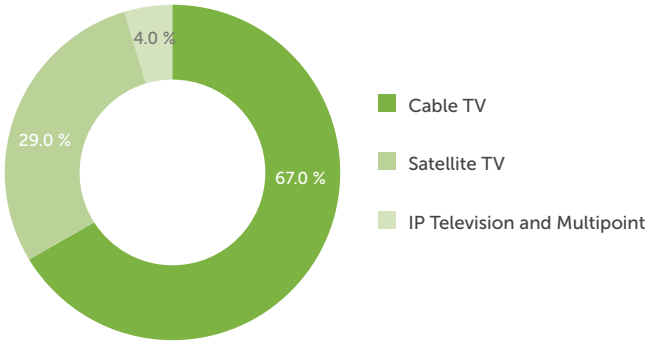
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 127.
Costa Rica. Total Pay-TV subscriptions by quarter, 2014 – 2018
(Annual figures)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

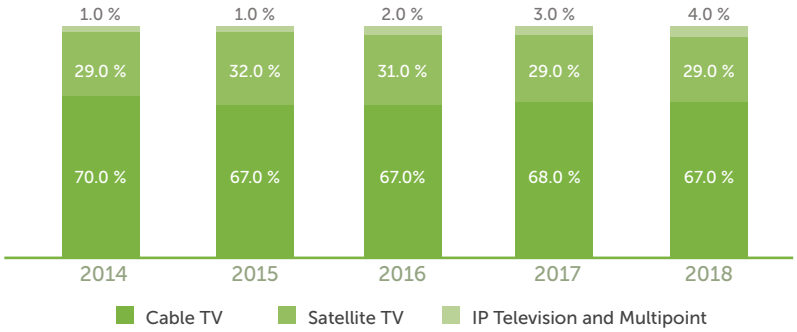
Graph Nº 128.
Costa Rica. Percentage share of Pay-TV subscriptions according to access technology, 2018



67 % of the subscriptions recorded in 2019 are offered thru coaxial cable.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 129.
Costa Rica. Evolution of percentage share of Pay-TV by technology, 2014 – 2018
(Figures in percentage)



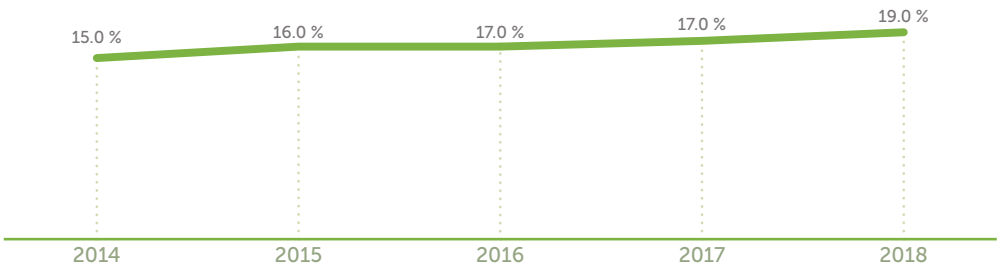
The participation of television by subscription over IP and Multipoint for 2018 increased by 1 %.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 13.
Costa Rica. Total number of subscriptions to subscription television by access technology, 2014-2018
(Numbers by year)

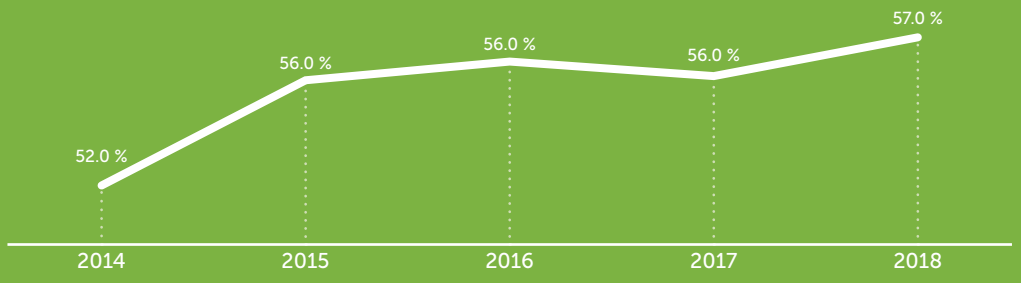
Technology	2014	2015	2016	2017	2018
Cable Television	510,390	531,807	548,113	563,607	594,508
Satellite Television	217,140	257,986	257,486	244,881	255,193
Television over IP	4,191	6,434	14,702	22,054	33,075
Multipoint terrestrial distribution service	825	1,003	1,274	1,365	1,107
Total	**732,546**	**797,230**	**821,575**	**831,907**	**883,883**

Graph Nº 130.
Costa Rica. Pay-TV subscriptions per every 100 inhabitants, 2014 – 2018
(Figures in percentage)



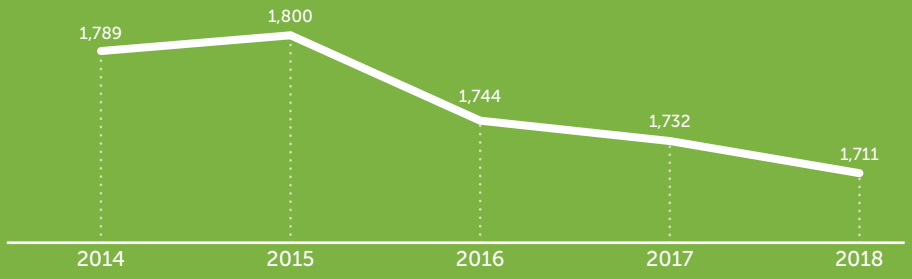
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 131.
Costa Rica. Pay-TV subscriptions per every 100 households, 2014 – 2018
(Figures in percentage)



Source: SUTEL, General Directorate for Markets based on Population Estimates and Projections. INEC 2011 - 2050, Costa Rica, 2018.

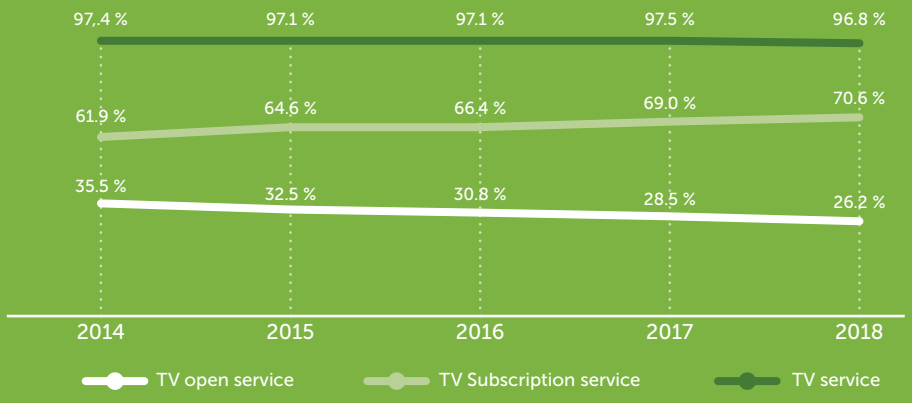
Graph Nº 132.
Costa Rica. Yearly evolution of HHI. 2014.- 2018



2018 presents the lowest HHI value for the service of subscription TV.

Source: Sutel, General Directorate for Markets and INEC, Costa Rica, 2018.

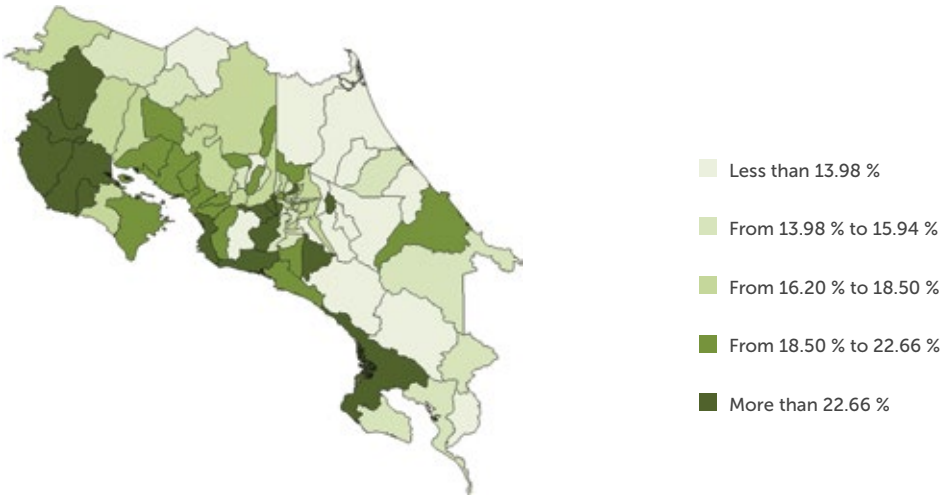
Graph Nº 133.
Costa Rica. Percentage of households with some TV service, 2014 – 2018
(Figures in percentage)



1.6 % more homes have the service of subscription television.

Source: Sutel, General Directorate for Markets and INEC, Costa Rica, 2018.

Map Nº 1.
Costa Rica. Subscriptions to Pay-TV per every 100 inhabitants, per canton, 2018



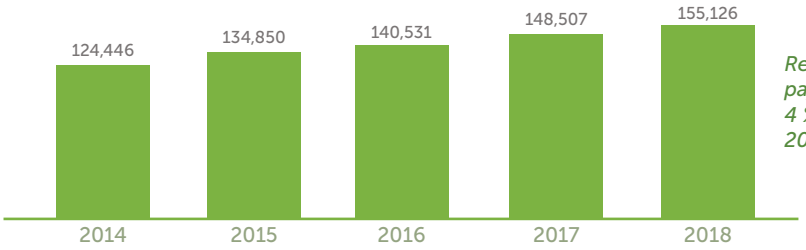
Source: SUTEL, General Directorate for Markets, based on Population Estimates and Projections. INEC 2011 - 2050

Table Nº 14.
Costa Rica. Subscriptions to subscription television by 100 inhabitants by canton, 2018
(Percentages)

Canton	%	Cantón	%	Canton	%	Canton	%	Canton	%
Garabito	53,05	Montes de Oca	22,66	Curridabat	18,50	Coto Brus	15,94	Paraíso	13,97
Santa Cruz	31,63	Tilarán	22,57	Nandayure	18,49	León Cortés	15,82	Pérez Zeledón	13,94
San Isidro	29,18	Aguirre	22,35	Atenas	18,17	Tibás	15,65	Turrialba	13,72
Carrillo	28,73	Montes de Oro	21,55	Cañas	18,09	Golfito	15,64	Guácimo	12,75
Parrita	27,81	Orotina	21,40	Bagaces	17,99	Flores	15,50	Corredores	12,65
Dota	27,11	Hereria	20,96	La Unión	17,98	Siquirres	15,43	El Guarco	12,46
Alvarado	26,43	Turrubares	20,62	San Ramón	17,88	Goicoechea	15,38	Valverde Vega	12,39
Belén	26,41	San Mateo	20,57	Vásquez de Coronado	17,68	Desamparados	15,25	Pococí	12,02
Acosta	26,40	Alfaro Ruiz	20,35	Santo Domingo	17,58	Talamanca	15,24	Buenos Aires	11,70
Santa Ana	25,65	Abangares	20,35	San Carlos	17,55	Poás	15,14	Oreamuno	11,20
Escazú	25,43	Puntarenas	19,49	Moravia	17,47	Naranjo	14,86	Puriscal	11,10
Nicoya	25,01	Limón	19,31	Cartago	17,05	Aserrí	14,79	Alajuelita	11,00
Mora	24,18	Esparza	18,98	San José	16,69	San Rafael	14,74	Matina	10,79
Osa	23,70	Grecia	18,70	Palmares	16,67	Guatuso	14,52	Sarapiquí	10,67
Hojancha	23,42	San Pablo	18,51	La Cruz	16,66	Santa Bárbara	14,31	Los Chiles	9,63
Liberia	23,21	Tarrazú	18,50	Alajuela	16,60	Upala	13,98	Jiménez	7,74
				Barva	16,20				

Source: Sutel, General Directorate for Markets based on Population Estimates and Projections. INEC 2011 - 2050, Costa Rica, 2018.

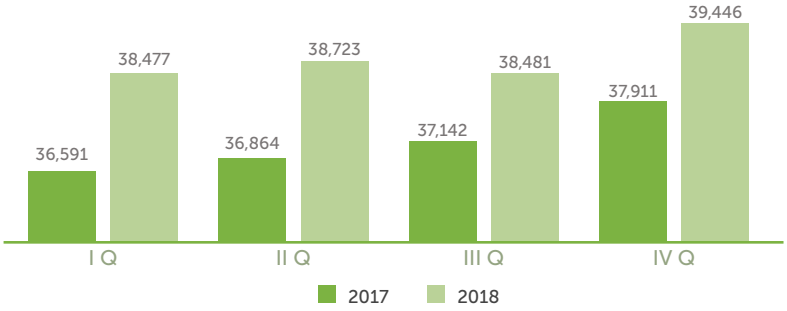
Graph Nº 134.
Costa Rica. Total income from Pay-TV subscription service, 2014 – 2018
(Annua figures in millions of colones)



Revenue generated from pay television increased 4 % between 2017 and 2018.

Source: Sutel, General Directorate for Markets, Costa Rica, 2018

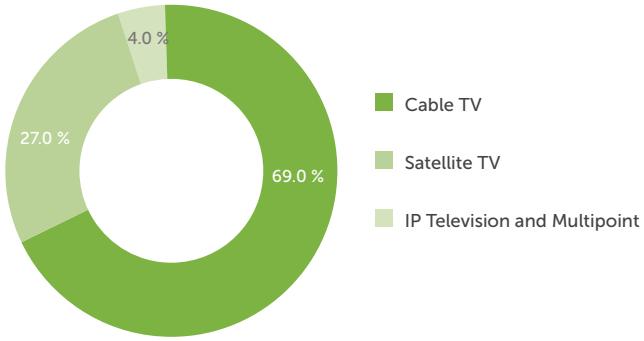
Graph Nº 135.
Costa Rica. Total income of Pay-TV per quarter, 2017 – 2018
(Figures in millions of colones)



Average quarterly revenue in 2017 is 39,366 million colones.

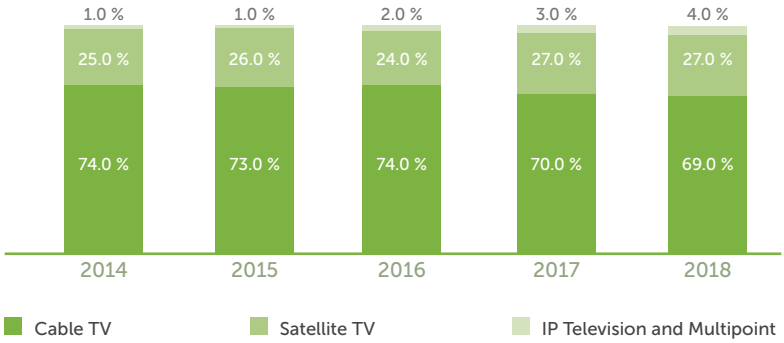
Source: Sutel, General Directorate for Markets, Costa Rica, 2018

Graph Nº 136.
Costa Rica. Percentage share of Pay-TV service income by access technology, 2018
(Annual figures in millions of colones)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018

Graph Nº 137.
Costa Rica. Evolution of the percentage share of Pay-TV service income by access technology, 2018
(Annual figures in percentage)



IP Television and Multipoint increase their revenue by 1,926 million colones (46 %) in 2018

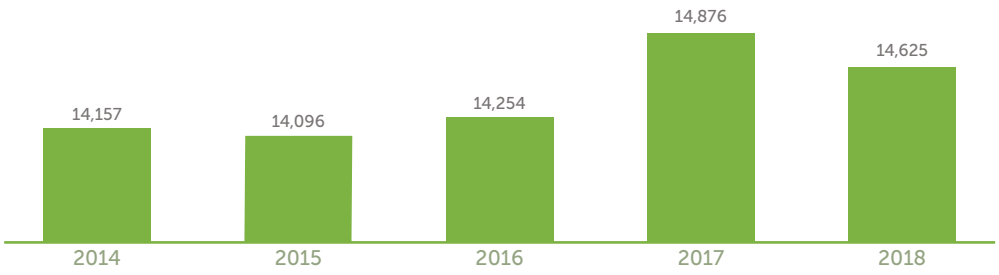
Source: Sutel, General Directorate for Markets, Costa Rica, 2018

Table Nº 15.
Costa Rica. Total revenue from paid television according to access technology per quarter.
(Figures in millions of colones, 2014-2018)

Technology	2014	2015	2016	2017	2018
Cable Television	91,994	98,859	103,927	103,471	107,843
Satellite Television	30,721	34,570	34,220	40,870	41,191
IP Television	1,618	1,371	2,335	4,117	6,045
Terrestrial multipoint Television	57	49	49	50	47
Total	**124,446**	**134,850**	**140 ,531**	**148,507**	**155,126**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018

Graph Nº 138.
Costa Rica. Monthly average income per subscriber Pay-TV service, 2014 - 2018
(Monthly figures based on quarterly information/colones per subscriber)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018

Table Nº 16.
Costa Rica. Average revenue by subscriber to the service of subscription television by access technology 2014 - 2018.
(Annual figures in millions)

Technology	2014	2015	2016	2017	2018
Cable television	15,020	15,491	15,801	15,299	15,117
Satellite television	11,790	11,167	11,075	13,908	13,451
IP Television	32,169	17,760	13,234	15,555	15,231
Terrestrial multipoint television	5,758	4,101	3,198	3,033	3,569
Total	**14,157**	**14,096**	**14,254**	**14,876**	**14,625**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018

Claudia Ramírez López,
prepaid line vendor outside the Costa Rica Post Office building
in San José.

COMMERCIAL OFFERS AND PRICES

Postpaid prices **drop 10%**

Prepaid mobile telecommunications prices **down 3 %**

11 %

reduction in fixed Internet prices in the last semester

The number of double-play offers increase

Commercial Offers of Telecommunication Services

Prices of the CommercialOffers of Mobile Telecommunications Services

The analysis of the prices of mobile telecommunications services is completed with information from two offer profiles based on the characteristics of the plans reported by the operators to the "Mi Comparador"[38] tool, in terms of call minutes and maximum download data.

The detail of the plans offered in 2017 and 2018 by the different mobile operators, which coincide with or approach the two previously defined offer profiles, are indicated in Tables Nº 74 , Nº 75 and Nº 76 of the Statistical Annex.

A comparison of the plans of both offer profiles allows a series of observations, which are set out in the following paragraphs.

The number of plans that fit the selected parameters (300 or 600 minutes of telephony and 4 or 8 Kb of download) increased in 2018 with respect to those existing in 2017. At the end of 2018, there were eleven plans in force that met these characteristics for each user profile; in 2017, the number was seven.

Three of Claro's plans available at the end of 2018 were in operation since the previous year. The same happens with one plan from Kolbi's. This implies price invariability for all four plans.

Two of the plans offered by Movistar that were offered at the end of 2017, called Plan 4G@3 (with and without terminal), were modified in 2018. The modification implied an increase in the number of minutes of conversation available (from 250 to 300 minutes) and an increase in the corresponding download equivalent, in both cases, to an additional 1 GB. Associated with this change, the price of the non-terminal plan increased from 20,900 colones to 21,500 colones (2.9 %). The cost of the terminal plan, on the other hand, went down from 24,000 colones to 21,500 colones (-10.4 %).

Actually both price changes actually imply a benefit for the consumer. In fact, even in the case of the plan without the terminal, the increase of 600 colones is compensated by an increase in the number of minutes of available calls (50 minutes); valued at 34, it is equivalent to 1,700 less colones. Add to this the GB of additional download. Needless to say, in all cases, the user received a benefit.

In 2018, Movistar introduced a plan with a cost to the user of 26,500 that considers 600 minutes of telephone conversation and 11 GB of data download. The existing plan in 2017, which by its characteristics is the most similar to that proposed by Movistar, is one of ICE that includes 600 minutes and 7 GB of download, with a price of 26,000 colones, that is, 500 colones cheaper (-1.9%). However, considering the additional 4 GB of download, as a whole Movistar's plan appears to be the least expensive in 2018.

During 2018, Claro included another plan, which differs from the one that the operator had already made available to its customers the previous year. This new plan included the following: (i) an increase in the amount of data that could be downloaded from 14 GB to 16 GB and (ii) an increase in the cost of the plan of 3,000 colones (from 18,500 to 21,500 colones, or 16.2 % more). If we value this additional

[38] The characterization of the profiles mentioned above is included in the Methodology section.

download at a price of 9,005 colones per GB, (which is the maximum rate authorized by Sutel for downloading data from the Internet), the cost to the user of the plan available in 2018 is lower than the one offered in 2017. In other words, the consumer would be saving 18,010 colones, by the additional 2 GB that could be downloaded.

In 2017, one of the plans presented by Claro referred to an offer of 600 minutes of conversation and 8 GB of data download, with a sales price of 34,900 colones. In 2018, Claro introduced two plans that contemplated the same 600 minutes, but with a variation of 14 GB of download and a price of 28,900 colones in one case, and 16 GB and 31,900 colones in the other. Both 2018 plans are more beneficial to the consumer than those of 2017 because their lower economic cost (-17.2 %), and because the higher data download allowed for less price. If the 6 GB and 8 GB additional were valued to the maximum rate authorized by Sutel for downloading data from the Internet, the user would be receiving that greater capacity at no cost, which according to this maximum market value implies a savings of 54,030 and 72,040 colones, as the case may be.

Other plans included in My Comparator in 2018 correspond to ICE's K2 Conversion plan that contemplates 400 minutes of conversation and 5 GB download, with a cost to the user of 16,000 colones. A similar plan, also from ICE, corresponding to 2017, is called 4G k3, offers 300 minutes and 5 GB of download, with a value of 18,000 colones. Again, the benefit to the 2018 plan is appreciable because its lower cost (-11.1 %) and the larger number of conversation minutes offered.

Based on the above information, plans introduced by operators in 2018 imply benefits for users, either because they are offered at lower prices than those released in 2017 or because they include greater consumption possibilities, in terms of minutes of conversation or data traffic, according to the previous examples. This implies not only lower prices than those of the previous year, but also an additional added value for each colón paid by the user.

This commercial dynamic is associated with higher levels of competition in the market and it is an important indicator after the declaration of the mobile telecommunications market as an effective competitive market, resulting of resolution RCS-248-2017 of September 18, 2017.

Commercial offers for the service of fixed internet

The tool My Comparator includes information about the service of fixed Internet. As noted in the chapter on Methodology, the information facilitates the evaluation of price variations associated with this service.

Tables N° 17 and N° 18 show a comparison in the commercial offers made during the years 2017 and 2018 respectively, which reported prices applicable exclusively to the residential service of fixed Internet.

The analysis contemplates an offer profile with the following characteristics for both years:

- Over-subscription[40] level of 20 users per connection.
- Connection speeds of 8 and 6 Mbps in the case of offers in force in 2018 and 8 Mbps in the case of 2017 offers.

[39] Refers to the rate of ¢ 0.0076 without taxes applicable to data transfer (KB) for mobile Internet service in prepaid mode, set by resolution RCS-295-2012 taken by the Board of Superintendence of Telecommunications, in the ordinary session N° 059-2012, held on October 3, 2012.

[40] Oversubscription refers to the number of connections to the Internet service per connection link.

On the basis of the data collected, a comparison can be made between the average prices charged in 2017 and those in force in 2018, considering the connection speed of the aforementioned 8 Mbps. The average price of 2017 (19,398 colones) is higher than the 18,470 colones charged on average a year later. The reduction is equivalent to 4.8%.

Bear in mind that the service of fixed Internet is sold in packages that include telephony and subscription television. Table Nº 19 includes a detail of commercial offers of fixed telephony packages available in 2017 to most users of fixed telephony (96 associated in turn with the four providers with national coverage (Cabletica, ICE, Telecable and Tigo) and that offer a speed of at least 6 Mbps per second and an over-subscription of 20 users per connection.

Table Nº 20, on the other hand, shows the packages available in 2018, a year that includes the offers of all providers, regardless of whether their coverage includes all of Costa Rican or not. Therefore, the number of offers and suppliers included (26) is greater than those active the year before (7).

Again, starting from the offers in which the connection speed is 8 Mbps, while in 2017 the average price of a package reached 28,948 colones, in 2018, that average had risen to 32,101 colones per package (10.9 % more).

The increase in prices in 2018 may be due, among other aspects, to the increase of approximately 6.8 % in the exchange rate, since the offers of some operators are subscribed in dollars. The increase in the price may also be the result of the packaging of Internet plus subscription television, a service in which content providers increase the number of channels on the grid as an element to compete, so that the price offered in the packages may be higher than similar offers in previous years.

Evolution of the prices of fixed internet and subscription television

Prices of fixed Internet services associated to a 1:20 level of oversubscription according to information reported to SITEL

Complementary, for the elaboration of the Report of Statistics of the Telecommunication Sector 2018, Sutel used the data available in the System of Indicators of Telecommunications (SITEL in Spanish), to analyze the evolution of the prices, specifically for the service of fixed Internet. Each operator must enter the data in this system and indicate the average charged for the services provided or, in this case, the price according to the download speed contracted by each user.

Most active operators and providers in the country offer Internet access with an over-subscription level of 1:20 because it can be offered at the lowest price and therefore constitutes the available option with the greatest number of users.

When it comes to asymmetric modality[41], this level of subscription is offered primarily to the residential sector, as well as to small and medium enterprises. Table Nº 21 shows a detail of the prices associated with the service (minimum, maximum and average) during 2018, considering asymmetric speeds.

In general, there is a direct relationship between the download speed and the corresponding rate. While a connection with a speed of 512/256 Kbps[42] the average price is 5500 colones, when the connection speed increases to 10/1 Mbps, the average price also increases to 29,038 colones.

[41] Asymmetric mode service should be understood as the Internet service in which the download speed differs from the upload speed, the first of these speeds being higher.

[42] In the case of the fixed Internet service, the offers of the service providers are made considering the connection speed expressed in Kbps; it should be noted that 1024 Kbps equivalent to one Mbps.

The comparison of the prices reported by operators in the SITEL for the period 2014-2018 makes it evident that in 2017 services with connection speeds above 3072/768 Kbps showed higher prices than those recorded in 2016. However, 2018 was characterized by prices lower than those recorded in all other measured years.

The difference is more noticeable when we compare 2014 and 2015 prices, specifically the ones referred to connection speeds above 3072/768 Kbps.

The downward trend observed in general for the prices of this service is associated with the growth in the number of telecommunications providers that offer it, especially subscription television operators that in principle only offered this last service. Thus, the competitive dynamism in this segment has increased and favored the user.

The ranges of price variation offered in the different consigned speeds, during the last five years, are shown in both Table Nº 22 and Graphic Nº 139.

Prices for fixed internet reported in the SITEL for services associated to a level of oversubscription of 1:5

Another level of over-subscription for which there is an available offer that allows prices to be associated with different connection speeds is the one called five services per link; that is, with an over-subscription level of 1:5. In this case, considering the asymmetric connection modality and as in the case of the 1:20 over-subscription, there is a direct relationship between connection speed and price, which occurs for all the considered connection speeds.

The higher the speed, the higher the price at which the respective service is offered. The average price range varies from 32,870 colones for a connection speed of 512/256 Kbps to 208,734 colones when the speed reaches 10/1Mbps. The details of the prices (maximum, minimum and average), applied by the providers during 2018, for asymmetric connection speeds, with an over-subscription level of 1:5, are shown in Table Nº 23.

Table Nº 24 and Graphic Nº 140, show the range of variation of the rates of the asymmetric Internet service offered in the last four years, considering an over-subscription level of 1:5. In general, 2018 prices are similar to those registered in 2016 and clearly lower than those applied in 2014, surpassing those observed in 2015 and 2017. However, starting in 2015, average prices associated with this service do not differ significantly from one year to the next.

With regard to the 1:5 over-subscription, symmetrical connection modality, increasing average prices are also observed (Table Nº 25), as the respective connection speed increases. From 101,856 colones on average for a 512 Kbps connection, the price rises to 503,722 colones when the connection speed reaches 10 Mbps.

Comparing the average prices for the symmetric mode of the service with an over-subscription of 1:5 over time, the available data shows that except for 2017, 2018 prices are the highest in the 2014-2018 period. The following may be considered as causes of this behavior: (i) the number of providers of fixed Internet connections with symmetric speed is lower than the number of providers offering the asymmetric service, which implies a lessen level of competition regarding the provision of the service, and (ii) the fact that the prices are expressed in dollars means that exchange rate fluctuations in the last two years have caused an increase in the prices in colones. Table Nº 26 and Graphic Nº 141 shows this data.

Comparison of prices reported in the SITEL 2009-2018

The information available regarding the service of fixed Internet, particularly the information concerning the services provided with an

over-subscription level of 1:20, allows a comparison between the prices applied in 2009 and 2018. In this regard, note that 2009 rates were the maximum rates initially set by the Autoridad Reguladora de los Servicios Públicos (ARESEP) and subsequently ratified by Sutel through resolution RCS-615-2009. In 2017 and 2018, on the other hand, market prices result from the review of the relevant markets and the declaration of this market in effective competition. It is appreciable that, because of the opening, greater competition and the increase in the number of Internet service providers, the prices evaluated have experienced a reduction that, on average, reaches 64 %, as shown in Table Nº 27.

This comparison can be seen in Graphic Nº 142, from which it can be deduced that in relative terms the decrease has been greater the higher the respective connection speed, to such an extent that, in the case of the 4096/768 Kbps connection speed, the reduction reaches 81 %.

Prices of subscription television reported in the SITEL

Regarding the performance of the prices of the different services provided using telecommunications networks, the information shared by the various operators of paid-TV makes it possible to determine the maximum, minimum and average prices offered by the basic service packages[43] for the period 2015-2018. The information shows a considerable increase in the price of the service in this last year to the point that while the maximum price reached 30,000 colones in 2018 compared to 19,500 colones in the previous year (a 53.8 % increase), the minimum price went from 5,384 in 2017 to 8,262 colones in 2018, for a 22 % increase.

The increases mentioned are explained both by exchange rate fluctuations in 2018, on the understanding that most service providers bill their customers in that currency, and by the fact that not all basic packages follow the 75 analogue channels cited in the footnote and new offers include the digitization of the service and/or a greater number of channels. Also, note that many of the providers of this service attend certain geographical areas. The respective price details are included in both Table Nº 28 and Graphic Nº 143.

Price Index

Due to the declaration of mobile telephony retail service as a market in competitive conditions in September 2017, as well as fixed Internet retail service in December 2017, Sutel stopped setting the rates for voice minutes, messaging, mobile and fixed data, and so the prices are now established based on supply and demand.

A key instrument for the analysis of the trend in prices of this service in the case of voice minutes, messaging and mobile data is the Index of prices of mobile telecommunications (IPTM) and in fixed data the Index of prices of Fixed Internet (IPIF).

Price Index for Mobile Telecommunications Services (TSPI)

The results of the trend of the IPTM indicate that to December 2018 the prices of mobile telecommunications have experienced a generalized reduction of 6.79 % in relation to July 2017, as a result of the decrease of 9.73 % for the postpaid modality and 2.96 % in prepaid (see Graphics Nº 144, Nº 145, Nº 146).

It is important to point out that on average in 2018 national prices remained 5 % below those recorded in the reference month (July 2017). In the case of prepaid the reduction is 1.5 % and for postpaid of 7.8 %.

[43] It should be understood as a basic package, consisting of 75 analog channels.

Price Index for Fixed Internet (IPIF, in Spanish)

The results of the last IPIF measurement show a sustained decrease in the calculation period (see Graphic Nº 147).

This tendency is also favored in terms of the benefits for the user, in the sense that, in the months of October, November and December 2018, operators made increases in speeds, but with the tariffs of previously contracted speeds.

In general terms, prices have decreased by 11.2 % compared to the base month (July 2018). From the analysis of the average monthly trend of this indicator for the period June 2018 to December 2018, it is gotten a 6.3 % decrease.

Table Nº 17.
Costa Rica. Price of the service of fixed Internet by selected provider and month, level of over-subscription of 1:20, year 2017
(Figures in colones)

Date	Operator	Name of the Plan or Package	Subscription charges and/or installation	Monthly plan of the price of Package (including taxes) (colones)	Download speed
01/01/2017	Telecable	-		18,500	8 Mb
01/12/2017	Telecable			19,250	8 Mb
01/01/2017	Coopelesca	8Mb/1Mb	-	19,925	8 Mb
01/07/2017	Coopelesca	8Mb/2Mb	-	19,925	8 Mb
01/12/2017	Coopelesca	8Mb/2Mb Individual	-	19,925	8 Mb
01/02/2017	ESPH-IBUX	Ibux 8		33,561	8 Mb
01/12/2017	ESPH-IBUX	Ibux 8		33,561	8 Mb
02/02/2017	Tigo	Internet 8 Mbps	N/A	18,500	8 Mb
01/12/2017	Tigo	Internet 8 Mbps	N/A	17,910	8 Mb
01/07/2017	Cabletica	Mega Internet 8Mbps	105,000	20,694	8 Mb
01/12/2017	Cabletica	Mega Internet 8Mbps	105,000	19,950	8 Mb

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 18.
Costa Rica: Price of the service of fixed internet by selected provider and month, for a level of over-subscription of 1:20, year 2018
(Figures in colones)

Date	Operator	Name of the Plan or Package	Subscription charge and/or installation	Monthly Price of the plan or package (includes taxes)	Download speed
22/5/2018	Cable Caribe S.A.	Internet 8 megas	¢ 5,000	₡16,500	8 Mbps
9/4/2018	Coopeguanacaste, R.L.	Residential 6 MB		₡19,900	6 Mbps
22/5/2018	Coopelesca RL	Residential Internet 8MB / 2MB		$33.95	8 Mbps
28/5/2018	Coopealfaroruiz	Internet 8MB/2MB		₡13,150	8 Mbps
10/5/2018	Coopesantos RL	Internet 8 megas / 2 mega	¢ 20,000	₡23,405	8 Mbps
11/5/2018	Coopesantos RL	Fiber internet 6 megas	¢ 14,000	₡24,500	6 Mbps
29/5/2018	Cable Zarcero SA	Plan 6 Megas		₡17,500	6 Mbps
13/5/2018	Conecta Develpments SA	Internet Silver	¢ 5,705	₡35,750	6 Mbps
9/4/2018	ESPH	Ibux 8		₡29,700	8 Mbps
16/5/2018	ESPH	Ibux 6		₡23,000	6 Mbps
9/4/2018	JASEC	Internet 6Mbps/4Mbps Residential		₡16,000	6 Mbps
17/4/2018	JASEC	Internet 8Mbps/6Mbps Residential		₡19,000	8 Mbps
21/2/2018	Kölbi	kölbi Internet 6 Mbps		₡17,900	6 Mbps

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Fecha	Operador	Nombre del Plan o paquete	Cargo de Suscripción y/o instalación	Precio Mensual del Plan o paquete IVI	Velocidad de bajada
17/9/2018	Kölbi	kölbi Internet 8Mbps (Network Cable Visión)	¢ 10,000	₡17,500	8 Mbps
17/5/2018	Metro Wireless Solutions Costa Rica MWS S.A.	Service of residential internet 6MBPS	¢ 56,900	₡113	6 Mbps
5/11/2018	Movistar	Advanced 8MB		₡19,900	8 Mbps
5/11/2018	Movistar	Intermedium 6 MB		₡18,900	6 Mbps
22/5/2018	Servicios Femaroca TV SA	Internet 6 Mbps	¢ 3,000	₡13,500	6 Mbps
22/5/2018	Servicios Femaroca TV SA	Wireless internet 8 Mbps	¢ 7,500	₡18,000	8 Mbps
22/5/2018	Servicios Femaroca TV SA	Internet 8 Mbps	¢ 3,000	₡17,000	8 Mbps
30/11/2018	Telecable	@ 6 Mbps		₡18,000	6 Mbps
5/3/2018	Transdatelecom	Transdatelecom 3	¢ 14,000	₡18,000	8 Mbps
3/5/2018	Transdatelecom	Transdatelecom 2	¢ 14,000	₡16,000	6 Mbps

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 19.
Costa Rica: Price of fixed telephony packages by selected provider and month, with a level of over-subscription of 1:20, year 2018
(Figures in colones)

Fecha	Operador	Nombre del Plan o paquete	Servicios incluidos	Zona o región	Cargo de Suscripción y/o instalación	Precio Mensual del Plan o paquete IVI	Velocidad de bajada
01/01/2017	Telecable	TV+@	TV, Internet	All the zones with coverage	-	₡28,500	8 Mb
01/12/2017	Telecable	TV+@	TV, Internet	Areas with coverage	-	₡29,500	8 Mb
01/02/2017	kölbi	kolbi hogar internet + Advanced Tv	Internet + TV	Across the country		₡35,800	6 Mb
01/12/2017	kölbi	kolbi hogar internet + AdvancedTv	Internet, TV	Across the country		₡35,800	6 Mb
01/07/2017	Cabletica	Super Pack Doble Play + Digital	CATV + @ + TV Digital	Across the country	₡105,000	₡30,250	8 Mb
01/12/2017	Cabletica	Triple Play	CATV + @ + VoIP	Across the country	₡105,000	₡29,990	8 Mb
01/12/2017	Tigo	Digital TV and Internet	Basic Digital + 8 MB			₡26,500	8 Mb

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 20.
Costa Rica: Price of fixed telephony packages by selected provider and month, with a level of subscription of 1:20, year 2018
(Figures in colones)

Date	Operator	Name of the plan or package	Services Included	Zone or region	Subscription charges and/or installation	Monthly Price of the plan of package (sales tax included)	Download speed
22/5/2018	Cable Caribe S.A.	Basic 8 megas + tv	Fixed internet, television	Limón	¢ 5,000	₡26,500	8 Mbps
9/4/2018	Coopeguanacaste, R.L.	Standard digital tv digital + 6 mb internet	Fixed internet, television	Guanacaste		₡31,900	6 Mbps
9/4/2018	Coopeguanacaste, R.L.	Tv digital premium + 6 mb internet	Fixed internet, television	Guanacaste		₡38,900	6 Mbps
21/5/2018	Coopelesca RL	Tv digital plus + 8mbps/2mbps	Fixed internet, television	Heredia, Alajuela		₡26,940	8 Mbps
22/5/2018	Coopelesca RL	Economic digital tv + 8mbps/2mbps	Fixed internet, television	Heredia, Alajuela		₡26,840	8 Mbps
22/5/2018	Coopelesca RL	Ultra plus + 8mbps/2mbps	Fixed internet, television	Heredia, Alajuela		₡27,390	8 Mbps
10/5/2018	Coopesantos RL	Cablesantos económico + internet 8 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡31,025	8 Mbps
10/5/2018	Coopesantos RL	Cablesantos plus + internet 8 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡36,625	8 Mbps
10/5/2018	Coopesantos RL	Cablesantos plus hd + internet 8 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡37,625	8 Mbps
10/5/2018	Coopesantos RL	Cablesantos premium + internet 8 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡43,140	8 Mbps
10/5/2018	Coopesantos RL	Cablesantos full + internet 8 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡44,140	8 Mbps
11/5/2018	Coopesantos RL	Cablesantos economic + internet por fibra 6 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡31,500	6 Mbps
11/5/2018	Coopesantos RL	Cablesantos plus + internet por fibra 6 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡36,500	6 Mbps
11/5/2018	Coopesantos RL	Cablesantos plus hd + internet por fibra 6 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡38,200	6 Mbps
11/5/2018	Coopesantos RL	Cablesantos premium + internet por fibra 6 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡42,200	6 Mbps
11/5/2018	Coopesantos RL	Cablesantos full + internet por fibra 6 megas	Fixed internet, television	Cartago, San José	¢ 14,000	₡43,200	6 Mbps

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Fecha	Operador	Nombre del Plan o paquete	Servicios incluidos	Zona o región	Cargo de Suscripción y/o instalación	Precio Mensual del Plan o paquete IVI	Velocidad de bajada
15/5/2018	Kölbi	Plan triple 6mbps	Fixed telephony fixed internet, television	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡32,900	6 Mbps
16/5/2018	Kölbi	Dual plan internet + telephony 6 mbps	Fixed telephony, fixed internet	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡19,900	6 Mbps
20/5/2018	Kölbi	Plan dúo internet + tv avanzada 6 mbps	Fixed internet, television	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡29,900	6 Mbps
17/5/2018	Kölbi	Plan dúo internet + tv digital 8mbps	Fixed internet, television	Cartago, San José, Heredia, Alajuela	¢ 10,000	₡28,000	8 Mbps
21/5/2018	Millicom	Tv dvb + 6 megas	Fixed Internet, Television	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡25,990	6 Mbps
31/8/2018	Millicom	TV Análoga + 6 Megas Parrita y Quepos 2018	Fixed Internet, Television	Puntarenas		₡29,690	6 Mbps
22/5/2018	Servicios Femaroca TV SA	Doble play 6mbps	Fixed internet, television	Cartago	¢ 7,500	₡29,600	6 Mbps
22/5/2018	Servicios Femaroca TV SA	Doble play 8mbps	Fixed internet, television	Cartago	¢ 7,500	₡33,100	8 Mbps
21/5/2018	Televisora de Costa Rica SA	Triple play 8mbps	Fixed telephony, fixed internet, television	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela	¢ 105,000	₡29,990	8 Mbps
13/6/2018	Transdatelecom	Super cable hogar conectado	Fixed internet, television	Alajuela		₡26,000	8 Mbps

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 21.
Costa Rica: Prices of the service access to asymmetrical fixed Internet with a level of over-subscription of 1:20, 2018
(Colones per month)

Download/upload speed (Kbps)	Maximun Price	Minimun Price	Average price
512-256	5,500	5,500	5,500
1024/512	13,750	5,445	8,693
2048/768	13,000	7,500	10,846
3072/768	14,650	13,897	14,349
4096/1024	28,292	9,315	16,235
5120/1024	16,317	15,173	15,741
6144/1024	35,686	16,000	21,730
8192/1024	25,000	13,150	19,804
10240/1024	65,240	17,465	29,038

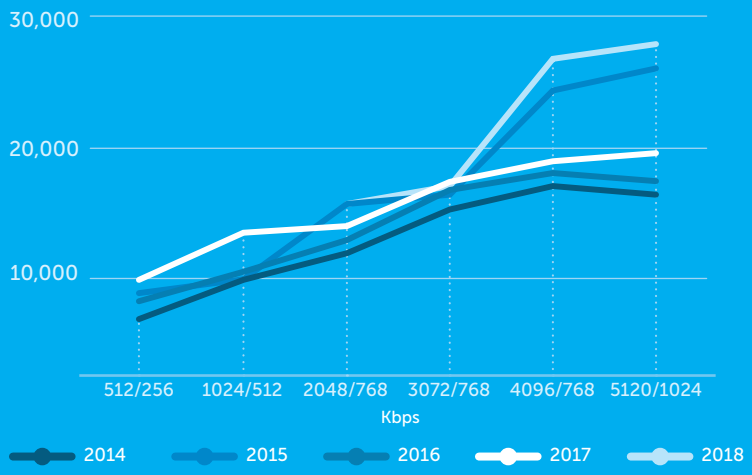
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 22.
Costa Rica: Average prices of the service access to asymmetrical fixed Internet, level of over-subscription of 1:20, 2014-2018
(Colones per month)

Download/upload speed (Kbps)	2014	2015	2016	2017	2018
256/128	7,233	6,902	8,576		
512/256	7,690	7,444	6,855	8,667	5,500
1024/512	8,663	9,019	9,331	12,398	8,693
2048/768	14,924	14,806	11,858	13,088	10,846
3072/768	16,536	15,645	16,030	16,646	14,349
4096/768	26,713	24,040	17,336	18,350	16,235
5120/1024	27,748	25,848	16,711	19,013	15,741

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 139.
Costa Rica. Asymmetric Internet access prices, level of over-subscription 1:20, 2014 – 2018
(Colones per month)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 23.
Costa Rica: Prices of the service of access to asymmetrical fixed Internet
Level of over-subscription of 1:5, 2018
(Colones per month)

Download/upload speed (Kbps)	Maximum Price	Minimum Price	Average rate
512-256	34,040	31,700	32,870
1024/512	56,589	22,700	40,088
2048/768	91,243	24,573	66,807
4096/1024	181,500	32,538	89,596
5120/1024	167,397	45,800	108,857
6144/1024	193,978	48,462	130,316
8192/1024	248,366	45,000	153,183
10240/1024	394,764	84,000	208,734

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 24.
Costa Rica: Average prices of the service of access to asymmetrical fixed Internet, level of over-subscription of 1:5, 2014-2018
(Colones per month)

Download/upload speed (Kbps)	Price 2014	Price 2015	Price 2016	Price 2017	Price 2018
512/256	31,762	33,782		33,685	32,870
1024/512	40,651	39,199	39,031	35,016	40,088
2048/768	98,833	51,992	52,588	34,961	66,807
4096/1024	165,264	75,430	92,834	55,304	89,596
5120/1024	153,426	54,487	59,859	76,060	108,857
6144/1024	291,605	94,213	133,889	95,066	130,316
8192/1024	388,805	135,506	194,100	105,197	153,183
10240/1024	437,416	127,251	234,521	137,160	208,734

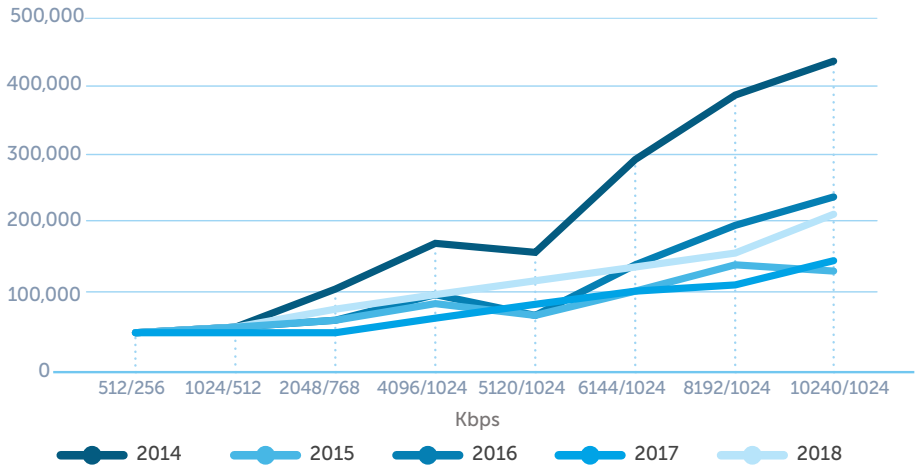
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 25.
Costa Rica: Price of the service access to asymmetrical fixed Internet, level of over-subscription of 1:5, 2018
(Colones per month)

Download/upload speed (Kbps)	Maximum speed	Minimum Price	Averate rate
512Kbps	131,562	72,149	101,856
1/1 Mbps	177,359	66,655	128,179
2/2 Mbps	315,741	101,631	213,217
4/4 Mbps	452,138	132,001	303,034
5/5 Mbps	446,370	150,626	309,202
6/6 Mbps	515,934	171,579	388,286
8/8 Mbps	660,859	210,544	436,223
10/10 Mbps	776,034	250,265	503,722

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 140.
Costa Rica. Asymmetric internet access prices, level of oversubscription 1:5, 2014 – 2018
(Colones per month)



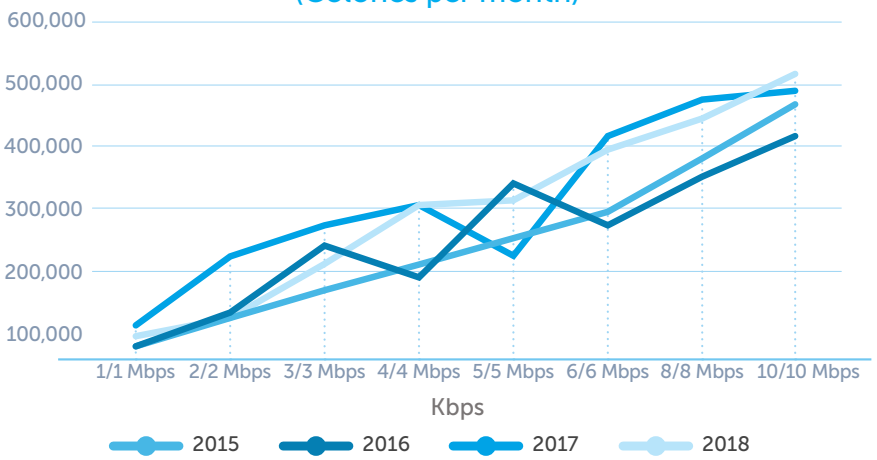
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 26.
Costa Rica: Average prices of the service of access to asymmetrical fixed Internet, level of over-subscription of 1:5, 2014-2018
(Colones per month)

Download/upload speed (Kbps)	Price 2014	Price 2015	Price 2016	Price 2017	Price 2018
1/1 Mbps	67,500		88,651	116,535	101,856
2/2 Mbps	130,266	132,300	138,736	221,994	128,179
3/3 Mbps	181,471	172,800	243,000	270,120	213,217
4/4 Mbps	199,620	213,300	191,356	306,363	303,034
5/5 Mbps	254,559	253,800	340,200	224,713	309,202
6/6 Mbps	272,435	294,300	273,925	412,719	388,286
8/8 Mbps	341,982	375,300	348,001	465,583	436,223
10/10 Mbps	387,179	456,300	409,728	477,659	503,722

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 141.
Costa Rica. Symmetric Internet access prices, level of oversubscription 1:5, 2015 – 2018
(Colones per month)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

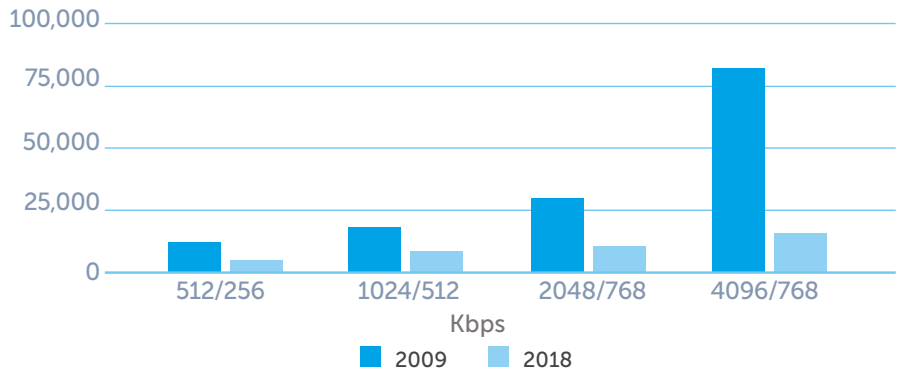
Table Nº 27.
Costa Rica. Comparative of prices for the asimetric fixed internet service access 2009 vs. 2018
Level of over subscription 1:20
(Colones per month)

Download speed / upload speed (Kbps)	Maximum rate 2009*	Average price 2017	Annual variance (%)
512/256	12,663	5,500	-57 %
1024/512	19,248	8,693	-55 %
2048/768	31,405	10,846	-65 %
4096/768**	85,605	16,235	-81 %

*Rates set by ARESEP and ratified by Sutel through resolution RCS-615-2009 of December 18, 2009, for the residential sector
**Service for small and medium-sized businesses, which implies a higher subscription level than the one offered to the residential sector

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 142.
Costa Rica. Comparative of fixed Internet asymmetric access, level of oversubscription 1:20
(Figures in Colones per month)



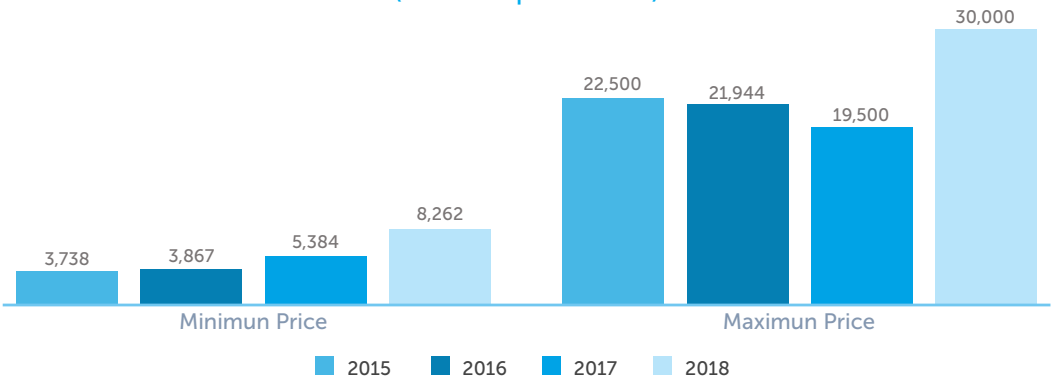
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 28.
Costa Rica: Price of the basic package for the service of subscription television, 2015-2018
(Figures in colones)

Price	2015	2016	2017	2018	Variation 2015-2016	Variation 2016-2017	Variation 2017-2018
Maximum	22,500	21,944	19,500	30,000	-2.5 %	-11.1 %	53.8 %
Minimum	3,738	3,867	5,384	8,262	3.4 %	39.2 %	53.5 %
Average	12,290	13,683	12,657	15,442	11.3 %	-7.5 %	22.0 %

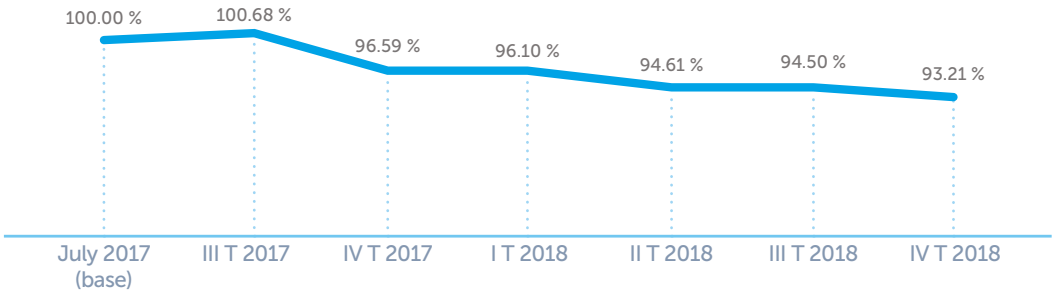
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 143.
Costa Rica. Maximum and minimum prices for basic Paid-TV package, 2015 – 2018
(Colones per month)



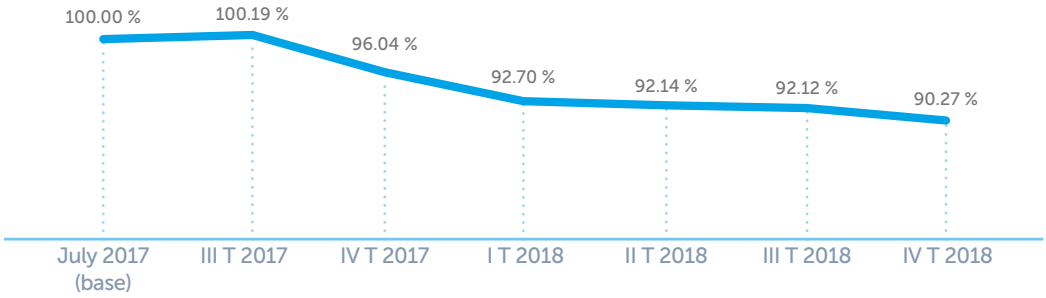
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 144.
Costa Rica. Quarterly evolution of the nationwide mobile phone price index, July 2017 (base), 2017-2018
(Figures in percentage)



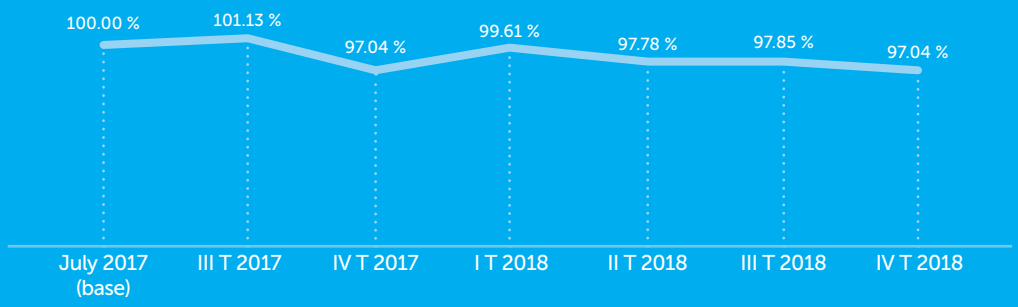
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 145.
Costa Rica. Quarterly evolution of the nationwide mobile phone postpaid price index, July 2017 (base), 2017-2018
(Figures in percentage)



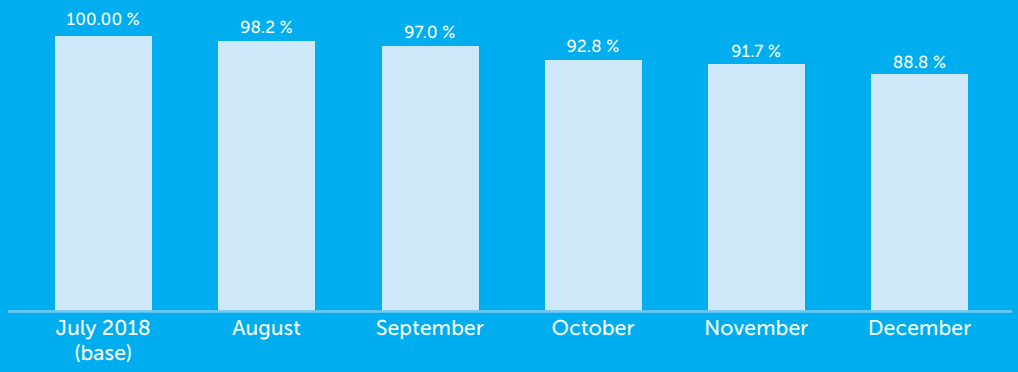
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 146.
Costa Rica. Quarterly evolution of the nationwide mobile phone prepaid price index, July 2017 (base), 2017-2018
(Figures in percentage)



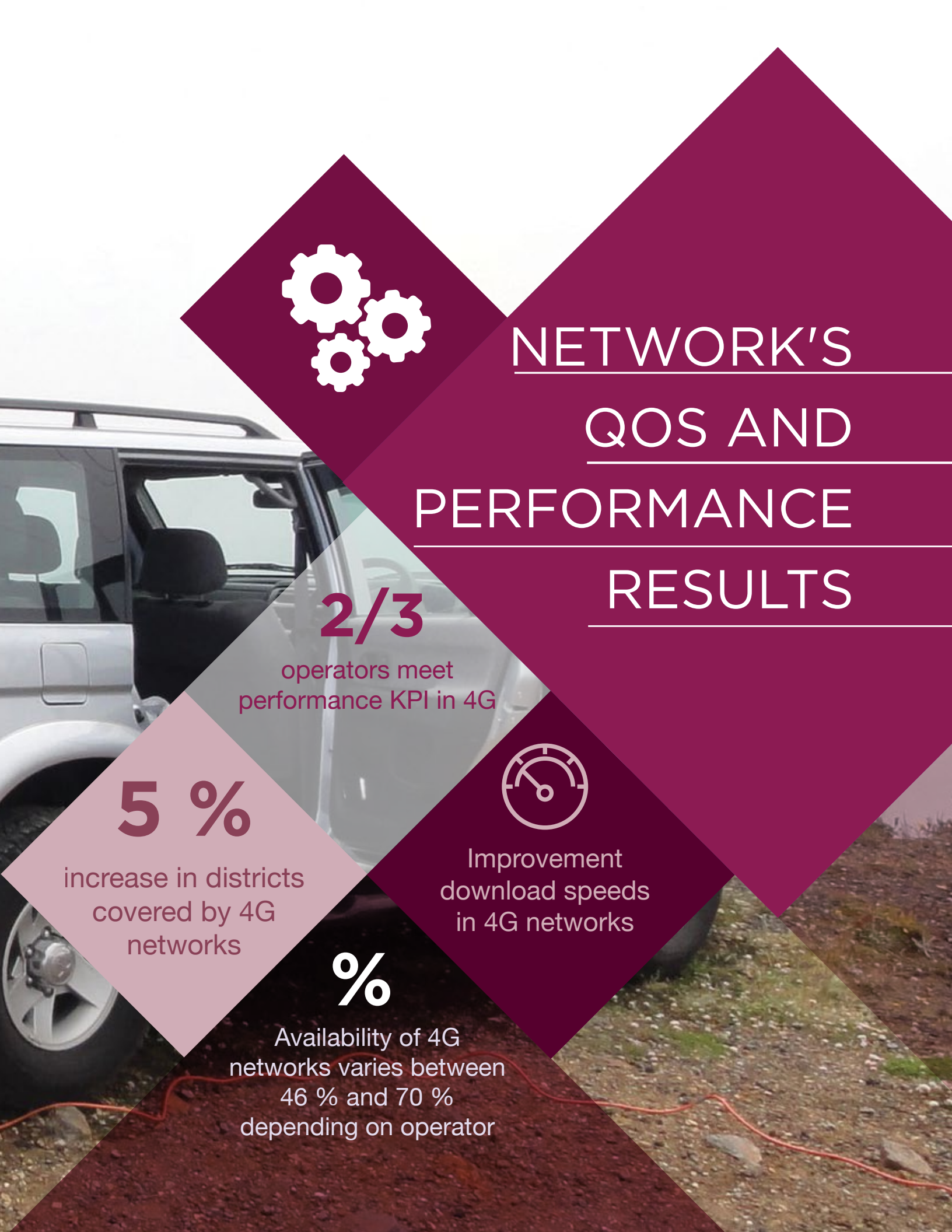
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Graph Nº 147.
Costa Rica. Evolution of the nationwide fixed Internet price index, July 2018 (base), 2018
(Figures in percentage)



Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

SUTEL's engineers performing QoS measurements in a community near the Irazú volcano in Cartago.



NETWORK'S QOS AND PERFORMANCE RESULTS

2/3

operators meet performance KPI in 4G

5 %

increase in districts covered by 4G networks

Improvement download speeds in 4G networks

%

Availability of 4G networks varies between 46 % and 70 % depending on operator

Network's QoS and Performance Results

Herein, a summary of the QoS results obtained from the annual measurements executed in 2018.

The data collected, using specialized measurement equipment, is compare to the threshold (minimum QoS value) established[44], according to the QoS KPI's (Key Performance Indicator) from the Reglamento de prestación y calidad de servicio[45] in force. SUTEL runs drive test national measurements of the mobile telephony and Internet services, gathering data simultaneously of the operators, in selected areas delimited according to the operator's coverage maps and coverage drive test results published by them in their own WEB sites.

The results for 2018 from the OpenSignal tool, a collaborative specialized tool that measures the performance of the mobile networks, are also included. This OpenSignal tool is installed voluntarily in the end user's terminal, and the results are informative.

The following sections present the results obtained for each of these studies.

Drive test QoS measurements for mobile networks

As part of the continuous process of national evaluation of the QoS of mobile 2G, 3G and 4G networks of ICE, Claro and Telefonica, Sutel performed a drive test measurement between February 12 and November 22, 2018 (with allowed measurement schedules between 6:00 a.m. and 11:00 p.m., both in towns and national roads in accordance with the measurement methodologies resolution RCS-019-2018).

SUTEL's measurements are carried out using specialized drive test benchmarking equipment, this equipment involves mobile phones from which the data is collected will on the drive test tour in towns and national roads, compiling jointly and simultaneously the QoS conditions offered by the three operators of mobile telephone and Internet networks

These measurements are done in accordance with the methodologies known as "Measurement methodology applicable to mobile telephony services of the Reglamento de prestación y calidad de servicio" and "Measurement methodology applicable to Internet access services of the Reglamento de prestación y calidad de servicio", approved by the Council through resolution RCS-019-2018 "Resolution on Measurement Methodologies applicable to the Reglamento de prestación y calidad de servicio". The detail of the considerations of these methodologies is included in the chapter Methodology and Description of Services.

The measurement involved a total of 47,021 km, in 471 districts, and allowed the compilation of 27 million data samples per operator.

Results were obtained for the following KPIs after processing and analyzing the data collected:

[44] According to threshold resolution RCS-152-2017.
[45] The Reglamento de prestación y calidad de servicios (RPCS) was published on February 17, 2017 in Scope No. 36 of La Gaceta, and its entry into force was as of February 17, 2018.

- Percentage of unsuccessful calls (article 35 of the RPCS).
- Voice quality in telephone services (article 36 of the RPCS).
- Call set-up time (RPCS Article 37).
- Percentage of dropped calls (Article 40 of the RPCS).
- Mobile service coverage areas (Article 41 RPCS).
- Comparison between the local or international transfer speed against the provisioned speed (Article 46 of the RPCS).

It is important to point out that, with the approval of the new Reglamento de prestación y calidad de servicio on February 17th 2018[46], thresholds and methodologies; new KPIs applies, which is why no historical comparison is presented, except in the case of 4G networks.

QoS KPI's compliance, for the mobile voice service (2G and 3G networks)

This section presents the results of the KPI's[47] perceptible by end users: percentage of unsuccessful calls[48], percentage of dropped4[49] calls and coverage area (coverage accuracy).

Percentage of non successful calls

Based on the analysis of the results obtained in 2018 (see Graph Nº 148), for the 2G network, Claro recorded a percentage of unsuccessful calls of 8 %, ICE 7 % and Telefonica 4 %.

Regarding 3G network (see Graph Nº 149) for 2018, Claro registers a percentage of unsuccessful calls of 3 %, ICE 6 % and Telefonica 3 %.

Considering that the maximum quality threshold for both 2G and 3G networks corresponds to 4 %, it can be conclude that Claro and ICE exceed the maximum quality threshold for 2G network and ICE exceeds the maximum quality threshold for the 3G network.

Percentage of dropped calls

According to figures obtained from the processing of data of this KPI (see Graph Nº 150), Claro registers in 2018 a percentage of dropped calls of 1 % on the 2G Network, while ICE reports 2 % and Telefónica 1 %.

Regarding 3G network for 2018, Claro registers a percentage of dropped calls of 1 %, ICE 4 % and Telefonica 2 % (see Graph Nº 151).

The maximum quality threshold for both 2G and 3G networks corresponds to 2 %. Therefore, it is possible to conclude that Claro and Telefonica meet the maximum quality threshold for both 2G and 3G networks, and ICE meets the maximum quality threshold for 2G network, however, exceeds it for 3G network by 2018.

Coverage area (coverage accuracy)

The evaluation of this KPI took into account the analysis of the four types of coverage, in accordance with the respective areas covered by operators and published in their own websites, namely: within buildings, inside vehicles, outside only and outside the area of coverage.

To estimate the compliance of coverage area, SUTEL needed the coverage maps provided by the operators Claro and Telefónica for February 2017. Regarding the coverage map of the operator ICE, it was built from the data

[46-47] The Reglamento de prestación y calidad de servicio(RPCS) was published on February 17, 2017 in Scope No. 36 of La Gaceta, and its entry into force was as of February 17, 2018.
[48] This indicator evaluates accessibility of mobile service.
[49] This indicator evaluates the retainability of mobile service.

collected by this operator through drive test measurements also conducted in 2018.

A filtering procedure was carried out using a Geographical Information System tool (by its acronym in english GIS), owned by SUTEL. This procedure consists of correlating the intensity level of the signal obtained in the field, with the coverage maps delivered by the operators and published on their respective websites[50].

For the 2G network and for the year 2018, the operator Claro registers a percentage of coverage area (coverage precision) of 91 %, the ICE 84 %, while Telefonica registers 96 % (see Graph Nº 152).

In the case of the 3G network by 2018, Claro registers a percentage of coverage area (coverage accuracy) of 79 %, ICE registers 85 % for the same KPI and Telefonica 99 % (see Graph Nº 153).

Finally, for the 4G network (see Graph Nº 154), by 2018 Claro records a percentage of coverage area (coverage accuracy) of 67 %, ICE 87 % and Telefónica 99 %.

The minimum quality threshold for 2G, 3G and 4G networks is 90 %. Thus, Claro exceeds the regulatory threshold for 2G networks, but not for 3G and 4G; ICE does not reach the regulatory threshold for any of the networks, and Telefónica exceeds the regulatory threshold for all networks in 2018.

Performance of the average download speed (measured vs provisioned-contracted)

The evaluation of the KPI comparison between the local or international transfer speed against the provisioned speed, was done based on the application of the "Measurement methodology applicable to Internet access services of the Reglamento de prestación y calidad de servicio"[51]. The measurements were carried out on route along the national roads collecting samples of instant download speed.

The calculation process of this KPI required the instant download speed samples collected within the coverage maps of each operator specially within two types of coverage; within buildings and inside vehicules[52]. For greater detail see chapter Methodologies and Service Description. The results presented in Graph Nº 155 and Nº 156, correspond to the average performance of the download speed measured against the download speed provisioned (contracted), for 3G and 4G networks from Claro, ICE and Telefónica.

As explained before, considering the renewal of the KPIs thresholds for mobile service coverage area for 3G networks, the analysis is only included for 2018 (see graph Nº 155), due to the adjustment of the thresholds per types of coverage area including within buildings and inside vehicles. In the case of the 4G network and given that the thresholds per type of coverage remains the same, the results and their evolution are shown from 2015 onwards (see Graph Nº 155).

The results obtained at a national level for the 3G network shows that Claro registers a download speed performance percentage of 59 %, ICE registers a performance percentage of 60 % and Telefónica 63 % (see Graphic Graph Nº 155).

The analysis of the results per province for Claro in its 3G network (see Graph Nº 157), indicate the following extreme results regarding the percentage of download speed performance: Guanacaste, with 64 % and Limon with 53 %, compare against the provisioned speed of 5 Mbps.

[50] Claro: http://mapas-claro.addax.cc/map.php?sucursales, ICE: http://mapas.ice.go.cr/MapasCobertura/ y Telefónica: http://movistar.cr/cobertura-movil.
[51] According to RCS-019-2018 resolution.
[52] In accordance with point 4 of article 46 of the current RPCS.

The extreme results for ICE in its 3G network related to the percentage of performance of download speed are the provinces of San Jose with 65 % and Alajuela with 53 %, compare against the provisioned speed of 3 Mbps (see graph Nº 158).

For Telefónica in its 3G network, the extreme results of the percentage of download speed performance are presented in the provinces of San Jose with 70 % and Limon with 52 %, compare against the provisioned speed of 4 Mbps (see Graph Nº 159).

As mentioned, in Graph Nº 156 are display the results obtained for the 4G networks[53]. This indicator is calculated considering the provisioned speed according to the information provided by the operators, compared against the speed measured on field.

The current data shows: Claro with 46 %, registering an increase of 15 percentage points against the results for 2017; ICE with 72 %, reporting a reduction of 3 percentage points against the results for 2017; and Telefónica with 65 %, reporting a reduction of 7 points against the results for 2017.

Analyzing these results per province for Claro in its 4G network, the extreme results are Puntarenas with 57 % and San Jose with 43 %, this compare against the provisioned speed of 12 Mbps (see Graph Nº 160).

In the case of the ICE in its 4G network, the extreme results are Cartago with 76 % and Guanacaste with 61 %, compare against the provisioned speed of 12 Mbps (see Graph Nº 161).

The Graph Nº 162 shows the data obtained for Telefónica in its 4G network, whose extreme results are Heredia with 75 % and Limon with 53 %, compare against the provisioned speed of 12 Mbps.

Finally, and to describe this further, Graph Nº 157, Nº 158, Nº 159, specify the provisioned speed compare against the measured speed for the 3G network, during the measurements of 2018. Thus, for Claro, the measured average speed is 3.0 Mbps, compare against the provisioned speed of 5 Mbps. For ICE, the measured average speed is 1.8 Mbps compare against the provisioned speed of 3 Mbps, and for Telefónica the measured average speed is 2.6 Mbps compare against the provisioned speed of 4 Mbps.

Likewise, Graph Nº 160, Nº 161, Nº 162, specify the provisioned speed compare against the measured speed for the 4G network, during the measurements of 2018. The results indicate that for Claro the measured average speed is 5.7 Mbps compare against the provisioned speed of 12 Mbps. For ICE, the measured average speed is 9.0 Mbps compared against the provisioned speed of 12 Mbps, and finally, for Telefónica the measured average speed is 8.0 Mbps compare against the provisioned speed of 12 Mbps.

Considering that the minimum quality threshold of the performance percentage for the 3G network correspond to 40 % for year 1, it is possible to conclude that the three operators Claro, ICE and Telefonica exceed the regulatory threshold for 2018. Likewise, regarding the minimum quality threshold of the performance percentage for the 4G network correspond to 50 % for year 1, it is possible to conclude that the operators ICE and Telefonica, outdo the regulatory threshold for 2018, not so Claro.

QoS adjustment factor (FAC, in Spanish – QoS score)

The QoS Adjustment Factor (FAC in Spanish) allows to obtain a score base on the compliance of the QoS conditions for the operators under study, Claro, ICE and Telefonica, particularly for mobile telephony and Internet services.

[53] 4G networks are in the process of deployment and expansion.

The FAC is calculated considering the relative weights assigned per indicator and service, detailed in article 51 of the Reglamento de prestación y calidad de servicio[54]. Based on the KPI's for which data was collected during the drive test measurements, a reallocation of the relative weights was made, that is, an adjustment of the relative weights of the KPI's, so that only the evaluated indicators are considered in the FAC computation.

Based on the reallocation, Table Nº 29, details the national FAC per operator, for 2G, 3G and 4G networks, for mobile telephony and Internet services.

Table Nº 29.
Costa Rica. FAC results per operators Claro, ICE and Telefónica, for 2G, 3G and 4G networks, for the mobile telephony and mobile Internet services, year 2018.

		FAC (QoS score)		
Network	Service	Claro	ICE	Telefónica
2G	Mobile telephony	95.7 %	91.8 %	78.9 %
3G		94.3 %	92.9 %	100.0 %
4G		66.6 %	87.3 %	100.0 %
3G	Mobile Internet	100.0 %	100.0 %	100.0 %
4G			100.0 %	100.0 %

Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Quality of User Experience (QoE)

The following section, the complementary results of the technical measurements are presented. In this case, the results of the QoE from the user's perspective, collected with the OpenSignal tool, are described below:

- The user experience quality reports generated from data obtained from the OpenSignal tool, acquired by Sutel, which presents the quality experienced by those users who voluntarily decide to install the application and, therefore, the results obtained depend on the characteristics of the plans they have subscribed.

QoE Reports

Since 2016, the SUTEL acquires reports of the quality of the service taking advantage of data collected through collaborative tools, which allow to evaluate the quality of the service from the perspective of the user's experience (QoSE; for its acronym in English).

This collaborative tool allows collecting data from the user's terminals, users that install the tool on a voluntary basis. The initiative to acquire these reports is a complementary data source to the QoS measurements done by Sutel.

The reports are done by the company OpenSignal, and the measurements are taken regardless of where the user is at a given time -indoors or outdoors; in urban or rural areas; in towns or national roads- and capture the performance of the network, as experienced by the end user.

The results of these reports were obtained from an average of 10,783 users who have

[54] "The Provision and Quality Service Regulation was published on February 17 of the year 2017, in Scope No. 36 of the Diario Oficial La Gaceta, and it went into effect beginning on February 17 of the year 2018."

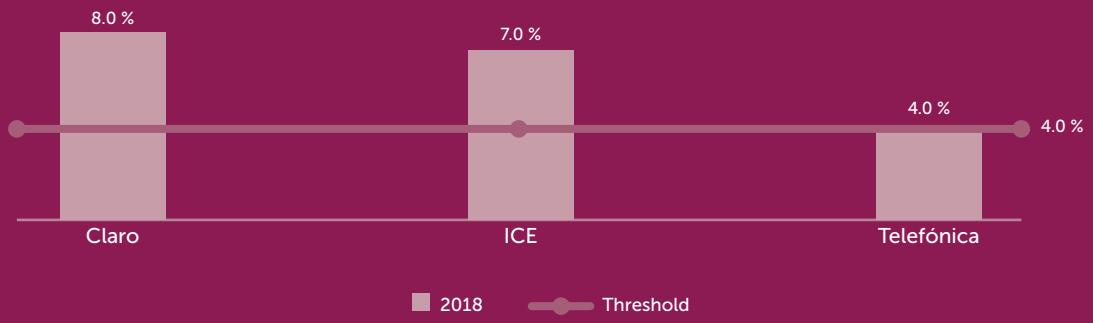
installed the OpenSignal application. As for the download speed for the 3G network for the period corresponding to the I and II semester of 2018, Claro has an average download speed of 2.2 Mbps; the ICE of 2.8 Mbps, and Telefónica has an average download speed of 2.5 Mbps (see Graph Nº 163). Thus, it is possible to conclude that by 2018 there were increases in the average download speed for operators Claro, ICE and Telefonica in the 3G network.

In the case of the download speed for the 4G network for the period corresponding to the I and II semester of 2018, Claro records an average download speed for the two periods of 11.1 Mbps, while for the ICE the average for the two periods is 18.25 Mbps and for Telefonica 8.55 Mbps (see Graph Nº 164). This implies increases for operators Claro, ICE and Telefónica, increasing 3.85 Mbps for Claro, 10.9 Mbps for ICE and 3.2 Mbps for Telefonica, compare against the 2017 measurements.

Graphic Nº 165 show the results corresponding to the availability of the 4G network, which means the percentage of time that users of the operators remained connected to this network. Claro records an average 4G network availability of 46 %, ICE 62 %, and Telefónica 69.5 % on average.

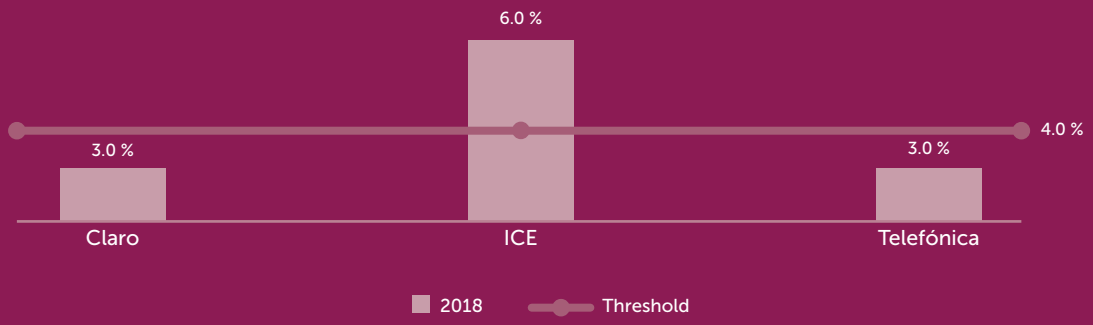
Finally, it is concluded from what has been presented that the percentage of availability of the 4G network has maintained a growing trend for Claro and ICE operators, registering increases of 4 percentage points for Claro and 2.15 for ICE. Additionally, it is possible to point out the increase in download speed for the 4G network registered for Claro, ICE and Telefonica operators of 3.85 Mbps, 10.9 Mbps and 3.2 Mbps respectively.

Graph Nº 148.
Costa Rica. Percentage of non successful calls for the 2G network by operator, 2018.
(Figures in percentage)[1]



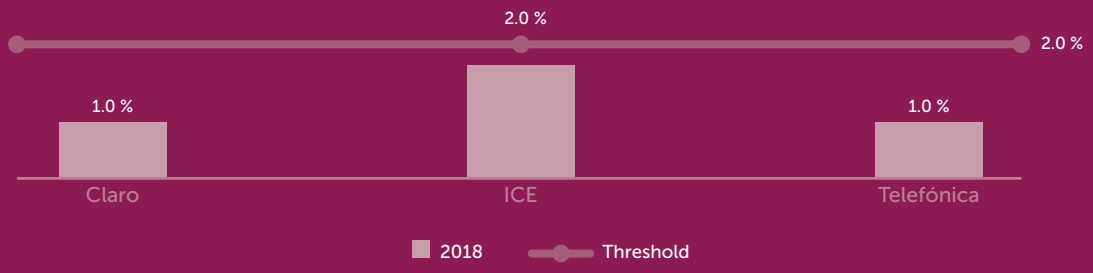
Note: [1]/The lower the percentage of unsuccessful calls, the better the user experience when trying to make a phone call.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 149.
Costa Rica. Percentage of non successful calls for the 3G networks by operator, 2018
(Figures in percentage)[1]



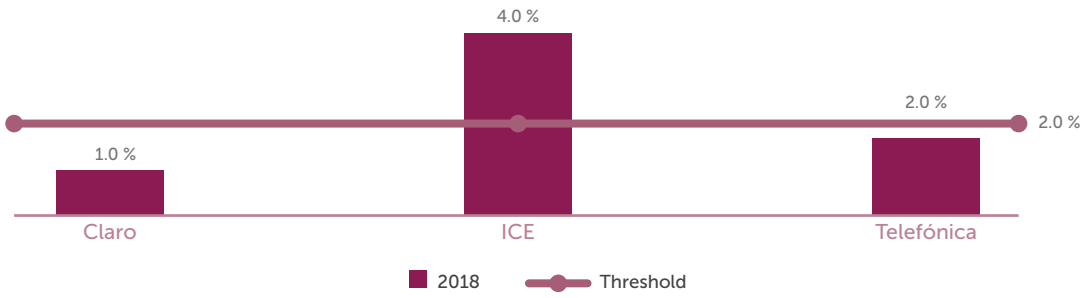
Note: [1]/The lower the percentage of unsuccessful calls, the better the user experience when trying to make a phone call.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 150.
Costa Rica. Percentage of dropped calls for the 2G network by operator, 2018
(Figures in percentage)[1]



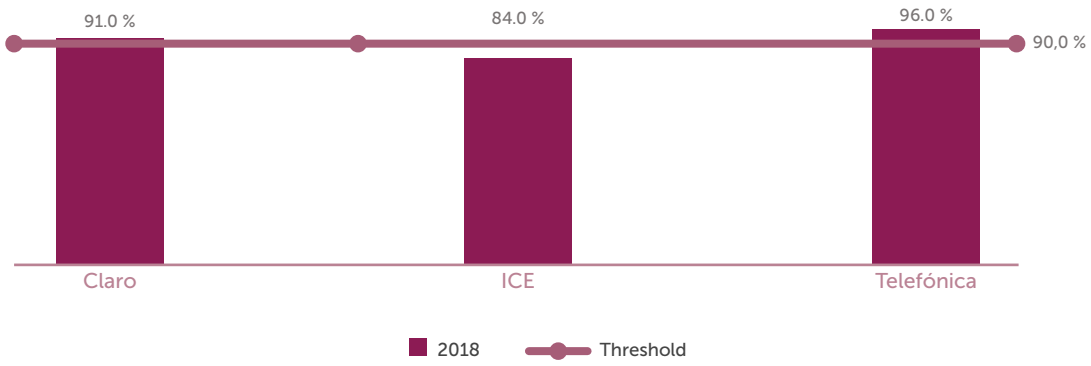
Note: [1]/The lower the percentage of dropped calls, the better the user experience when trying to make a phone call.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 151.
Percentage of dropped calls for the 3G network by operator, 2018
(Figures in percentage)[1]



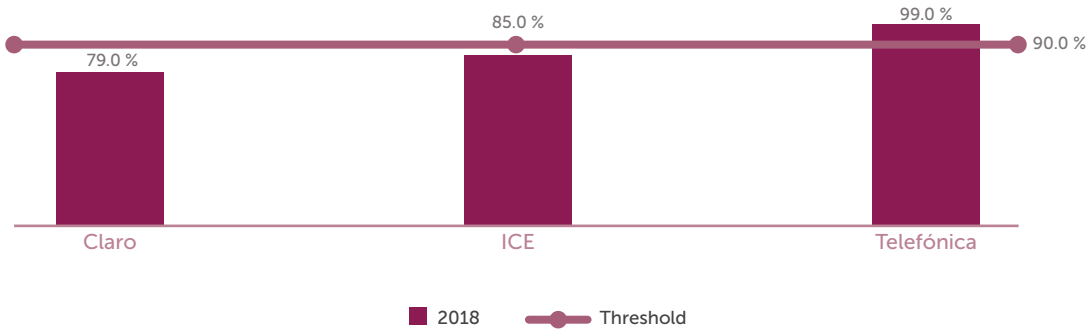
Note: [1/]The lower the percentage of dropped calls, the better the user experience when trying to make a phone call.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 152.
Percentage of coverage area (coverage accuracy) for the 2G network by operator, 2018
(Figures in percentage)[1]



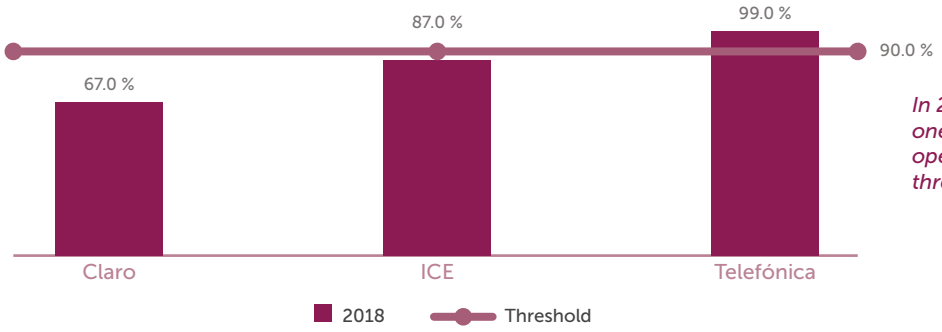
Note: [1/]The higher the coverage percentage, the greater the accuracy of the coverage maps published by the operator.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 153.
Percentage of coverage area (coverage accuracy) for the 3G network by operator, 2018
(Figures in percentage)[1]



Note: [1/]The higher the coverage percentage, the greater the accuracy of the coverage maps published by the operator.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

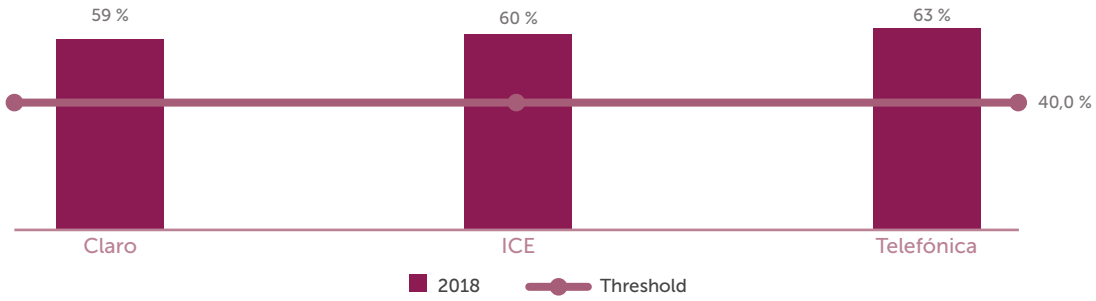
Graph Nº 154.
Percentage of coverage area (coverage accuracy) for the 4G network by operator, 2018
(Figures in percentage)[1]



In 2018, 4G networks, only one of three mobile operators met with the threshold of coverage.

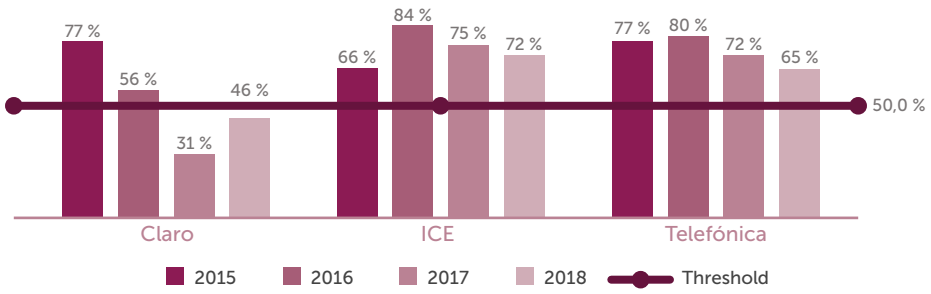
Note: [1/]The higher the coverage percentage, the greater the accuracy of the coverage maps published by the operator.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 155.
Costa Rica. Average performance of the measured speed compared against the provisioned (contracted) speed for the 3G network by the operator, 2018
(Figures in percentage)[1]



Note: [1/]The higher the percentage of performance, the better the user experience when browsing or downloading data from the Internet.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

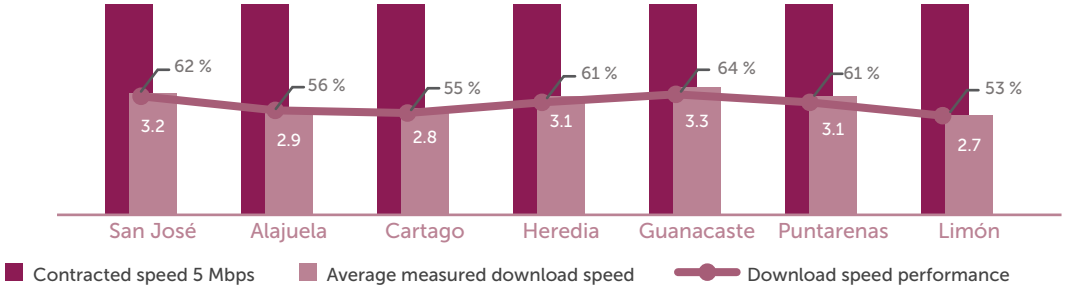
Graph Nº 156.
Costa Rica. Evolution of average performance of the measured speed compared against the provisioned (contracted) speed for the 4G network by the operator, 2015-2018
(Figures in percentages)[1]



In 2018 the percentage of 4G performance drops for two operators, while the third one does not exceed the threshold.

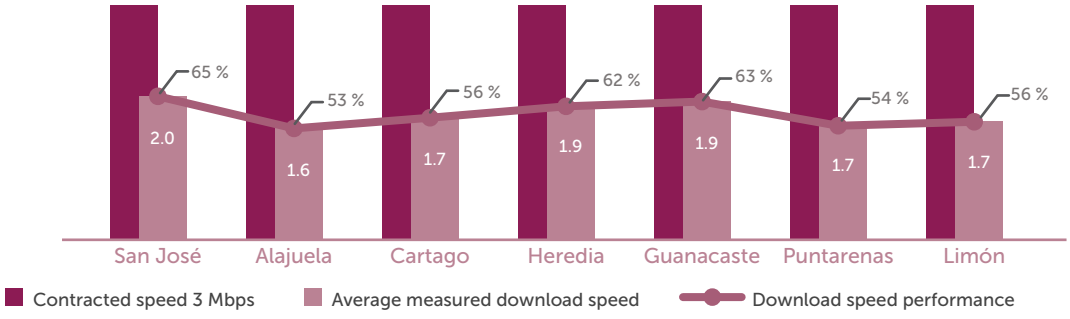
Note: [1/]The higher the percentage of performance, the better the user experience when browsing or downloading data from the Internet.
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 157.
Costa Rica. Average download speed compared against the contracted download speed (5 Mbps) and performance percentage per province for Claro in the 3G network, 2018
(Figures in Mbps and percentage)



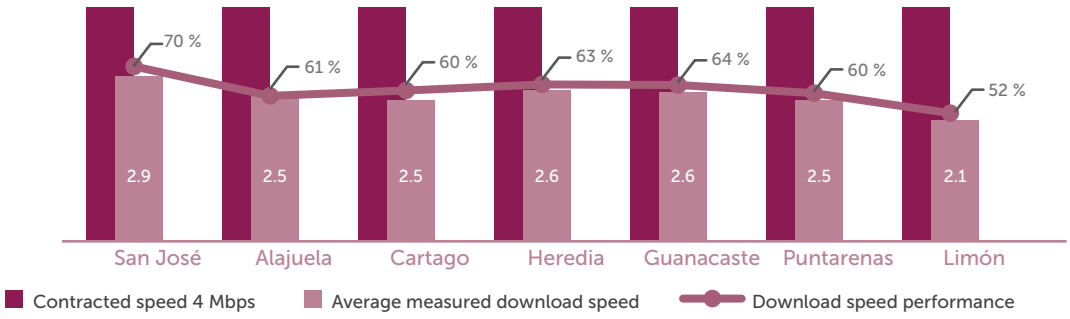
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 158.
Costa Rica. Average speed of download compared against the contracted download speed (3 Mbps) and performance percentage per province for ICE in the 3G network, 2018
(Figures in Mbps and percentage)



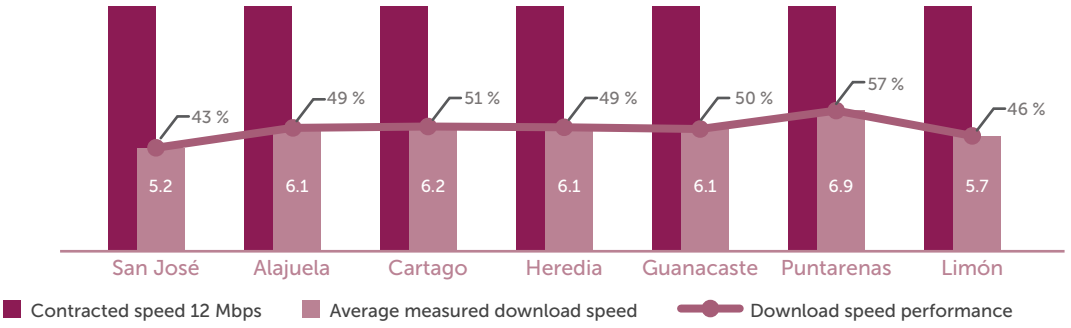
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 159.
Costa Rica. Average download speed compared against the contracted download speed (4 Mbps) and performance percentage per province for Telefónica in the 3G network, 2018
(Figures in Mbps and percentage)



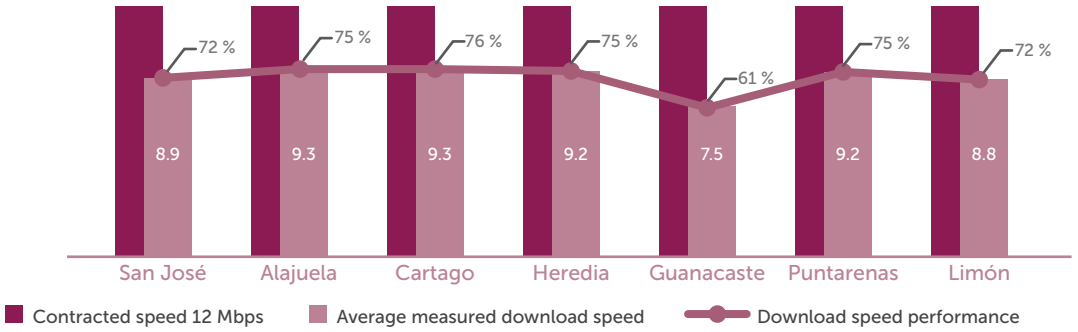
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 160.
Costa Rica. Average download speed compared against the contracted download speed (12 Mbps) and performance percentage per provinc for Claro in the 4G network, 2018
(Figures in Mbps and percentage)



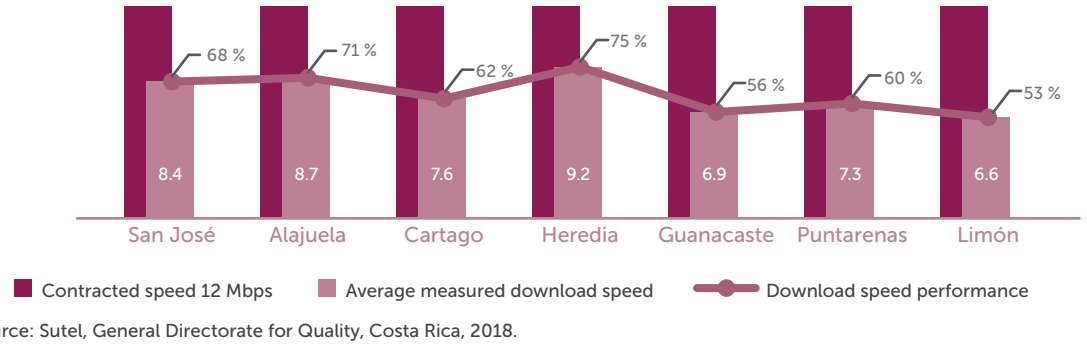
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 161.
Costa Rica. Average download speed compared against the contracted download speed (12 Mbps) and performance percentage per province for ICE in the 4G network, 2018
(Figures in Mbps and percentage)



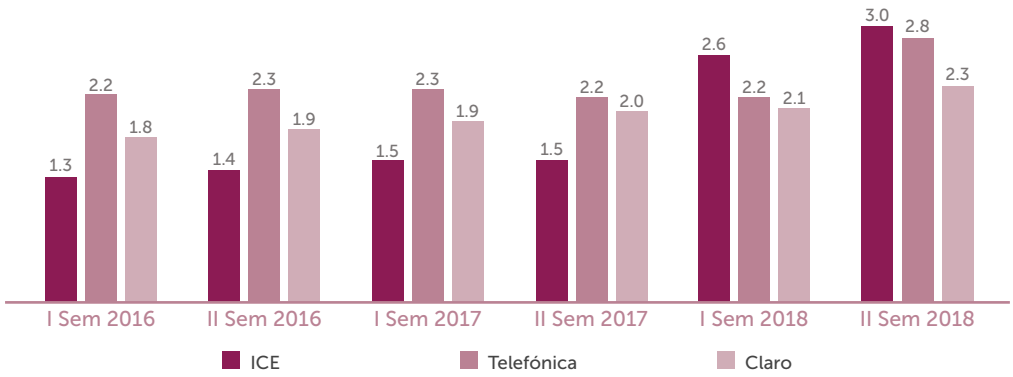
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 162.
Costa Rica. Average download speed compared against the contracted download speed (12 Mbps) and performance percentage per province for Telefónica in the 4G network, 2018
(Figures in Mbps and percentage)



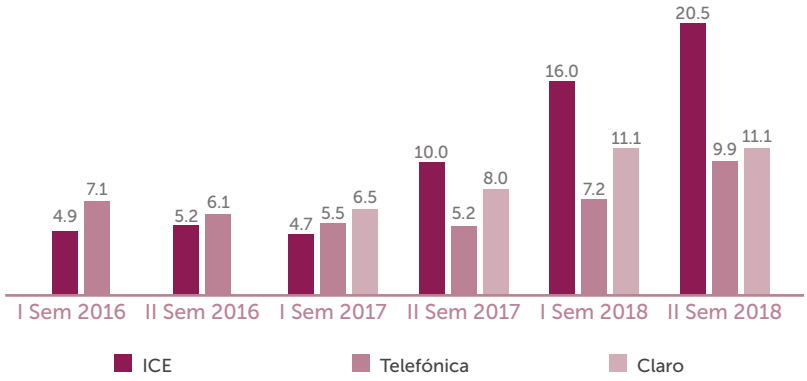
Source: Sutel, General Directorate for Quality, Costa Rica, 2018.

Graph Nº 163.
Costa Rica. Download speed for 3G network per operator, 2016-2018
(Semiannual figures in Mbps)



Source: OpenSignal, reports acquired by the General Directorate for Quality, Costa Rica, 2018.

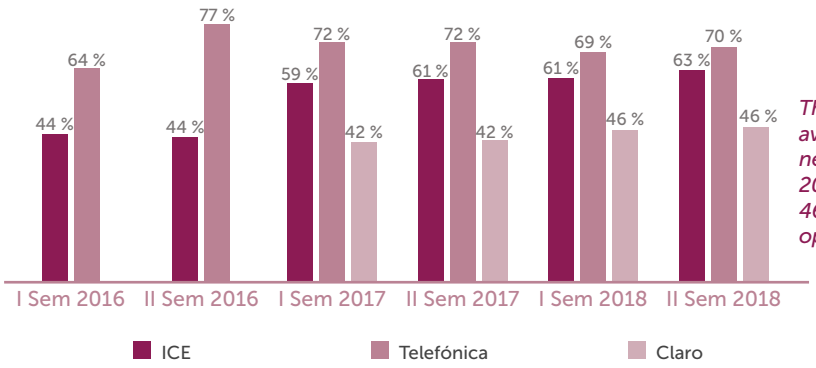
Graph Nº 164.
Costa Rica. Download speed for 4G network per operator, 2016-2018
(Semiannual figures in Mbps)



Download speeds in 4G networks, improves between the 2nd half of 2017 and the 2nd half of 2018.

Source: OpenSignal, reports acquired by the General Directorate for Quality, Costa Rica, 2018.

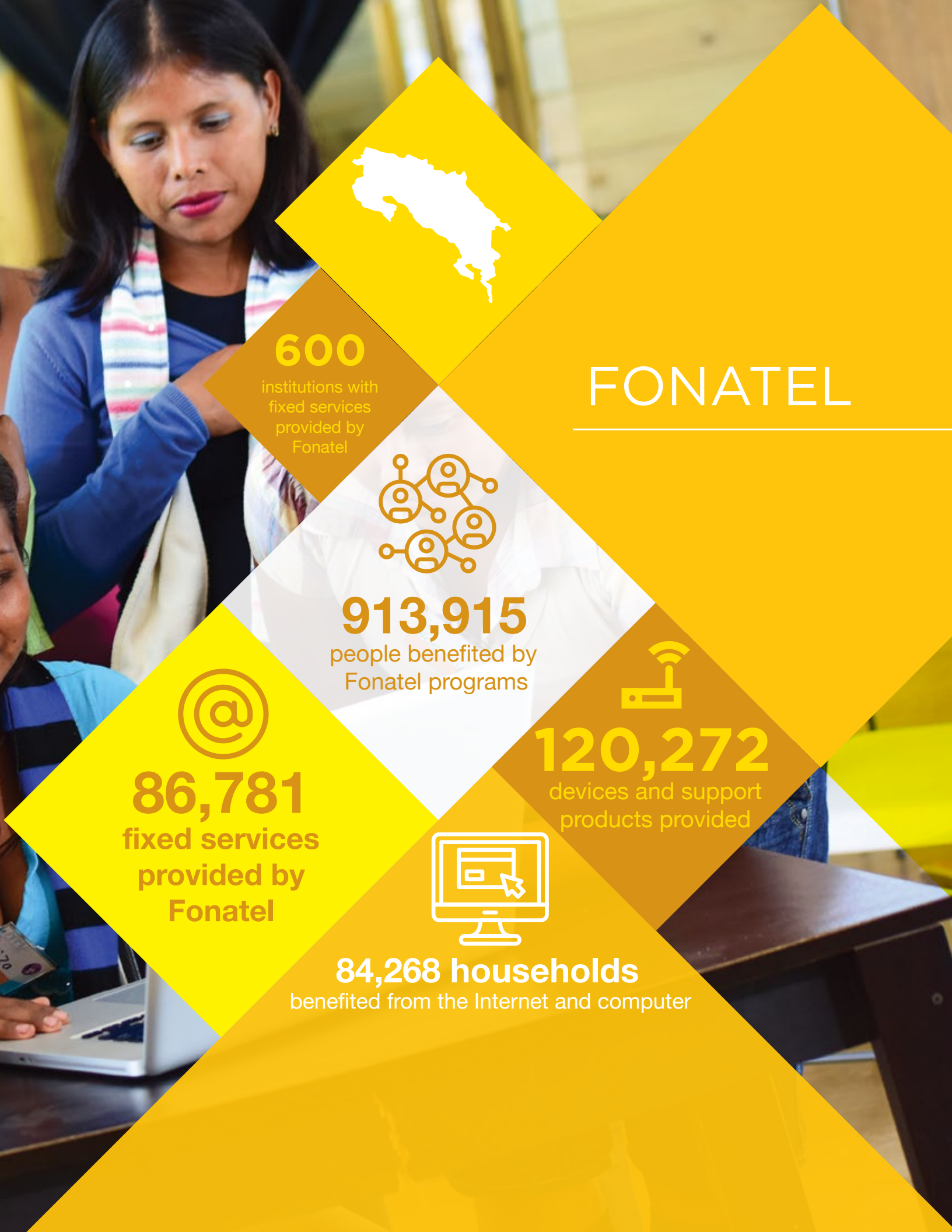
Graph Nº 165.
Costa Rica. 4G network availability per operator, 2016 - 2018
(Semiannual figures in percentage)



The percentage of availability of 4G networks, at the end of 2018, varies between 46 % and 70 % by operator.

Source: OpenSignal, reports acquired by the General Directorate for Quality, Costa Rica, 2018.

Chirripó indigenous territory, Pueblo Cabécar
Turrialba, Cartago.



FONATEL

600
institutions with fixed services provided by Fonatel

913,915
people benefited by Fonatel programs

120,272
devices and support products provided

86,781
fixed services provided by Fonatel

84,268 households
benefited from the Internet and computer

Fonatel

Aggregate performance indicators

The following results stand out regarding the performance of actions related to service provision, infrastructure development and the provisioning of support devices and products[55], from each intervention or program developed within the Fonatel framework in 2018.

- The program and project portfolio developed within the Fonatel framework does not show any variation in terms of quantity, but rather in their distribution according to deployment stages. At the end of 2018, there were 7 projects in the formulation stage, 9 in the deployment stage and 20 in production or providing services and support devices and products to the population (see graph Nº 166).

- According to figures at December 2018, the three programs currently in the production stage (Programa Comunidades Conectadas, Programa Hogares Conectados and Programa Centros Públicos Equipados) cover 445 districts (92 % of the national territory) (see map Nº 2), providing at a minimum access to fixed telecommunications services to 278,616 houses, 282,503 households[56] and 913,915 people (see graph Nº 167). At the end of 2018, the programs recorded 86,781 subscriptions to fixed voice and Internet services, corresponding to 317,640 directly benefited persons (see graph Nº 168). Likewise, 35,602 subscriptions to the mobile telephony service were registered in the areas covered by Fonatel[57] (see graph Nº 169).

- With the Fund's resources, a total of 120,272 support devices and products for Internet access were granted to institutions and households, generating broadband technological solutions to reduce the digital gap in a comprehensive manner. This result is 226.5 % higher than in 2017 (see graph Nº 170).

- The value of the Fund's total assets at December 2018 was 200,979 million colones, 17 % higher than the previous year. Such increase was mainly generated by the returns associated with the revenues from the 2017 spectrum auction, which amounted to 43 million dollars, and the collection of the Contribución Especial Parafiscal (CEPF), which registered a 4 % increase for the 2017-2018 biennium (see graphs Nº 171).

- The projection of the use of resources required by each of the programs and projects being implemented for their entire duration (2019-2026) was estimated at 197,454 million colones (see table Nº 30). It should be noted that Program 4: Espacios Públicos Conectados would already be under way for that period, and that the 2019-2020 biennium concentrates 50 % of the use of resources projected for that period.

- The cumulative investment executed in program and project management (2013-2018) reached 336 million dollars (45,862 million colones), being 2018 the year with the

[55] Assistive products are defined as equipment, instruments, technologies, software and products designed to promote the personal autonomy of people with disabilities.

[56] The number of households mentioned above was used to calculate the beneficiary population and multiplied by the proportion of persons per household estimated by the National Institute of Statistics and Census (INEC) for each of those years in the National Household Survey (ENAHO), namely: 3.41 (2014), 3.37 (2015), 3.34 (2016), 3.31 (2017) and 3.25 (2018).

[57] These subscriptions are marketed by network operators and providers of telecommunications services adjudicated in those areas, as a consequence of their incursion through the telecommunications infrastructure financed by this fund.

highest disbursement with 44 million dollars (25,409 million colones), corresponding to 52 % of the total disbursements made during that period (see graph Nº 172).

- The cumulative investment for the 2013-2018 period by program, presents the following distribution: 24,092 million colones (53 %) of the Programa Hogares Conectados; 13,660 million colones (30%) of the Programa Comunidades Conectadas and 8,109 million colones (18 %) of the Connected Public Centers Program. For its part, Fonatel disbursements made during 2018 by program, are: "Hogares conectados" Program 17,298 (68 %), Programa Comunidades Conectadas 4,754 (19 %) and Programa Centros Públicos Equipados 3,357 (13 %) (see graph Nº 172).

- In 2018 the 25,409 million colones disbursed in the different programs were distributed among Televisora de Costa Rica (Cabletica) with 23 %, the Instituto Costarricense de Electricidad (ICE) with 23 %, Telecable T.V.E.S.A. with 17 %, Radiográfica Costarricense (RACSA) with 13 %, Millicom Costa Rica S.A. with 13 %, (Tigo) with 12 %, Claro CR Telecomunicaciones (Claro) with 6 %, Cooperativa de Electrificación Rural de San Carlos (Coopelesca) with 2 %, Cooperativa de Electrificación Rural de Los Santos (Coopesantos) 2 %, Cooperativa de Electrificación Rural de Guanacaste (Coopeguanacaste) with 0.4 % and Telefónica de Costa Rica (Telefónica) with 0.3 % (see graph Nº 173).

Indicators by Program

The following are the main results obtained from the implementation of the funded projects portfolio developed under the Fonatel framework by program during the 2012-2018 period.

Programa Comunidades Conectadas (PCC)

According to the Plan Nacional de Desarrollo de Telecomunicaciones (PNDT) in force, the coverage targets associated with the PCC are 184 districts and 21 Indigenous Territories[58] at the closing of 2021. At December 2018, 32 projects are being developed, 18 of which are in the production stage (see graph Nº 174); enabling coverage of 6 planning regions of the Ministerio de Planificación Nacional y Política Económica (Mideplan) and 72 districts (see map Nº 3), as well as access to telecommunications services for 640,044 people (see graph Nº 175). This represents a 39 % advance in meeting the goal set in the PNDT, as well as an increase in coverage in 16 districts (28.5 %) compared to 2017. Projects relating to the coverage of the Central Region, as well as the 16 Indigenous Territories, are pending.

This program also includes the connectivity of the Centros de Prestación de Servicios Públicos (CPSP), which include the elementary and secondary schools of the Ministerio de Educación Pública (MEP), Centros Comunitarios Inteligentes (CECI), the Periodic Visiting Centers of the Caja Costarricense de Seguro Social (CCSS) and the Education and Nutrition Centers and Centros de Educación y Nutrición y Centros Infantiles de Atención Integral (CEN-CINAI), based on the information provided by each of the proposing or beneficiary institutions.

At December 2018, a total of 600 CPSPs with fixed telephony and Internet provided by the program have been registered and distributed in various areas of the country (see graph Nº 176). When reviewing the attention of these CPSP by operator, Claro registers 465 CPSPs, Telefonica 131 and ICE 4.

When analyzing the figures for subscription to telecommunications services in the areas

[58] The 3 remaining Indigenous Territories to complete 24, have pending the approval to develop infrastructure, after a process of constructive dialogues, in respect to their autonomy, to complete 100 % of the country's territories.

covered by the Programa Comunidades Conectadas at the end of 2018, 999 (3 %) correspond to fixed telephony service and 1,514 (4 %) to fixed Internet service (see graph Nº 177). The remaining 93 % (35,602 subscriptions) correspond to mobile subscriptions marketed by network operators and telecommunications service providers, on their own account and at their own cost, as part of the incursion into the area from the infrastructure funded by Fonatel (see graph Nº 178).

In this regard, it is important to clarify that the projects tendered under this program aim at extending the coverage of fixed voice and Internet services. However, there are areas where participating operators have deployed convergent solutions that enable the provision of mobile services. As part of this premise, the subscription figures per project and service for 2018 are reviewed:

- **Fixed Telephony:** 32 % of subscriptions are in Upala, 26 % in Sarapiquí, 21 % in Pérez Zeledón and 21 % in San Carlos. These results reflect significant changes in the distribution of subscriptions compared to 2017, a year in which San Carlos led the concentration of subscriptions with 36 % of the total, followed by Upala (28 %), Pérez Zeledón (27 %) and Sarapiquí (8 %) (see graph Nº 179).

- **Fixed Internet:** 31 % of subscriptions correspond to Upala, followed by Sarapiquí with 25 %, San Carlos 22 %, Pérez Zeledón 21 %, Roxana 1 % and Siquirres 0.1 %. This distribution varies compared to 2017, except in the case of Siquirres which maintains the percentage of subscriptions at 0.1 % and Roxana 1 %. At the end of that year, in contrast to 2018, San Carlos accounted for 48 % of subscriptions, followed by Upala with 22 % (down 26 percentage points), Pérez Zeledón with 19 % (down 2 percentage points) and Sarapiquí with 10 % (down 15 percentage points (see graph Nº 180).

- **Mobile Telephony:** 40 % of subscriptions correspond to Los Chiles, 16 % to Guatuso, 13 % to San Carlos, 10 % to Sarapiquí, 8 % to Upala, 6 % to Pérez Zeledón and 6 % to Siquirres. This distribution is very similar to that recorded at the end of 2017. However, it differs significantly from the scenario during 2016, as Upala and Sarapiquí appeared with much higher percentages (23 % and 24 % respectively).The advance in PCC coverage has generated a readjustment of the subscriptions to the mobile telephony service provided by the PCC for 2018 (see graph Nº 181).

In 2018, 4,754 million colones of the Fund were executed through the Programa Comunidades Conectadas, a figure much higher (141 %) than the 1,971 million colones invested in 2017. A total of 13,660 million colones have been invested in this program since its inception in 2013 (see graph Nº 182).

The telecommunication network operators that participate in the execution of this program are: ICE (18 projects), Claro Telecomunicaciones CR S.A. (5) and Telefónica Costa Rica TC S.A. (3). In 2018, ICE received 69 % of the total resources invested in the program, Claro 30 % and Telefónica 1 %. These results are far from the disbursement trend in 2013, but they are like the distribution obtained for 2017 in which ICE received 61 %, Claro 37 % and Telefónica 2 % (see graph Nº 183).

Programa Hogares Conectados

At the end of 2018, this program registered a total of 84,268 beneficiary households, 78,815 (93.52 %) of which were active and 5,190 (6.2 %) were terminated. The delinquency associated with the unsubsidized amount was the main reason why households were discharged (97.5 %).

From January to December 2018, the number of benefited households grew, on average, by 4,695 households per month, the year of greatest progress for the program with 51,641 additional subscriptions (77 %) (see graph Nº 184).

The number of active households reached by the program (78,815 households) represents an impact of 5 % in the penetration of the fixed Internet service compared to the country's total households. This percentage is important considering that the penetration of fixed Internet service at household level in the country is 73 %, according to the 2018 National Household Survey (ENAHO), published by the National Institute of Statistics and Census (INEC).

The program has a national scope, i.e. the service is installed in those geographical areas where the participating telecommunications service providers have coverage. Currently, there are beneficiary households in 434 districts, which corresponds to 90 % coverage (see figure Map Nº 4).

The distribution of beneficiary households by income quintile, a variable used as a pivot to determine the program's target population, shows an increase in the participation of households in quintiles 2 and 3. During the first year of the program's implementation, the database of beneficiaries did not include households in quintile 3, and the proportion of households in quintile 2 was 3 %, compared to 97 % for households in quintile 1. From December 2017 to April 2018, the distribution of beneficiary households by income quintile remained unchanged, with 82 % of households in the first income quintile, 14 % in the second quintile and 4 % in the third quintile. From May to December 2018, the percentage of households benefiting from the first income quintile increased by 3 percentage points, reaching 85 %, quintile 3 decreased by 1 percentage point and quintile 2 remained variable between 12 % and 13 %. This leads to conclude that the program is focused on households living in poverty and extreme poverty, quintile 1 (see figure Nº 185).

When analyzing the quotas of beneficiaries by province at the end of 2018, San José is in first place with 28,102 households (33 % of the total). In second place is Alajuela with 13,335 households (16 %), Puntarenas with 12,106 (14 %), Guanacaste with 10,458 (12 %), Cartago with 7,533 (9 %), Heredia with 6,997 (8 %) and Limón with 5,737 (7 %) (see graph Nº 186).

In general terms, it is important to point out that San José and Alajuela have maintained the first and second position, respectively, in terms of beneficiaries since the Program started in June 2016. Cartago has remained constant with a relative participation between 7 % and 9 %. While the rest of the provinces have experienced variations in their relative participation, the following movements stand out:

- Heredia was in third position during the first semester of the Program with a relative participation of 16 %; during 2017 it reduced its participation by 7 percentage points (9 %) and by December 2018 it represented 8 % of the total number of beneficiaries, i.e. 8 percentage points less than in January 2016.

- Guanacaste and Puntarenas are the provinces that have experienced the greatest growth in their relative participation, rising from 5 % in both cases in 2016, to 12 % and 14 % respectively in 2018

- Limón reduced its relative participation by 10 percentage points from 2016 to 2018, going from representing 17 % to owning 7 % of the total number of households benefiting from the Program.

By 2018, the ratio of households benefiting from the program per telecommunications service

provider is as follows: Televisora de Costa Rica (Cabletica) 27,520 (36.3 %), Telecable S.A. (Telecable) 21,826 (27.19 %), Millicom Cable Costa Rica S.A. (Tigo) 13,285 (16.19 %), Instituto Costarricense de Electricidad (ICE) 9,971 (12.73 %), Cooperativa de Electrificación Rural de San Carlos (Coopelesca) 2,972 (3.63 %), Cooperativa de Electrificación Rural de Los Santos (Coopesantos) 2,942 3.54 %), Cooperativa de Electrificación Rural de Guanacaste (Coopeguanacaste) 277 (0.38 %) and Cablevisión de Costa Rica 22 (0.03 %) (see graph Nº 187).

During 2018, 17,298 million colones were executed in this program, for a cumulative 2016-2018 investment of 24,092 million colones (see graph Nº 188).

When analyzing the distributions of resources invested in the program with cut to December 2018, it is found that Cabletica concentrates 34 %, Telecable 26 %, Tigo 18 %, ICE 15 %, Coopelesca and Coopesantos 3 % respectively and Coopeguanacaste 1 % (see graph Nº 189).

Programa Centros Públicos Equipados

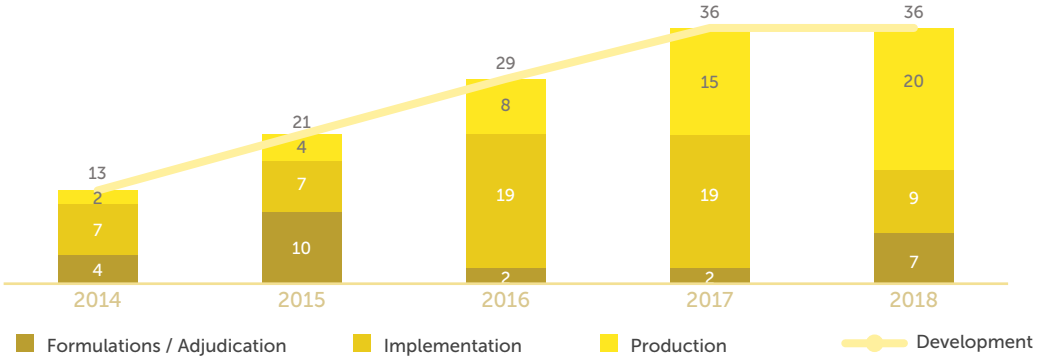
Through this program, by the end of December 2018, a total of 36,004 support devices and products for access to and use of telecommunications services had been delivered to the Centros de Prestación de Servicios Públicos (CPSPs), which so requested, a figure higher than that recorded at the end of 2017 (6,407 support devices and products, equivalent to 471.3 % growth). There are still 3,169 support devices and products to be tendered in order to reach the goal of the current PNDT (see graph Nº 190).

The CPSPs benefited were the Ministerio de Educación Pública (MEP), which received a total of 25,678 devices (71 %), followed by the Centros Comunitarios Inteligentes (CECI) of the Ministerio de Ciencia, Tecnología y Telecomunicaciones (MICITT) with 4,941 devices (14 %), hospitals, health areas and clinics of the Caja Costarricense de Seguro Social (CCSS) which together received 4,318 devices (12 %) and the Ministry of Health's Education and Nutrition Centers and Centros de Educación y Nutrición y Centros Infantiles de Atención Integral (CEN-CINAI) with 1,067 devices (3 %) (see graph Nº 191).

This program has been implemented through a tender for a total of 36,831 support devices and products for Internet access, 827 of which are pending distribution, 710 (86 %) correspond to MEP and 117 (14 %) to MICITT (see graph Nº 192).

For the total duration of this program (2017-2024), an investment of US$ 25 million was estimated. At the end of 2018, an accumulated investment (2017-2018) of US$ 20.65 million was recorded, equivalent to 8,109 million colones. During 2018, 5.96 million dollars were executed, equivalent to 3,357 million colones, a figure 1,395 million colones (29.4 %) lower than that executed in 2017 (4,752 million colones) (see graph Nº 193).

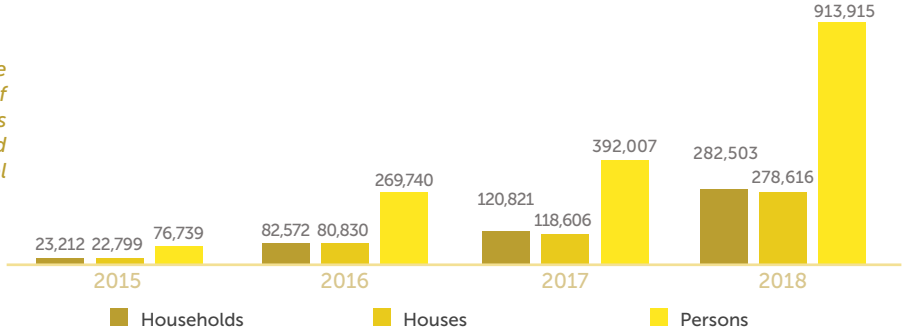
Graph Nº 166.
Costa Rica. Total number of projects financed with Fonatel resources by development stage, 2014 – 2018
(Annual figures)



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 167.
Costa Rica. Number of households, houses and persons with access to telecommunications services provided through Fonatel, 2015 – 2018
(Annual figures)

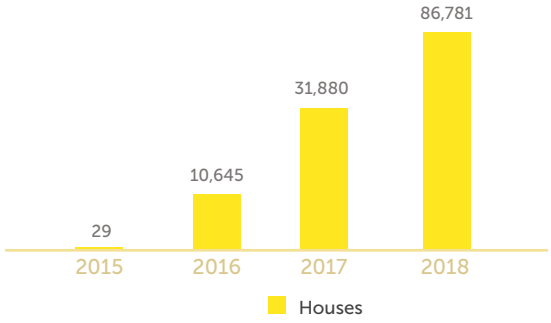
913,915 people with the availability of telecommunications services in areas operated by Fonatel



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

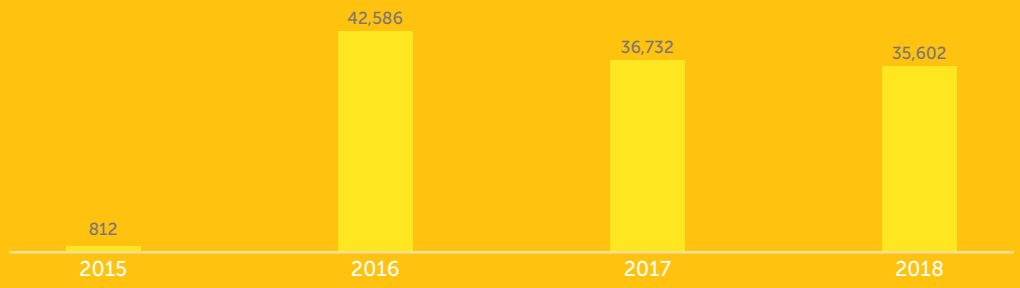
Graph Nº 168.
Costa Rica. Number of subscriptions to telecommunications services provided through Fonatel, 2015 – 2018
(Annual figures)

86,781 subscriptions to fixed voice and Internet services provided by Fonatel



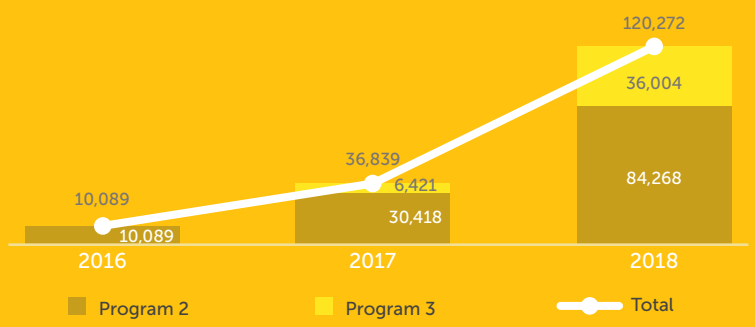
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 169.
Costa Rica. Number of subscriptions to mobile telephony service in the areas covered by Fonatel, 2015 – 2018
(Annual figures)



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

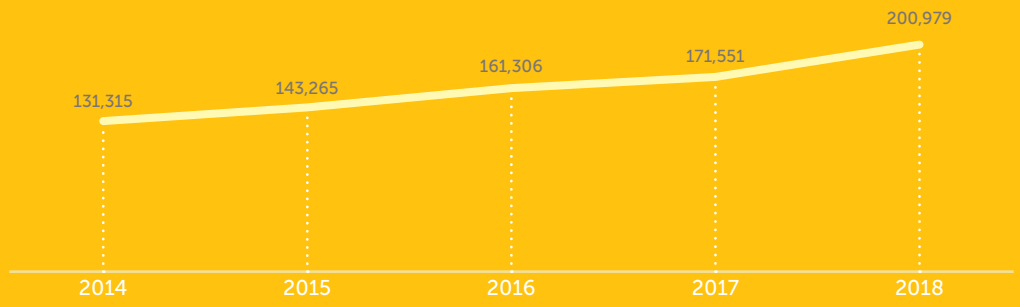
Graph Nº 170.
Costa Rica. Total number of support devices and products provided through Fonatel, 2016 – 2018
(Annual figures)



120 272 dispositivos y productos de apoyo provistos por Fonatel

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 171.
Costa Rica. Fonatel assets, 2014 – 2018
(Annual figures in millions of colones)



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

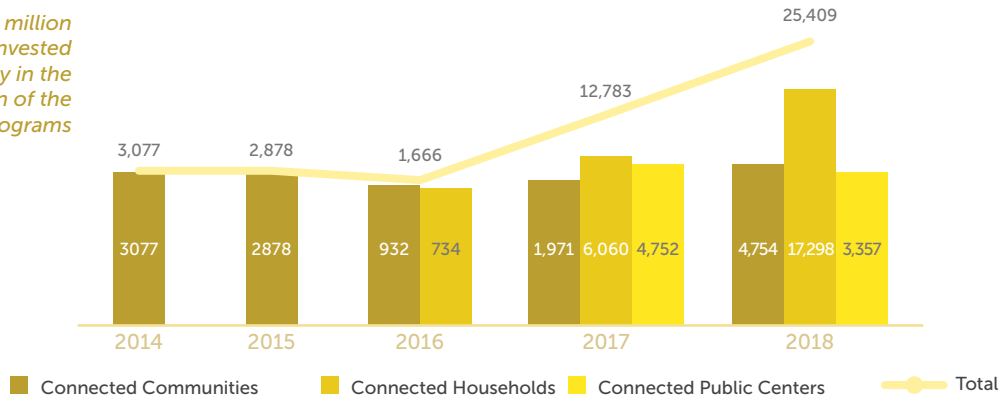
Table Nº 30.
Costa Rica. Projected investment of Fonatel for the development of programs and projects in execution, 2019-2026
(Figures in millions of colones)

Program	Proyecto	2019	2020	2021	2022	2023	2024	2025	2026	Total
Program 1: Connected Communities	Internet access to 183 districts	3779	20 432	7283	6286	5621	3726	1758	0	**48 884**
	Internet Access Indigenous Territories	13 506	13 580	6885	6940	6995	7050	1797	0	**56 754**
Program 2: Connected Households	Subsidy for Internet access and laptop	17 912	18 550	7232	3883	711	0	0	0	**48 288**
Program 3: Equipped Public Centers	Provision of access devices to CPSP	3932	1689	0	0	0	0	0	0	**5621**
Program 4: Connected Public Spaces	513 digital zones	2176	5710	7340	7399	6151	6199	2366	566	**37 907**
Total		**41 304**	**59 961**	**28 740**	**24 509**	**19 478**	**16 976**	**5 920**	**566**	**197 454**

Source: Sutel, General Directorate of Fonatel, Costa Rica, 2018.

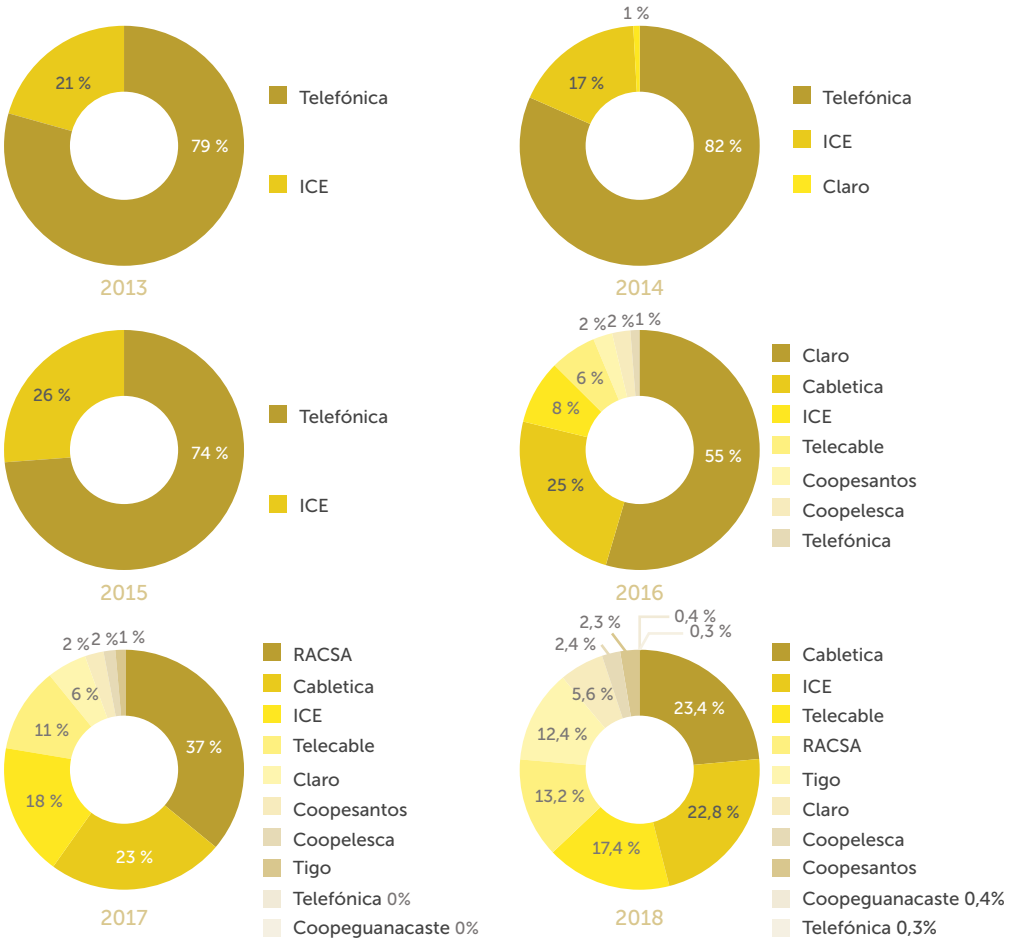
Graph Nº 172.
Costa Rica. Executed investment through Fonatel by program, 2014 - 2018
(Annual figures in millions of colones)

45,862 million colones invested cumulatively in the execution of the programs



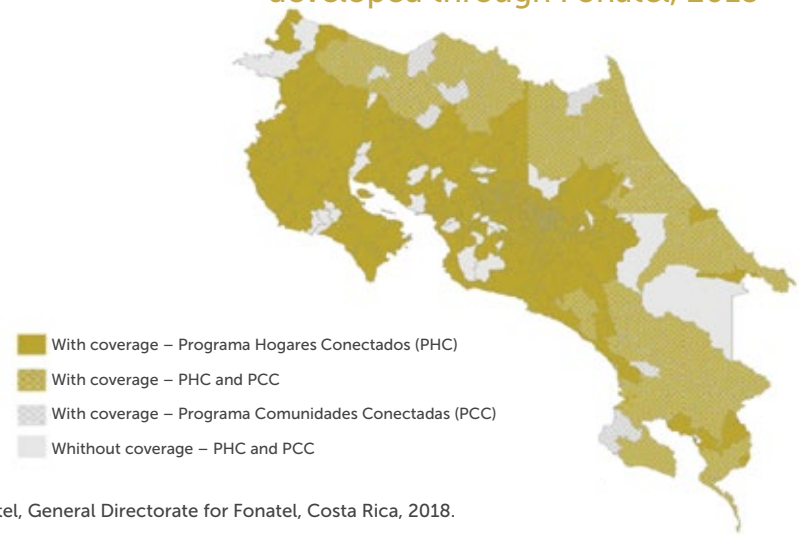
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 173.
Costa Rica. Fonatel assets, Investment executed through Fonatel by network operator and telecommunications service provider, 2013 - 2018
(Annual figures in millions of colones)



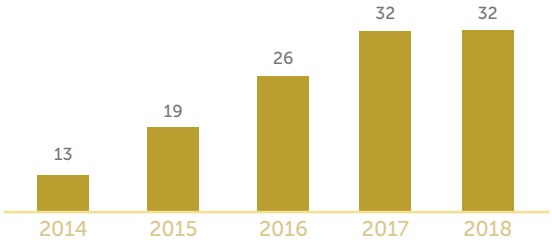
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Map Nº 2.
Costa Rica. Geographic coverage of the programs and projects developed through Fonatel, 2018



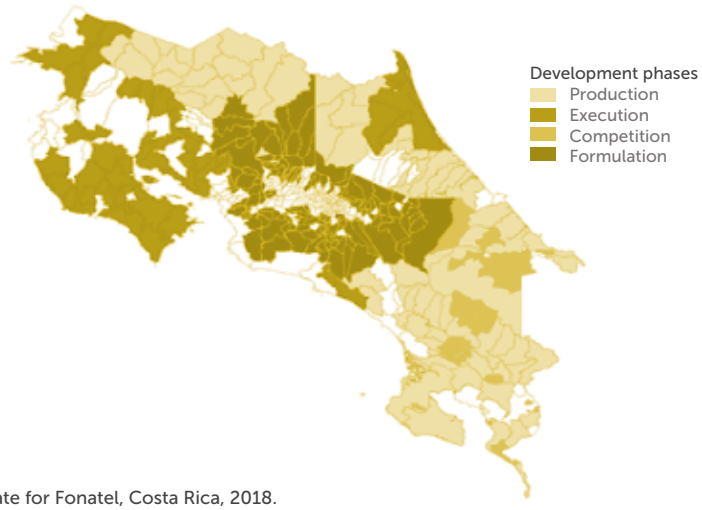
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 174.
Costa Rica. Number of projects of the Connected Communities Program, 2014 – 2018
(Annual figures)



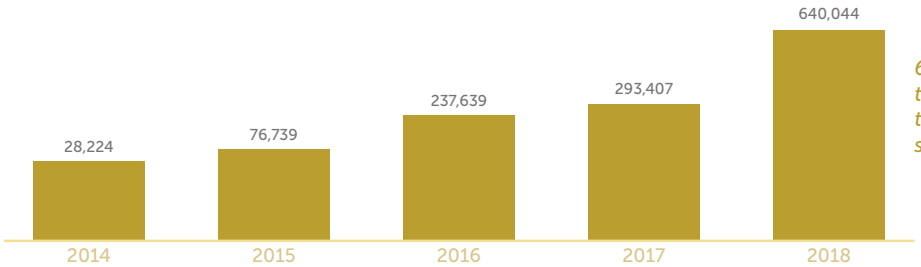
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Map Nº 3.
Costa Rica. Geographic coverage of the Connected Communities Program, 2018



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

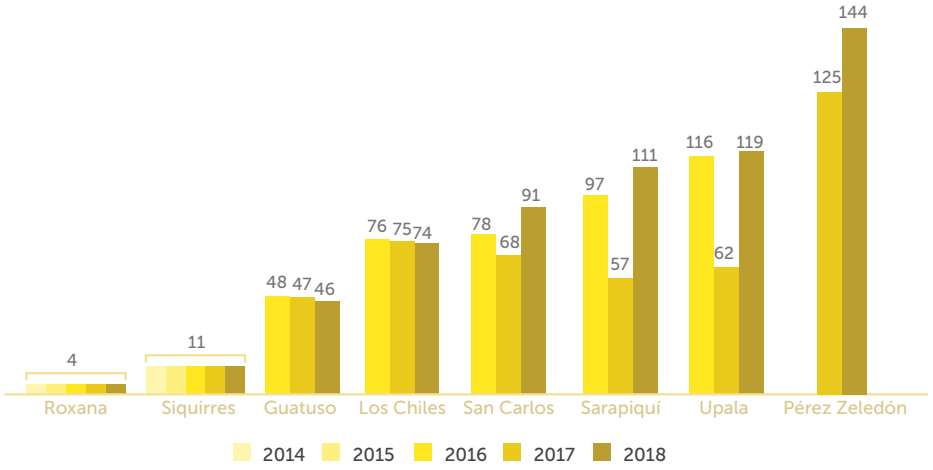
Graph Nº 175.
Costa Rica. Number of telecommunications projects services in the areas covered by the Connected Communities Program, 2014 – 2018
(Annual figures)



640,044 people with the availability of telecommunications services

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

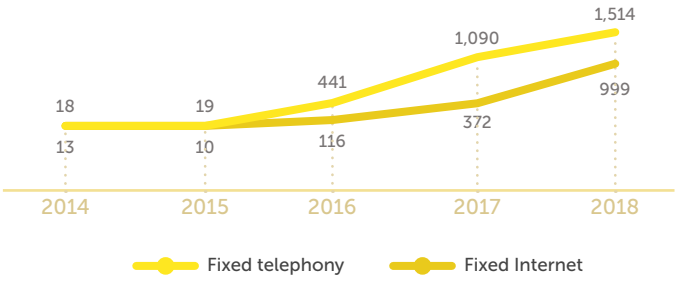
Graph Nº 176.
Costa Rica. Number of CPSPs with fixed services provided through the Connected Communities Program, 2014 – 2018



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 177.
Costa Rica. Cantidad total de suscripciones a servicios fijos de voz e Internet provistos por el Programa Comunidades Conectadas, 2014-2018
(Cifras anuales)

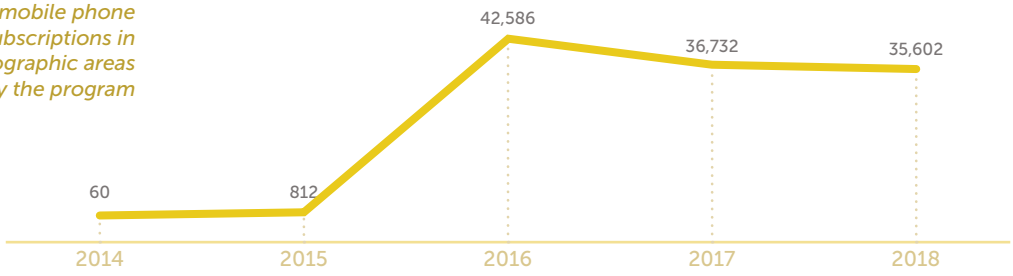
2,513 subscribers to fixed voice and Internet services generated by the program



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

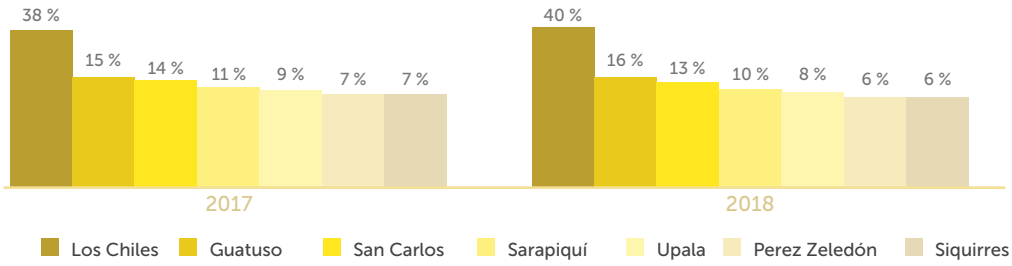
Graph Nº 178.
Costa Rica. Number of subscriptions to mobile telephony service in the geographic areas covered by the Connected Communities Program, 2014 – 201
(Annual figures)

35,602 mobile phone service subscriptions in the geographic areas covered by the program



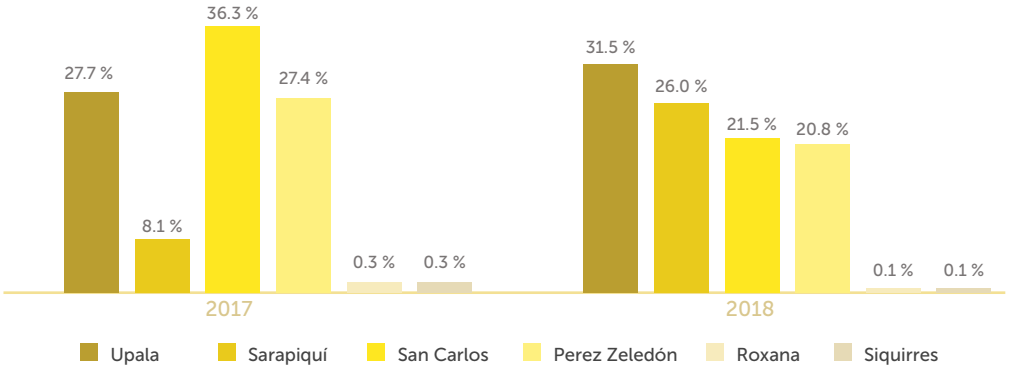
Source: Sutel. General Directorate for Fonatel. Costa Rica. 2018.

Graph Nº 179.
Costa Rica. Percentage of subscriptions to mobile telephony service in geographic areas covered by the Connected Communities Program by project, 2017 – 2018
(Figures in percentages)



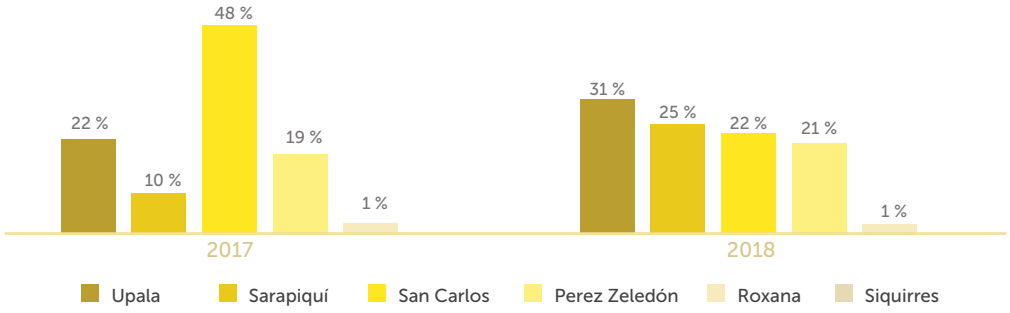
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 180.
Costa Rica. Percentage of subscriptions to fixed telephony service provided by the Connected Communities Program by project, 2017 – 2018
(Figures in percentages)



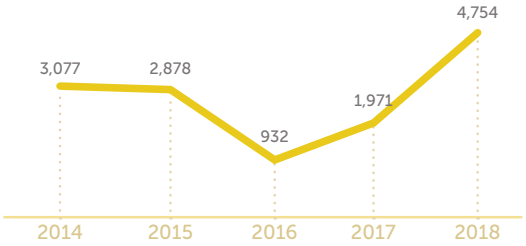
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 181.
Costa Rica. Percentage of subscriptions to fixed Internet service provided by the Connected Communities Program by project, 2017 – 2018
(Figures in percentages)



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

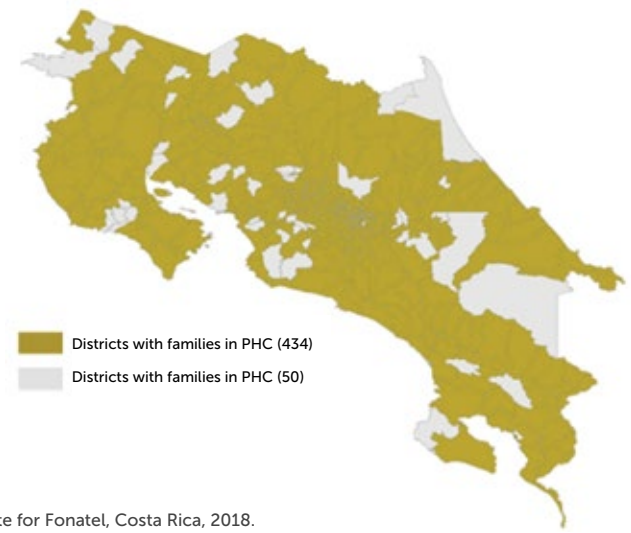
Gráfico Nº 182.
Costa Rica. Executed investment through the Connected Communities Program, 2014 – 2018
(Figures accumulated per year in millions of colones)



13,660 million colones invested cumulatively in the execution of the program

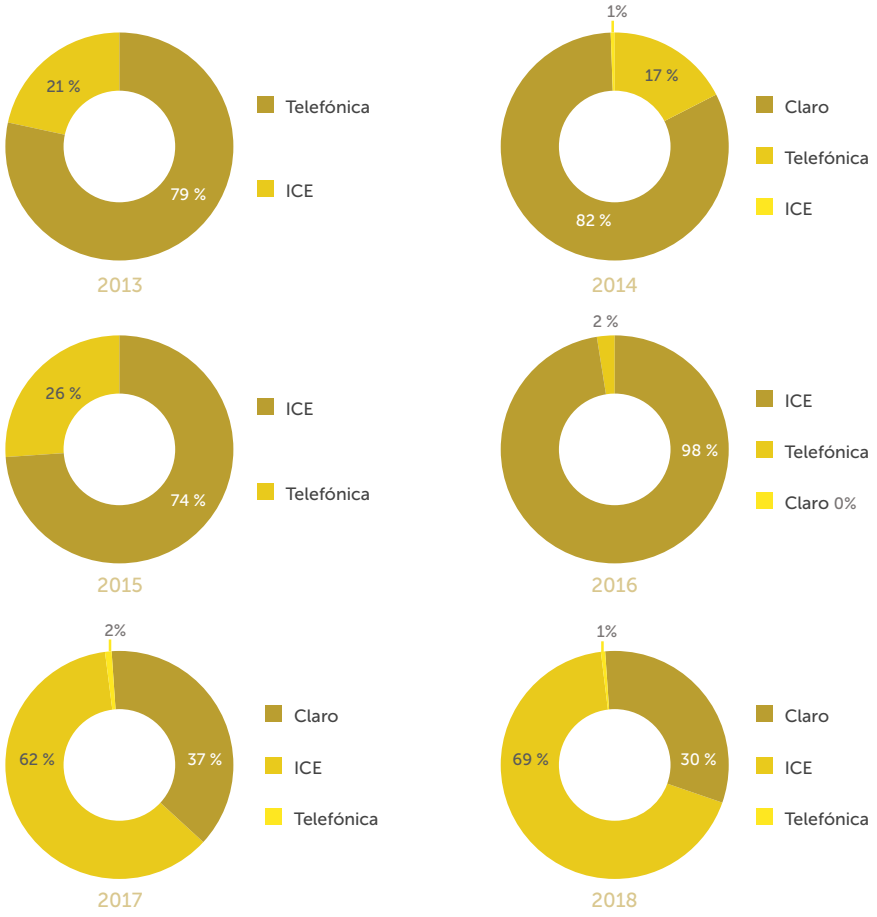
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Map Nº 4.
Geographic coverage of the Connected Households Programs, 2018



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

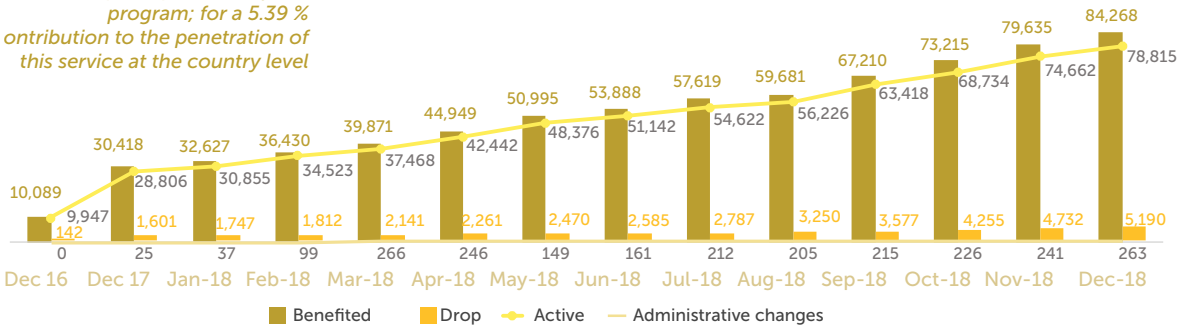
Graph Nº 183.
Costa Rica. Percentage of executed investment through the Connected Communities Program by operator, 2013 – 2018



ource: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 184.
Costa Rica. Total number of households registered in the System for the Administration of Beneficiaries of the Connected Households Program, 2016-2018
(Cumulative figures of beneficiaries)

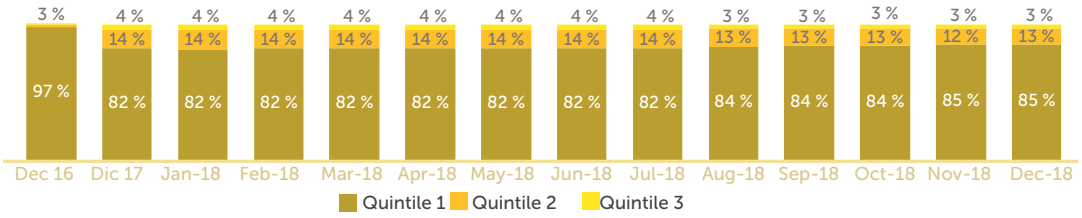
84,268 households with Internet and computer provided by the program; for a 5.39 % ontribution to the penetration of this service at the country level



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

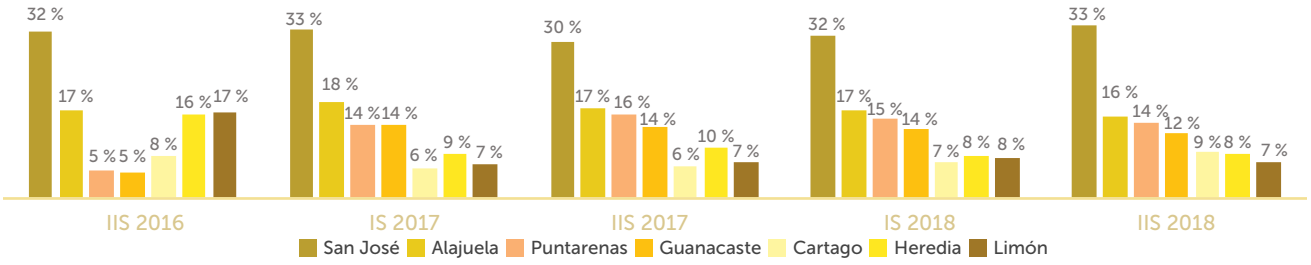
Graph Nº 185.
Costa Rica. Percentage of households benefited through the Connected Homes Program according to income quintile, 2016-2018
(Figures in percentage)

85% of households benefited through the program belong to the first income quintile, that is, they are in poverty and extreme poverty



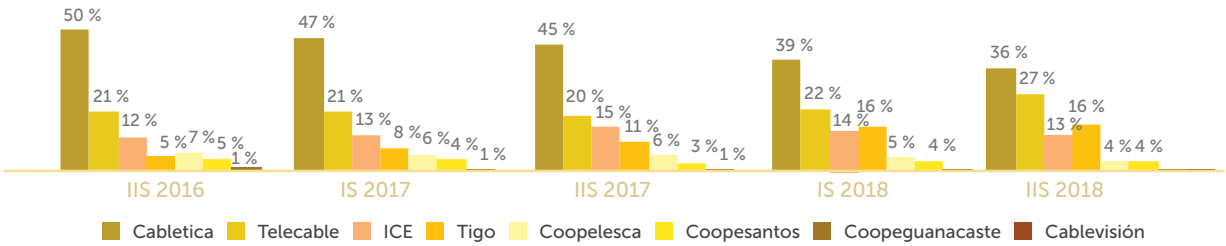
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 186.
Costa Rica. Percentage of households benefited through the "Hogares conectados" Program by province, 2016-2018
(Semiannual figures)



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

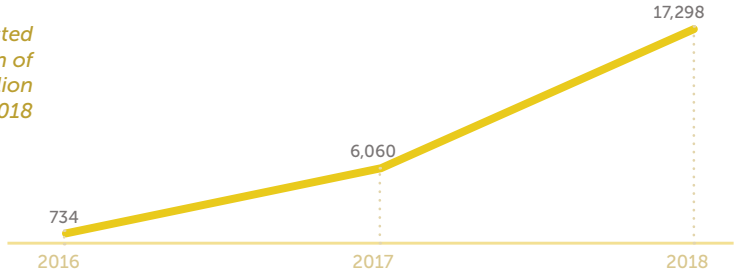
Graph Nº 187.
Costa Rica. Percentage of households benefited through the "Hogares conectados" Program by operator, 2016-2018
(Semiannual figures)



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

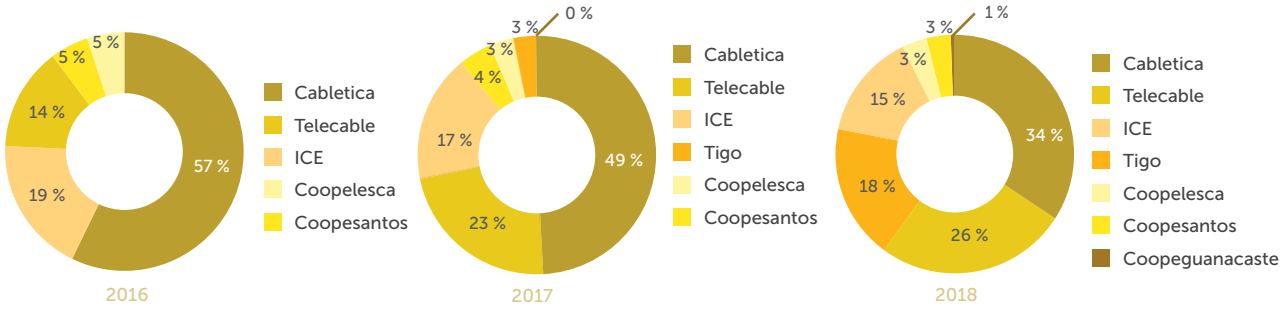
Graph Nº 188.
Costa Rica. Executed Investment through the Connected Households Program, 2016-2018
(Figures accumulated in millions of colones)

24,092 million colones invested cumulatively in the execution of the program and 17,298 million colones in 2018



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 189.
Costa Rica. Percentage of the Executed investment through the "Hogares conectados" Program according to the operator, 2016-2018
(Figures in percentage)

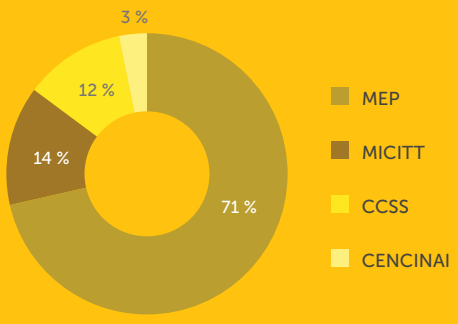


Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 190.
Costa Rica. Number of support devices and products for the use of telecommunications services provide through the Equipped Public Centers Program, 2017 - 2018

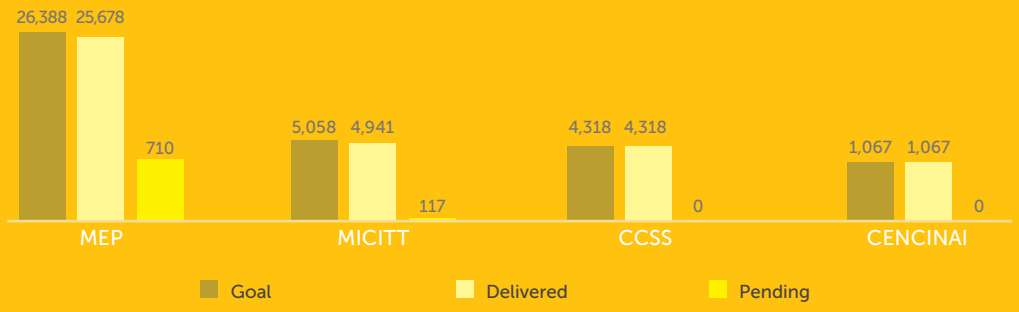
Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 191.
Costa Rica. Distribution of support devices and products for the use of telecommunications services provide through the Equipped Public Centers Program, 2017 - 2018



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 192.
Costa Rica. Level of fulfillment of the goal set for the Equipped Public Centers Program in the PNDT by institution, 2017 - 2018



Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Graph Nº 193.
Costa Rica. Excecuted Investment in the the Equipped Public Centers Program
(Annual figures accumulated in millions of colones)

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Flags of Latin America and the Caribbean, entrance of the Institute Inter-American Institute for Cooperation on Agriculture (IICA), in Coronado, San José

INTERNATIONAL

51 %
of the world's population has access to the Internet

Costa Rica
is among the countries with the **highest** mobile penetrationl

75 %
of the world's population has a mobile device

Costa Rica improvement is position is the 55 of 140 countries in the ICT adoption pillar of ICG

International

International general indicators analysis

To analyze the case of Costa Rica in the light of general indicators from leading countries in telecommunications, a series of international trends must be taken into account, to which the Costa Rican market is not exempt[59]:

- By the end of 2018, 51.2 % of the world's population has access to the Internet. This proportion differs according to the level of development of the countries. The proportion is 80 % in developed countries; the average for developing countries is 45 % and for less developed countries is 20 %.
- About 75 % of the world's population has a mobile device.
- Although in the last decade the indicators show sustained growth (except for fixed telephony, whose trend is downwards), for the last years a slowdown is observed. This poses the general challenge of how to achieve greater dynamism, especially in those markets where coverage rates are already high.
- Although there are differences according to the level of development of the markets, the truth is that there are already more mobile connections in the world than population.
- There has been sustained growth in both fixed and mobile broadband Internet access, which is consistent with the fact that the consumption patterns of data users are increasingly higher.
- The above has been associated globally with the fact that growth in broadband capacity and Internet traffic has been higher than the growth of the population that uses Internet, which reflects that consumption habits point to users increasingly intensive in the use of data and industry, in general, makes the forecasts of the case in terms of speed and network capacity.
- The global household Internet access indicator increased from 20% in 2005 to 60% in 2018. However, only about 50% of households globally have a computer, indicating that in some cases accessing to the Internet at home is only via mobile access.
- Virtually the entire world population lives in an area covered by a mobile signal and can access the service via 3G or higher. Nonetheless, the rate of growth in network coverage and deployment is faster than the growth of the population using Internet.

Based on the aforesaid, we can analyze the case of Costa Rica within the global context of the most prominent general indicators.

The penetration of fixed telephony (traditional basic telephony and VoIP telephony) measured as the percentage of total users with respect to the total population of the country, has shown, in general, a decrease in recent years.

This situation is not exclusive to Costa Rica as the number of subscriptions to this service continues to decline. This trend has been analyzed in various international forums of the ITU, has been reinforced by the introduction

[59] Measuring the Information Society Report 2018:
https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-1-E.pdf

and increasing penetration and availability of mobile telephony technologies, but also by the increased use of the Internet and other communication alternatives such as OTT (Over the top) and mobile applications. In fact, "cord cutters" have been called those segments of the population that have eliminated their fixed Internet subscriptions by having other alternatives according to their new habits of consumption and life, but also have emerged the so-called "cord nevers" that corresponds to those users, especially young people who have never subscribed to fixed services[60].

Costa Rica is no stranger to this trend. This is congruent with what happens around the world; however, if you compare the behavior of this indicator at the global level, we have that, with the exception of 2014 and 2018, the average number of subscriptions decrease at a higher rate in the world than in Costa Rica. (See graph Nº 194).

More precisely, it is possible to analyze the level of penetration of fixed telephony in Costa Rica, in relation to that of other countries outside Latin America such as Korea, Switzerland, Holland, the United States, Norway and Sweden, as well as other Latin American countries such as Argentina, Brazil, Chile and Mexico, among others. In 2017, according to ITU records, the countries that reached the highest penetration rate of fixed telephony are Korea, United Kingdom, Switzerland with 52.7 %, 50.1 % and 43.1 % respectively. In the case of Costa Rica, the penetration in 2017 was 16.9 %, while in 2018 was reduced by 14 %, placing the country in fifth position in Latin America, behind Uruguay, Argentina, Brazil and Chile (see graph Nº 195).

If we consider the estimates of the International Telecommunications Union (ITU) in 2018, based on the level of development of the countries, we can see that despite the reduction that this indicator has experienced in Costa Rica in recent years -by reducing the penetration of fixed telephony by 3 points in the 2014-2018 period- the penetration rate of fixed telephony recorded by Costa Rica is higher than the world's average, and even much higher than that recorded by the group of developing countries, that includes Costa Rica. However, it differs markedly from the average recorded for developed countries (see graph Nº 196).

In the case of mobile telephony service, Costa Rica remains among the countries with the highest penetration, reaching the first position in 2017, at world level, with 179 %, surpassing countries such as Singapore, Finland, and Switzerland among other European countries. The percentage of penetration that was reached in 2018 (170 %) is consistent with the country trend to remain at the top of this penetration indicator, as can be seen in the Graphic graph Nº 197.

Although in 2018 according to ITU estimates there are more mobile phone subscriptions than inhabitants in the world, there are still significant differences according to the level of development of countries. This means that although on average the penetration of mobile telephony in the world is more than 100 %, not all people are connected through mobile technologies. For example, the penetration of mobile telephony in the world reaches 107 people per 100 inhabitants, while in less developed countries this rate is 72 %. Costa Rica surpasses in that year (2018) even the penetration rate registered in developed countries that reached 128 % in that year compared to 170 % in our country (see graph Nº 198).

As for the comparative trend of this indicator for Costa Rica and the world, 2016 records the largest difference between the growth rate of mobile subscriptions in Costa Rica in relation to the world average, year in which our country grew at a rate greater than 6 percentage points

[60] Measuring the Information Society Report 2018: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-1-E.pdf

with respect to the global growth rate. It is important to mention that, unlike what happened in the world in 2018, when subscriptions to mobile telephony increased by 4 %, the case of Costa Rica in the same year records an opposite trend to register a fall of 4 %. (see graph Nº 199). Therefore while for our country the penetration of mobile telephony service falls in 2018, worldwide this indicator increases in the same year.

This dissimilar behavior between last year's world trend and that registered by Costa Rica, can be attributed to the accelerated growth registered in less developed countries, where the penetration is lower, there is the possibility that the market grows faster. Contrary to these markets, in the case of developed and developing countries such as Costa Rica, it is to be expected that as they are more mature markets, growth will turn out to be slower. The ITU points out that organic growth[61] is to be expected in these latter markets.

Costa Rica continues to be among the countries with the highest proportion of prepaid lines, surpassed only by Colombia, Mexico, Panama and Nicaragua. These results contrast with those observed in European and Asian countries, where the relationship is inverse, as shown in Graphic Nº 200.

As in the previous edition of the Telecommunication Sector Statistics, Costa Rica 2017, there is still an inverse relationship between the proportion of prepaid services and per capita income, according to data from the ITU Report for 2017. Mobile phone users in countries with a higher level of development and higher purchasing power mostly opt for postpaid services, while countries with lower purchasing power opt for prepaid services. The details can be seen in the graph Nº 201.

For Costa Rica, the measurement of fixed Internet access per 100 inhabitants was 17 % by 2018, up 2 percentage points from the previous year, which was 15.1 %. This indicator, although higher than that recorded in most other Latin American countries considered in this report as part of a comparative sample, is lower than that achieved by Chile (16.9 %), Argentina (17.7 %) and Uruguay (27.6 %). If the comparison is made with European countries, like Switzerland, Denmark, the Netherlands and Norway, the values recorded in these countries, in general, are three times that reached by Costa Rica. Graph Nº 202 shows this in detail.

As mentioned at the beginning of this chapter, one of the important global trends is the accelerated growth rate of both fixed and mobile broadband internet connections. In fact, it is estimated that a 1 % increase in the fixed broadband Internet penetration rate is associated with an average increase of 0.08 % in the Gross Domestic Product (GDP). Hence the importance of analyzing the behavior of this indicator in the case of Costa Rica with respect to that recorded in other markets.

By 2018 (see graph Nº 203), the penetration of fixed broadband service in Costa Rica, although higher than that recorded globally (17 % vs 14 %), is about half the corresponding rate for developed countries. In this sense, although the national performance has been quite favorable, there are still ample possibilities for improvement.

It is worth highlighting the fact that, for the last 3 years, the growth rate of subscriptions to this service is higher for Costa Rica than for the global average. The difference between the growth rate of this indicator in the country has been between 5 and 7 percentage points higher than that shown globally (see graph Nº 204).

Contrary to what happens with fixed Internet access, for mobile Internet Costa Rica continues to show a relatively high position within the countries evaluated. Penetration by 2017 (97.6

[61] At the time of making this report, the ITU had registered the value 180, 2 %, data that had not been updated, for this reason, 179 % was used as the final data for 2017.

%) is only surpassed at the Latin American level by Uruguay (112.1 %) and, at the Asian and European level, is led by Finland (153.8 %), Singapore and other Nordic countries (Sweden, Denmark and Norway). If the 2018 figure (95 %) is considered, Costa Rica's position increases, but is comparable to that of the developed countries included in the sample analyzed. The detail can be seen in the Graphic Nº 205.

In general, by 2018, the mobile broadband Internet penetration rate is only surpassed by that recorded in developed countries, which show a rate of 111 % compared to 95 % recorded for Costa Rica in that year. However, the overall value is much lower than that of our country as it amounts to 69 %. This figure is undoubtedly affected by the percentage recorded by less developed countries where only 28 out of every 100 inhabitants have access to mobile broadband Internet. (See graph Nº 206). Despite the above, the behavior recorded in the case of Costa Rica in recent years in the growth of this indicator turns out to be much slower and more conservative than that recorded globally. (See graph Nº 207).

Finally, the relative weight of telecommunications revenues in relation to the Gross Domestic Product (GDP) is quantified in dollars for each country. Using the most updated data on telecommunications revenues available to ITU in its records for 2017, in the case of Costa Rica, the value is 2.9 %, surpassed by Korea 3.3 %, respectively; in this measure for 2018, a value of 2.3 % was recorded for Costa Rica. For European countries, the tendency is discrete, with values ranging from 1 % to 1.7 %. The respective detail can be seen in the graph Nº 208.

Analysis of the Global Competitiveness Index 4.0

The Global Competitiveness Index is developed by the World Economic Forum and measures the ability of countries to provide high levels of prosperity to their citizens. The position in this index depends on the level at which a country uses its available resources efficiently. Consequently, the index measures a set of institutions, policies and factors that define levels of sustainable economic prosperity in the present and medium term. It should be noted that by 2018 the index changed methodology and from that year is called Global Competitiveness Index 4.0.

The index is calculated using public information from different institutions and the Executive Opinion Survey conducted by the World Economic Forum in conjunction with a network of partner institutes (including leading research institutions and business organizations[62]) in the countries included in the report.

In 2018, more than 12,000 business leaders were interviewed in the 140 countries included in the estimate. The survey is designed to capture a wide range of factors that affect the business climate within a country's economy. The index results in scores ranging from 0 to 100, where 100 is the highest score a country can obtain and thus the highest degree of global competitiveness.

One of the pillars of the measurement of this index corresponds to the pillar of adoption of information and communication technologies (ICT). This pillar measures the agility with which an economy adopts existing technologies to improve the productivity of its industries, with specific emphasis on its ability to take full advantage of ICT in daily activities and production processes to increase efficiency and competitiveness.

ICT reduces transaction costs and accelerates the exchange of information and ideas, improving efficiency and generating innovation.

[62] In the case of Costa Rica, INCAE Business School is the Institution responsible for coordinating annually the development of the Executive Opinion Survey (EOE) of the World Economic Forum in 8 countries of Latin America, namely: Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Dominican Republic, Ecuador, and Bolivia.

As ICTs are general-purpose technologies increasingly integrated into the structure of the economy, they are becoming as necessary as energy and transport infrastructure in all economies.

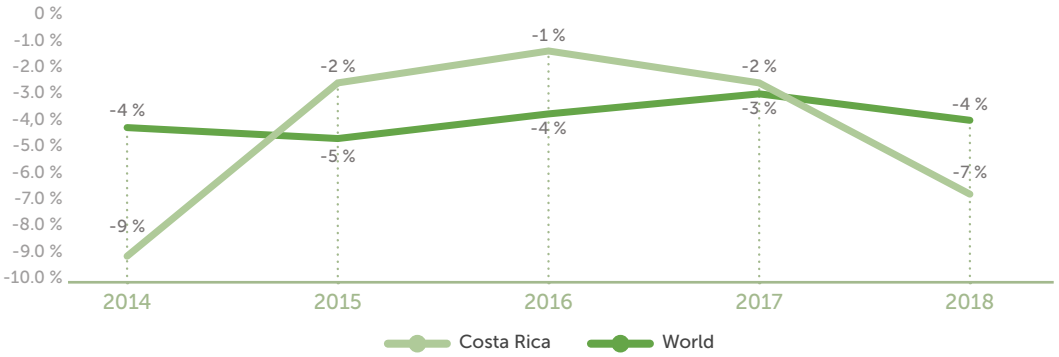
As evidenced in Table Nº 31, , the variables used in the calculation of the technological readiness pillar include indicators calculated and captured by Sutel.

In relation to the trend of the Global Competitiveness Index for Costa Rica, it can be seen in graph Nº 209 for 2018, which shows progress in a position compared to last year, when it went from 61.7 in 2017, to 62.1 in 2018, showing an improvement in the country's competitiveness. In this sense, it ranks 55th out of 140 countries.

In terms of Latin America, Costa Rica is in position 4, surpassed only by Chile, Mexico and Uruguay with a score of 70.3, 64.6 and 62.7 respectively; Costa Rica is above countries such as Colombia, Peru, Brazil and Argentina, among others. (See graph Nº 210).

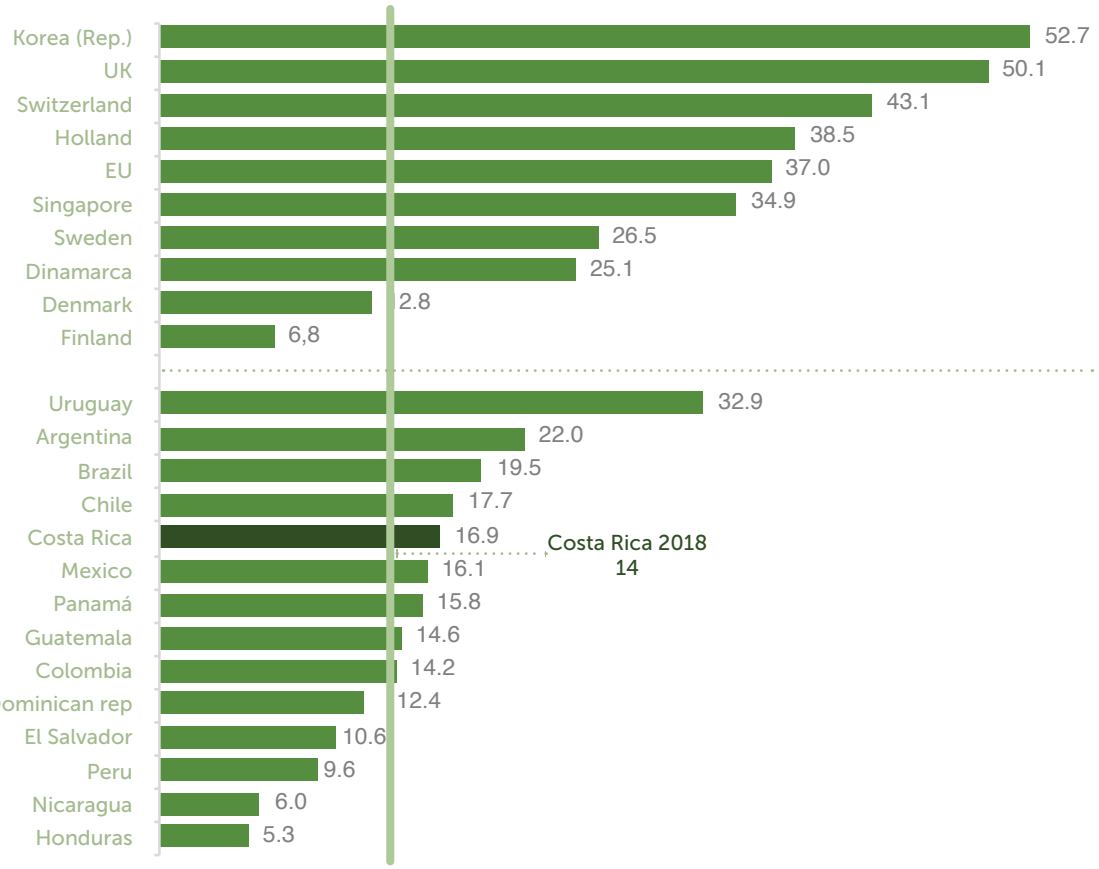
For the ICT adoption pillar, Costa Rica ranks 55th out of 140 countries in 2018. By 2018, as the calculation methodology changed, the results of previous editions are not comparable. Costa Rica ranks third in Latin America, outranked by Uruguay and Chile, with scores of 78.1 and 61.3 respectively. This difference is since these countries have higher scores in the following indicators: fiber Internet subscriptions and Internet users. Graph Nº 211 provides further details.

Graph Nº 194.
Costa Rica. Fixed telephony subscriptions. Annual growth rates, 2014-2018
(Figures in percentage)



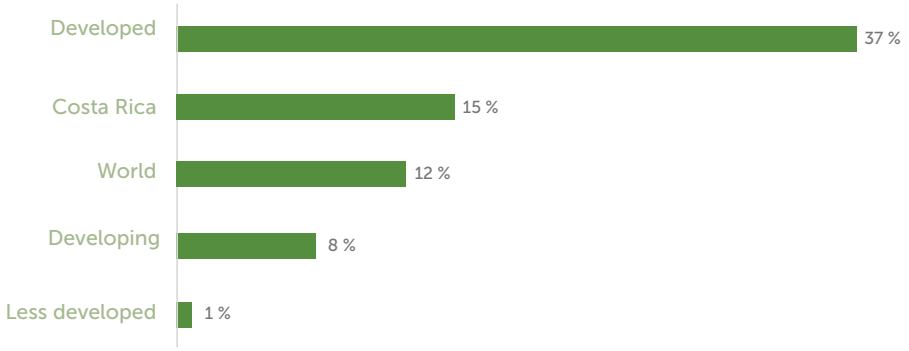
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 195.
Costa Rica. Fixed telephony subscriptions per hundred inhabitants, 2017 *
(Figures in percentage)



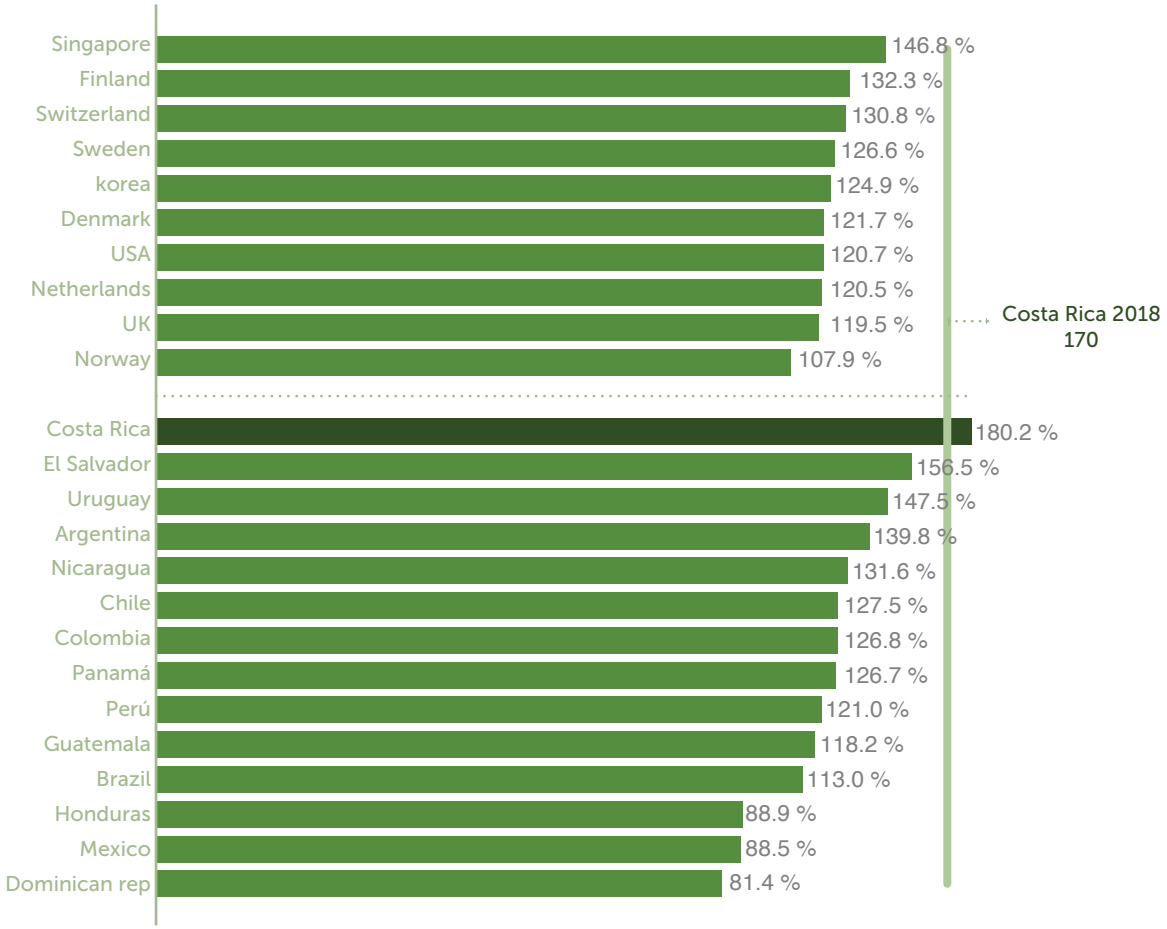
Note *: See the subscriptions of traditional fixed telephony and VoIP telephony.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 196.
Costa Rica. Fixed telephony service subscriptions per every 100 inhabitants, 2018
(Estimated figures according to the level of development of the countries, world average and Costa Rica)



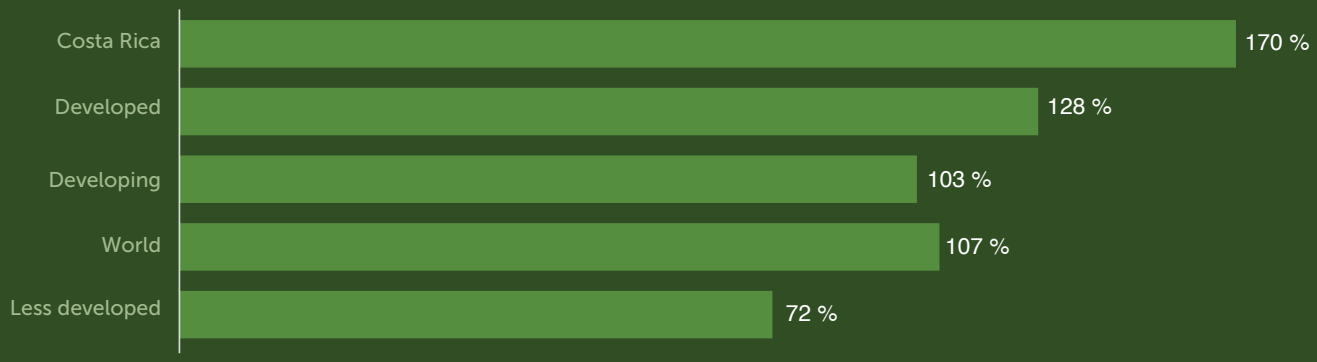
Note: Figures estimated by ITU by groups of countries according to level of development.
Source: Sutel, Directorate General for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 197.
Costa Rica. Mobile telephony service subscriptions per every 100 inhabitants, 2017
(Figures in percentage)



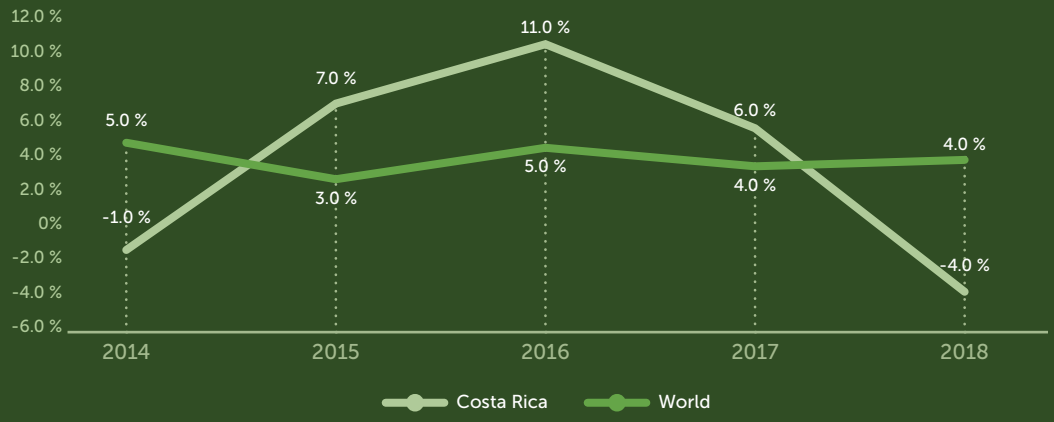
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 198.
Costa Rica. Mobile telephony service[1] subscriptions per every 100 inhabitants, 2018*
(Estimated figures according to the level of development of the countries, world average and Costa Rica)



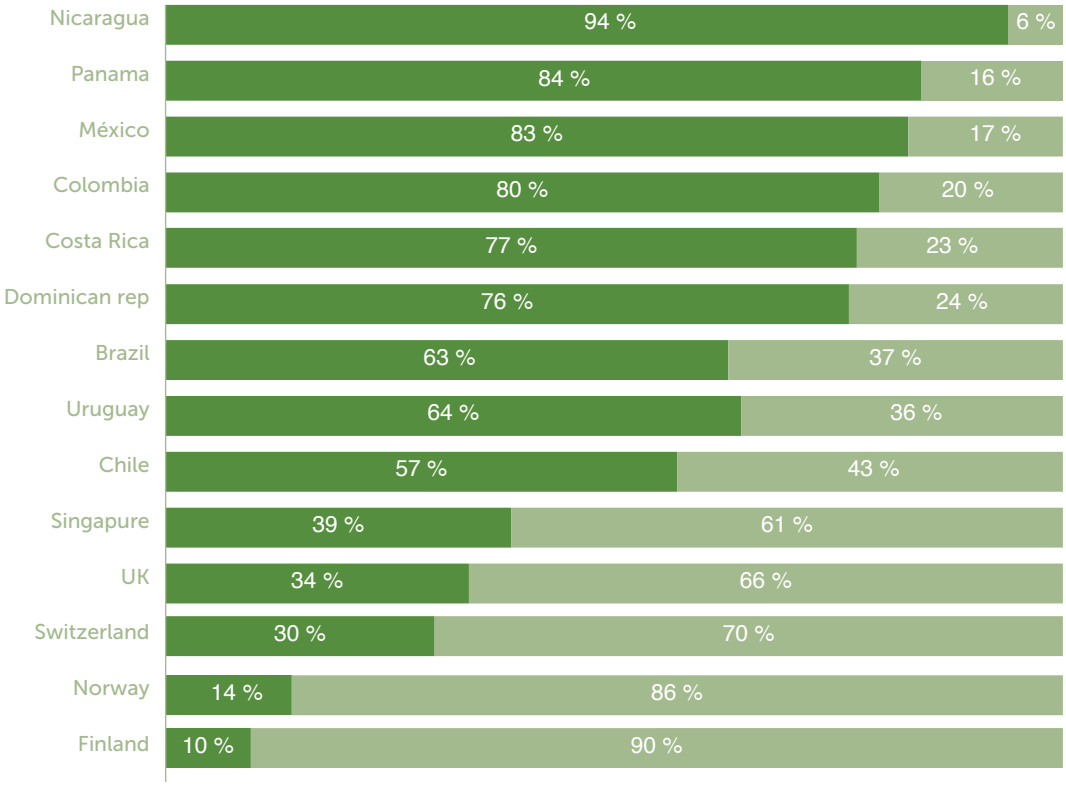
Note: [1] / Figures estimated by ITU by groups of countries according to level of development.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 199.
Costa Rica. Mobile telephony service subscriptions[1]
Annual growth rates, 2014-2018



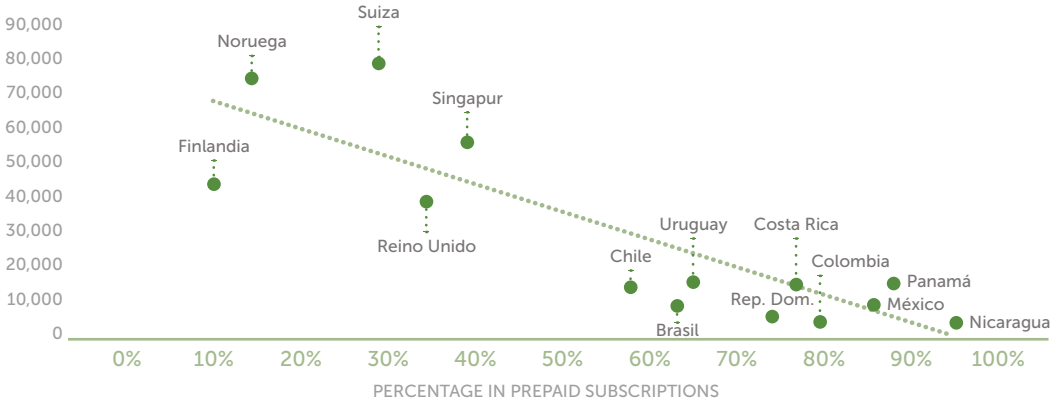
Note: [1] / Figures estimated by ITU by groups of countries according to level of development.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 200.
Costa Rica. Percentage share of mobile subscriptions between postpaid and prepaid, 2017
(Figures in percentage)



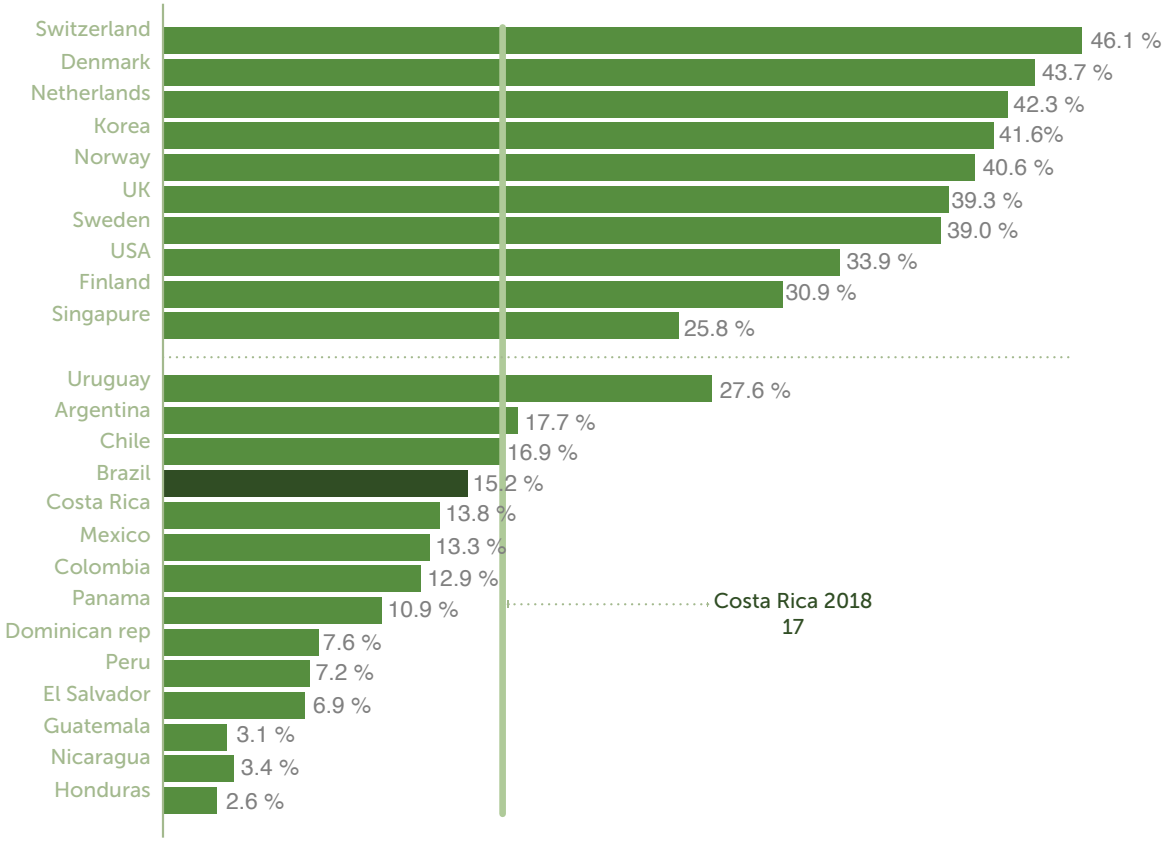
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 201.
Costa Rica. Average income per inhabitant and percentage of prepaid subscriptions[1], 2017



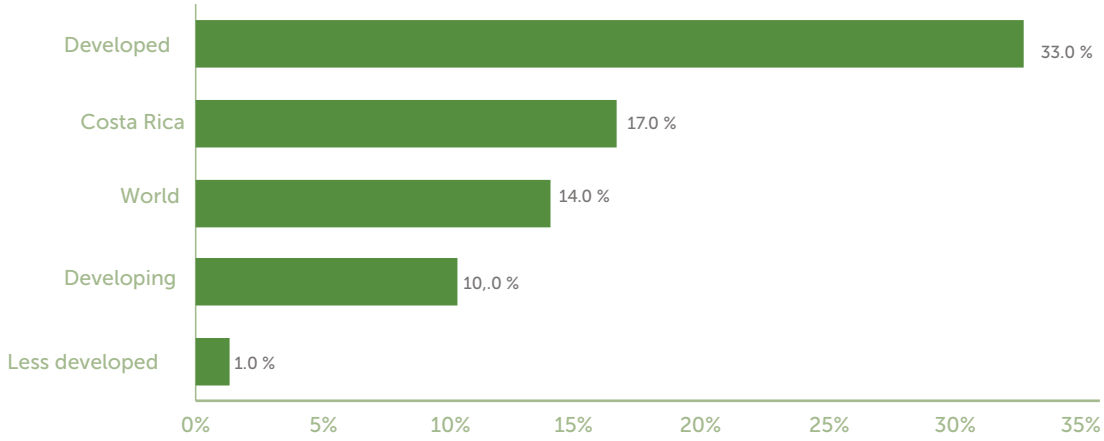
Note: [1] / The purchasing power parity is not considered
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018. Does not include purchasing power parity.

Graph Nº 202.
Costa Rica. Penetration of fixed Internet access per 100 inhabitants, 2017
(Figures in percentage)



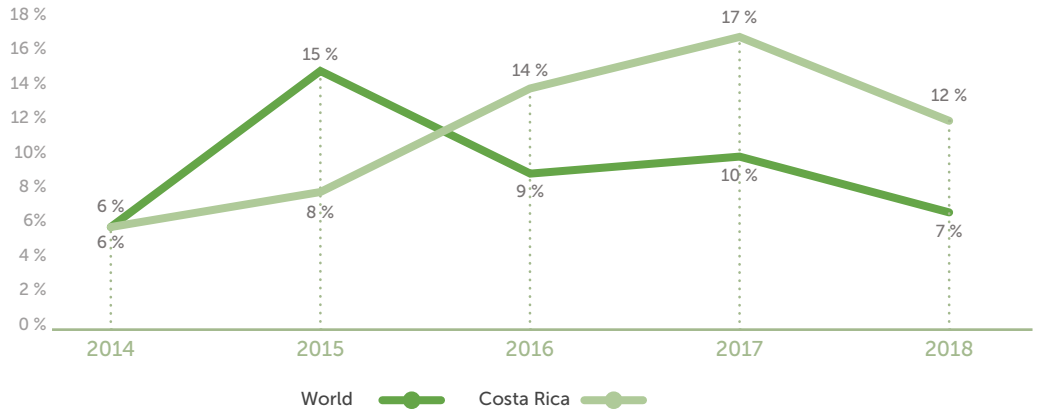
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 203.
Costa Rica. Fixed broadband Internet service subscriptions per every 100 inhabitants, 2018
(Estimated figures according to the level of development of the countries, world average and Costa Rica)



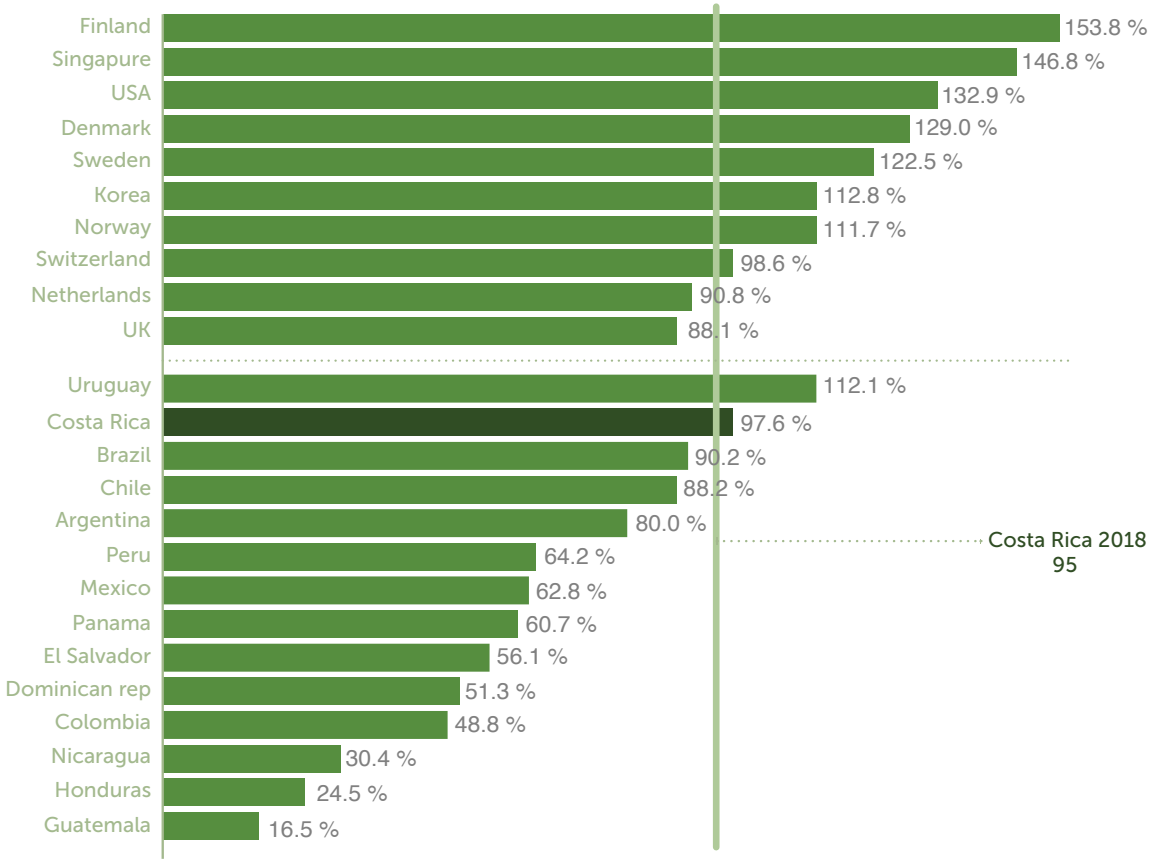
Note: Figures estimated by ITU by groups of countries according to level of development.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 204.
Costa Rica. Fixed broadband Internet service subscriptions. Annual growth rates 2014-2018



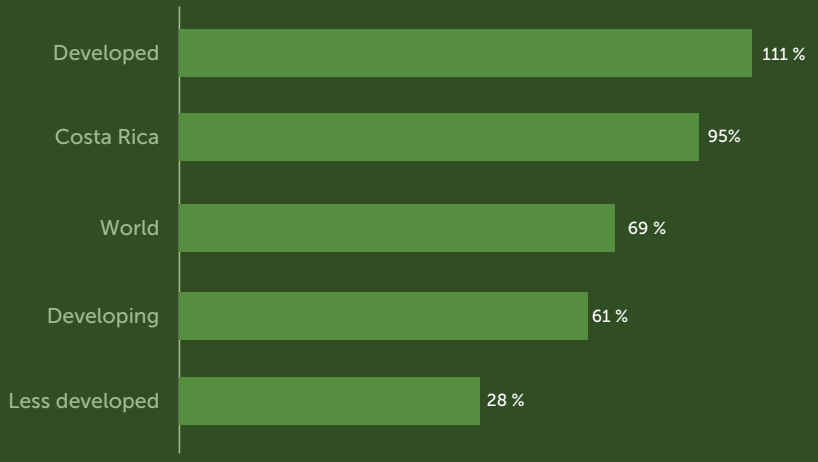
Note: Figures estimated by ITU by groups of countries according to level of development.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 205.
Costa Rica. Penetration of mobile Internet access per 100 inhabitants, 2017
(Figures in percentage)



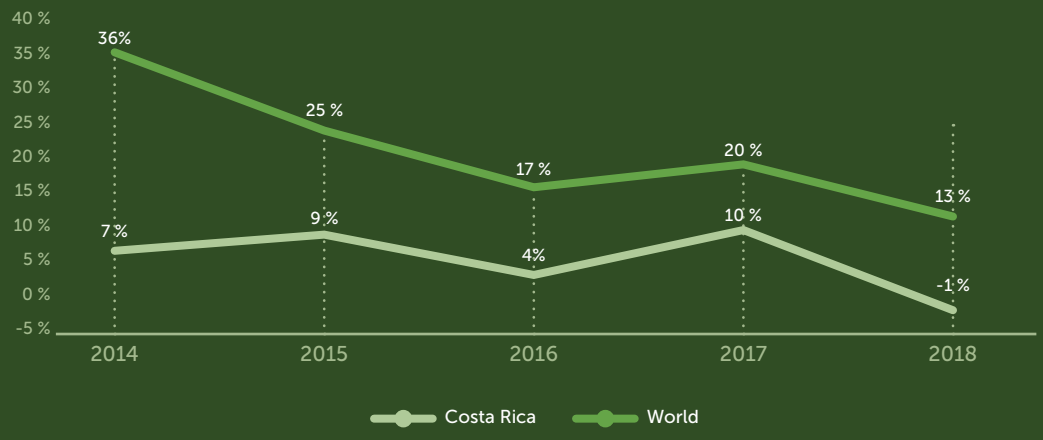
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 206.
Costa Rica. Mobile broadband Internet service subscriptions per every 100 inhabitants, 2018 *



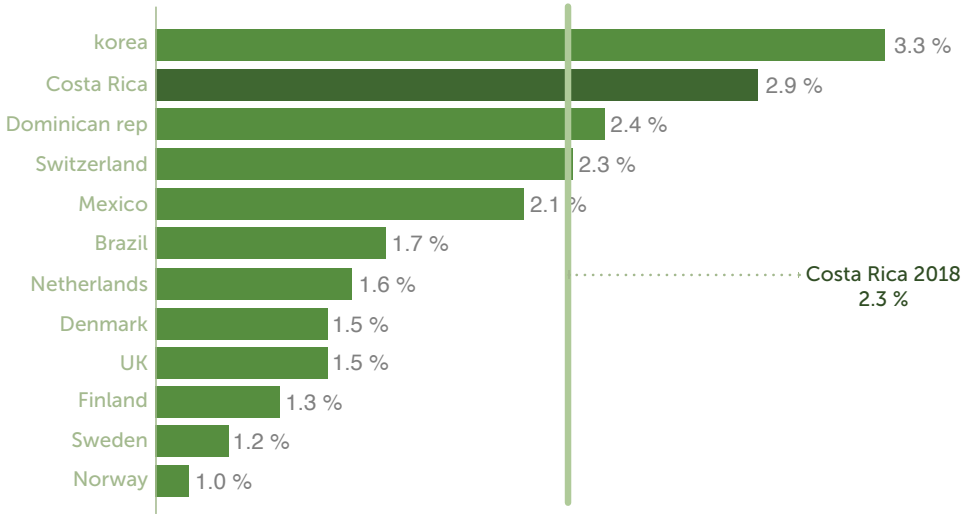
Note: */ Figures estimated by ITU by groups of countries according to level of development.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 207.
Costa Rica. Mobile broadband Internet service subscriptions, annual growth rates 2014-2018 *



Note: */ Figures estimated by ITU by groups of countries according to level of development.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Graph Nº 208.
Costa Rica. Reason for a total income of the telecommunications sector with respect to GDP1, 2017
(Figures in percentage)



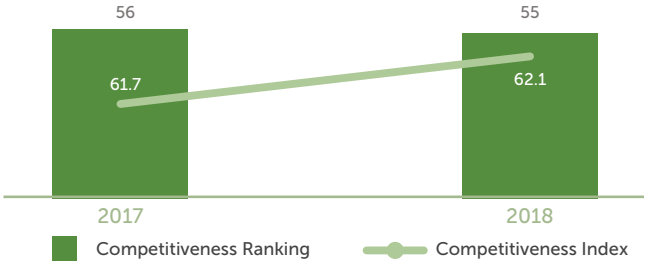
Note: [1] / Purchasing power parity is not contemplated.
Source: Sutel, General Directorate for Markets, with information from ITU, Costa Rica, 2018.

Table Nº 31.
Costa Rica. Tercer pilar: adopción de las TIC, variables que lo componen, 2018

Indicator	Position of Costa Rica (Worldwide)	Value
Telephony subscriptions mobile-cell phones.	3	180.2
Subscriptions to mobile bandwidth	15	116.6
Subscriptions to fixed bandwidth Internet	57	15.2
Subscriptions to fiber Internet	77	0.2
Internet users	60	66

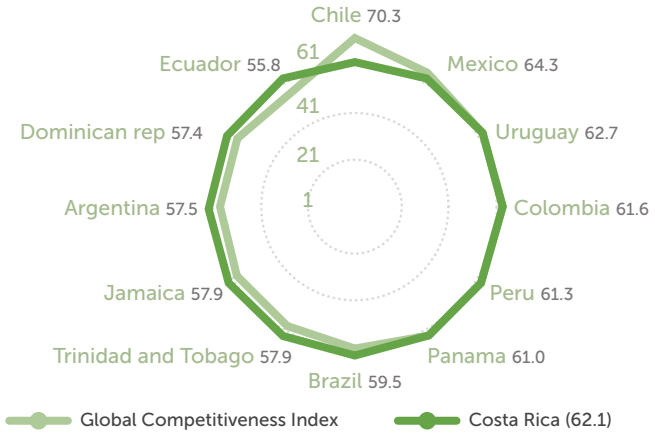
Source: Sutel, General Directorate of Markets, with information from the World Economic Forum, 2018.

Graph Nº 209.
Costa Rica. Global competitiveness index, ranking and value 2017-2018



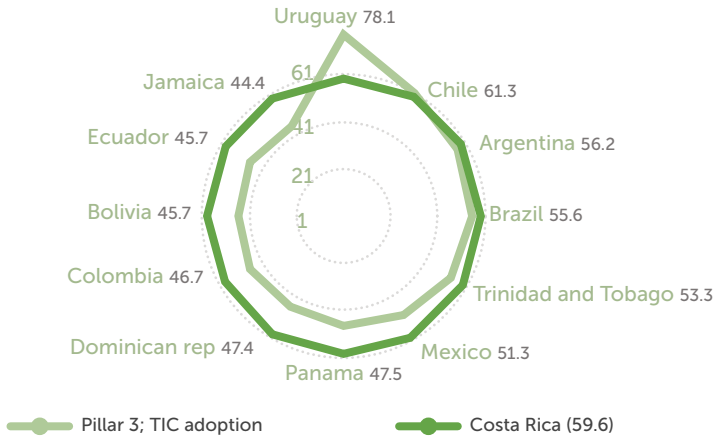
Source: Sutel, General Directorate for Markets, with information from the World Economic Forum, Costa Rica, 2018.

Graph Nº 210.
Costa Rica. Global Competitiveness Index: value obtained according to the countries of Latin America, 2018



Source: Sutel, General Directorate for Markets, with information from the World Economic Forum, Costa Rica, 2018.

Graph Nº 211.
Costa Rica. Pillar 3, TIC adoption: Score obtained according to Latin American countries, 2018



Source: Sutel, General Directorate for Markets, with information from the World Economic Forum, Costa Rica, 2018.

"My Comparator" advertising campaign.
Bus terminal, Coronado, San José.

STATISTICAL ANNEX

Statistical Annex

The Sector's General Evolution

Table Nº 32.
Costa Rica. Total income of the telecommunications sector, 2014 - 2018
(Quarterly and annual figures in million colones)

Indicator	2014				2015				2016			
	IT 2014	IIT 2014	IIIT 2014	IVT 2014	IT 2015	IIT 2015	IIIT 2015	IVT 2015	IT 2016	IIT 2016	IIIT 2016	IVT 2016
Million colones	178,789	182,611	176,614	180,477	184,637	190,825	187,380	189,322	187,157	191,934	197,219	198,549
Variation rate	**3 %**	**5 %**	**6 %**	**4 %**	**16 %**	**2 %**	**-3 %**	**2 %**	**2 %**	**3 %**	**-2 %**	**1 %**

Indicator	2017				2018			
	IT 2017	IIT 2017	IIIT 2017	IVT 2017	IT 2018	IIT 2018	IIIT 2018	IVT 2018
Million colones	198,552	201,093	201,279	206,372	203,530	200,199	200,072	205,561
Variation rate	**0 %**	**0 %**	**0 %**	**0 %**	**0 %**	**0 %**	**0 %**	**0 %**

Indicator	2012	2013	2014	2015	2016	2017	2018
Million colones	501,648	576,742	718,491	752,164	774,858	807,296	809,363
Variation rate	**---**	**15 %**	**25 %**	**5 %**	**3 %**	**4 %**	**0 %**

Source: Sutel, General Directorate of Markets, Costa Rica, 2018

Table Nº 33.
Total income of the telecommunications sector according to service, 2014 - 2018
(Quarterly figures in million colones)

	IT 2014	IIT 2014	IIIT 2014	IVT 2014	IT 2015	IIT 2015	IIIT 2015	IVT 2015	IT 2016	IIT 2016	IIIT 2016	IVT 2016
Traditional basic telephony and VoIP	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 (voice and instant messaging)	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)	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	10,835	10,612	10,211	8,930	8,890	9,351	9,174	8,787	7,611	8,384	9,306	9,132
Total	**178,789**	**182,611**	**176 ,614**	**180,477**	**184,637**	**190,825**	**187,380**	**189,322**	**187,157**	**191,934**	**197,219**	**198,549**

	IT 2017	IIT 2017	IIIT 2017	IVT 2017	IT 2018	IIT 2018	IIIT 2018	IVT 2018
Traditional basic telephony and VoIP	20,409	20,104	19,756	19,426	18,848	18,468	17,910	17,337
Mobile telephony (voice and instant messaging)	86,024	85,649	86,477	89,342	84,846	82,581	82,610	83,429
Internet access (including mobile Internet)	80,759	84,746	84,018	85,613	88,614	88,358	88,778	93,265
Dedicated lines	11,360	10,595	11,028	11,992	11,222	10,793	10,774	11,531
Total	**198,552**	**201,093**	**201,279**	**206,372**	**203,530**	**200,199**	**200,072**	**205,561**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 34.
Costa Rica. Total income of the telecommunications sector according to service, 2014 - 2018
(Yearly figures in million colones)

	2014	2015	2016	2017	2018
Mobile telephony (voice)	366,143	358,377	347,713	347,492	333,466
Traditional basic telephony and VoIP telephony	92,311	86,363	87,501	79,695	72,564
Internet access (including mobile Internet)	219,449	271,222	305,210	335,136	359,014
Dedicated lines	40,588	36,202	34,433	44,974	44,319
Total	**718,491**	**752,164**	**774,858**	**807,296**	**809,363**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 35.
Costa Rica. Ingreso total del sector de telecomunicaciones según servicio, 2014 - 2016
(Cifras anuales en porcentaje)

	2014	2015	2016	2017	2018
Mobile telephony (voice)	51 %	48 %	45 %	43 %	41 %
Traditional basic telephony and VoIP telephony	13 %	11 %	11 %	10 %	9 %
Internet access (including mobile Internet)	31 %	36 %	39 %	41 %	44 %
Dedicated lines	5 %	5 %	5 %	6 %	6 %
Total	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 36.
Costa Rica. Total income of the telecommunications sector according to service, 2014 - 2016
(Yearly figures in million colones)

	2014	2015	2016	2017	2018
Telefonía móvil y acceso a Internet móvil	493,340	528,751	542,216	555,156	544,956
Telefonía básica tradicional y telefonía VoIP	92,311	86,363	87,501	79,695	72,564
Acceso a Internet fijo	92,252	100,848	110,707	127,472	147,524
Líneas dedicadas	40,588	36,202	34,433	44,974	44,319
Total	**718,491**	**752,164**	**774,858**	**807,296**	**809,363**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 37.
Costa Rica. Total income of the telecommunications sector according to service, 2014 - 2016
(Annual figures in percentages)

	2014	2015	2016	2017	2018
Mobile telephony (voice)	69 %	70 %	70 %	69 %	67 %
Traditional basic telephony and VoIP telephony	13 %	12 %	11 %	10 %	9 %
Internet access (including mobile Internet)	13 %	13 %	14 %	16 %	18 %
Dedicated lines	5 %	5 %	5 %	5 %	6 %
Total	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 38.
Costa Rica. Labor force in the telecommunications sector, 2014 - 2018
(Bi-annual and annual figures in absolute)

Indicator	2014		2015		2016		2017		2018	
	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
Persons	11,006	11,017	11,497	11,426	11,751	11,870	11,691	12,186	10,939	11,804
% of variation	**5 %**	**0 %**	**4 %**	**-1 %**	**3 %**	**1 %**	**-2 %**	**3 %**	**-6 %**	**-3 %**

Indicator	2014	2015	2016	2017	2018
Persons	11,017	11,426	11,870	12,186	11,804
% of variation	**6 %**	**4 %**	**4 %**	**3 %**	**-3 %**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 39
Costa Rica. Percentage of labor force in the telecommunications sector with respect to the economically active population, 2014 - 2018
(Annual figures in percentages)

Indicator	2014	2015	2016	2017	2018
Total country	2,284,142	2,276,104	2,206,179	2,274,432	2,359,644
Telecommunication Sector	11,017	11,426	11,870	12,186	11,804
Percentage	0.48 %	0.50 %	0.54 %	0.54 %	0.50 %
Percentage of variation	**8 %**	**7 %**	**7 %**	**0 %**	**-7 %**

Source: Sutel, General Directorate of Markets and INEC (Continuous Employment Survey), Costa Rica, 2018.

Table Nº 40.
Costa Rica. Percentage of labor force of the telecommunications sector with respect to the total population, 2014 - 2018
(Annual figures in percentages)

Indicator	2014	2015	2016	2017	2018
Total population	4,773,130	4,832,234	4,890,379	4,947,490	5,003,402
Telecommunication Sector labor force	11,017	11,426	11,870	12,186	11,804
Percentage	**0.23 %**	**0.24 %**	**0.24 %**	**0.25 %**	**0.24 %**

Source: Sutel, General Directorate of Markets and INEC (Continuous Employment Survey), Costa Rica, 2018.

Table Nº 41.
Costa Rica. Female labor force in the telecommunications sector, 2014 - 2018
(Bi-annual figures in absoluts)

Indicator	2014		2015		2016		2017		2018	
	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem
Persons	2,811	2,914	2,963	3,010	3,057	3,061	3,178	3,344	3062	3,258
Percentage of biannual variation		4 %		2 %		0 %		5 %	-8 %	6 %
Percentage of annual variation		**1 %**		**3 %**		**2 %**		**9 %**	**-4 %**	**-3 %**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Fixed Telephony

Table Nº 42.
Costa Rica. Subscriptions to traditional basic telephony and VoIP telephony, 2014 - 2018
(Figures at the closing of each year)

Subscriptions	2014	2015	2016	2017	2018
Total	881,217	859,857	838,346	814,910	774,303
Traditional basic telephony	839,968	804,468	779,972	747,428	695,518
VoIP	41,249	55,389	58,374	67,482	7,785

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 43.
Costa Rica. Subscriptions to traditional basic telephony and VoIP telephony, 2017 - 2018
(Figures at the closing of each quarter)

Subscriptions	2017				2018			
	I T	II T	III T	IV T	I T	II T	III T	IV T
Total	833,974	830,401	824,552	814,910	810,843	799,275	784,659	774,303
Traditional basic telephony	771,725	767,115	759,127	747,428	738,133	726,686	712,247	695,518
VoIP	62,249	63,286	65,425	67,482	72,710	72,589	72,412	78,785

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 44.
Costa Rica. Distribución Subscriptions de Traditional basic telephony y telefonía VoIP, 2014 - 2018
(Figures at the closing of each year in percentages)

Suscripciones	2014	2015	2016	2017	2018
Traditional basic telephony	95.3 %	93.6 %	93.0 %	91.7 %	89.8 %
VoIP	4.7 %	6.4 %	7.0 %	8.3 %	10.2 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 45.
Costa Rica. Percentage distribution of subscriptions of traditional basic telephony and VoIP telephony , 2017 - 2018
(Percentage figures at the closing of each quarter)

Suscripciones	2017				2018			
	I T	II T	III T	IV T	I T	II T	III T	IV T
Traditional basic telephony	92.5 %	92.4 %	92.1 %	91.7 %	91.0 %	90.9 %	90.8 %	89.8 %
VoIP	7.5 %	7.6 %	7.9 %	8.3 %	9.0 %	9.1 %	9,.2 %	10.2 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 46
Costa Rica. Penetration of the traditional basic telephony service with respect to the population, 2014-2018

Indicator	2014	2015	2016	2017	2018
Fixed connections per capita	17.6 %	16.6 %	15.9 %	15.1 %	13.9 %
Fixed traditional basic telephony	839,968	804,468	779,972	747,428	695,518
Total population	**4,773,130**	**4,832 ,234**	**4,890,379**	**4,947,490**	**5,003,402**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 47
Costa Rica. Penetration of VoIP service with respect to the population, 2014-2018

Indicator	2014	2015	2016	2017	2018
Fixed connections for every 1,000 inhabitants	8.6	11.5	11.9	13.6	15.7
VoIP subscribers	41,249	55,389	58,374	67,482	78,785
Total population	**4,773,130**	**4,832,234**	**4,890,379**	**4,947,490**	**5,003,402**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 48
Costa Rica. Traditional basic telephony: number of public telephones in operation, 2014-2018
(Figures at the closing of each year)

Indicator	2014	2015	2016	2017	2018
Public telephones	8,188	5,726	4,731	4,674	4,581

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 49
Costa Rica: Distribution of public telephone devices according to geographical area, 2018
(Quarterly figures)

Geographical Area	I T	II T	III T	IV T
Brunca	362	364	358	357
Huetar Norte	760	764	751	750
Huetar Atlántico	146	147	144	144
Metropolitana Este	2,292	2306	2,269	2,266
Metropolitana Oeste	838	842	828	827
Pacífico Central y Norte	240	241	237	237
Total	**4,638**	**4,664**	**4,587**	**4,581**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 50.
Costa Rica. Fixed telephony traffic completed on net and outbound, 2014-2018
(Annual figures in millions of Minutes and percentages of variation)

Indicator	2014	2015	2016	2017	2018
Minutes	3,472	3,210	2,966	2,683	2,402
% variation		-7.6 %	-7.6 %	-9.5 %	-10.5 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 51.
Costa Rica. VoIP telephony traffic completed on net and outbound, 2014-2018
(Annual figures in millions of Minutes and percentages of variation)

Indicator	2014	2015	2016	2017	2018
Minutes	173,391	232,267	336,270	393,596	395,056
% variation		34.0 %	44.8 %	17.0 %	0.4 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 52.
Costa Rica. Fixed telephony and VoIP telephony traffic completed on net and outbound, 2017 - 2018
(Quarterly figures in millions of Minutes and percentages of variation)

Indicator	2017				2018			
	I T	II T	III T	IV T	I T	II T	III T	IV T
Minutes	696	666	657	664	662	615	579	546
% variation		-4.3 %	-1.3 %	1.0 %	-0.2 %	-7.1 %	-5.9 %	-5.6 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 53.
Costa Rica. VoIP telephony traffic completed on net and outbound, 2017 - 2018
(Quarterly figures in millions of Minutes and percentages of variation)

Indicator	2017				2018			
	I T	II T	III T	IV T	I T	II T	III T	IV T
Minutes	102	89	91	111	116	113	90	77
% variation		-12.4 %	2.5 %	21.8 %	3.9 %	-2.2 %	-20.7 %	-14.6 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 54
Costa Rica. Total income from fixed telephony services, 2014 - 2018
(Annual figures in million colones and percentages of variation)

Indicator	2014	2015	2016	2017	2018
Minutes	92,311	86,363	87,511	79,864	72,565
% variation		-6.4 %	1.3 %	-8.7 %	-9.1 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 55.
Costa Rica. Income from VoIP telephony, 2014 - 2018
(Annual figures in million colones and percentages of variation)

Indicator	2014	2015	2016	2017	2018
Minutes	4,300	4,973	5,445	6,087	6,231
% variation		15.7 %	9.5 %	11.8 %	2.4 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 56.
Costa Rica. Total income from fixed telephony services, 2017 - 2018
(Quarterly figures in million colones and percentages of variation)

Indicator	2017				2018			
	Minutes	II T	III T	IV T	I T	II T	III T	IV T
% variation	20,440	20,140	19,801	19,483	18,848	18,468	17,910	17,338
% variación		-1.5 %	-1.7 %	-1.6 %	-3.3 %	-2.0 %	-3.0 %	-3.2 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 57.
Costa Rica. Income from VoIP telephony, 2017 - 2018
(Quarterly figures in million colones and percentages of variation)

Indicator	2017				2018			
	Minutes	II T	III T	IV T	I T	II T	III T	IV T
% variation	1,546	1,476	1,508	1,557	1,550	1,570	1,553	1,558
% variación		-4.5 %	2.2 %	3.2 %	-0.5 %	1.3 %	-1.1 %	0.3 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 58.
Costa Rica. Average income per subscriber in traditional basic telephony and VoIP telephony, 2014-2018
(Annual figures in colones and percentages of variation)

Year	Average income			Percentage variation		
	Traditional basic	VoIP	Fixed Telephony	Traditional basic	VoIP	Fixed Telephony
2014	104,772	104,368	104,753			
2015	101,172	89,789	100,439	-3 %	-14 %	-4 %
2016	105,217	93,277	104,385	4 %	4 %	4 %
2017	98,708	90,204	98,004	-6 %	-3 %	-6 %
2018	95,373	79,091	93,717	-3 %	-12 %	-4 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 59.
Costa Rica. Average income per minute in traditional basic telephony and VoIP telephony, 2014-2018
(Figures in colones and percentages of variation)

Year	Average income			Percentage variation		
	VoIP	Traditional basic	Fixed Telephony	VoIP	Traditional basic	Fixed Telephony
2014	25	27	27			
2015	21	27	27	-14 %	2 %	1 %
2016	20	31	30	-9 %	14 %	12 %
2017	21	32	31	5 %	3 %	3 %
2018	16	33	30	-23 %	3 %	-2 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Mobile Telephony

Table Nº 60.
Costa Rica. Total subscriptions to the mobile telephony service by operator, 2014-2018
(Figures at the closing of each quarter in thousands of subscriptions and percentages of variation)

TOTAL	2014				2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
ICE	4,177	4,251	4,297	4,348	4,253	3,925	4,048	4,339	4,302	4,314	4,391	4,440
% of variation	-4 %	2 %	1 %	1 %	-2 %	-8 %	3 %	7 %	-1 %	0 %	2 %	1 %
Claro	1,386	1,282	1,121	1,144	1,206	1,319	1,328	1,414	1,526	1,559	1,551	1,639
% of variation	6 %	-7 %	-13 %	2 %	5 %	9 %	1 %	6 %	8 %	2 %	-1 %	6 %
Movistar	1,369	1,326	1,361	1,431	1,515	1,493	1,637	1,677	1,790	1,905	2,087	2,144
% of variation	8 %	-3 %	3 %	5 %	6 %	-1 %	10 %	2 %	7 %	6 %	10 %	3 %
Fullmóvil	34	24	27	31	33	41	50	59	63	71	92	101
% of variation	-24 %	-28 %	9 %	15 %	8 %	24 %	22 %	19 %	7 %	12 %	29 %	10 %
Tuyo Móvil	83	73	68	67	55	47	48	46	29	11	9	7
% of variation	-16 %	-12 %	-7 %	-2 %	-18 %	-14 %	2 %	-5 %	-37 %	-60 %	-26 %	-13 %
TOTAL	**7,049**	**6,957**	**6,873**	**7,020**	**7,061**	**6,826**	**7,112**	**7,536**	**7,711**	**7,860**	**8,130**	**8,331**
% of variation	**0 %**	**-1 %**	**-1 %**	**2 %**	**1 %**	**-3 %**	**4 %**	**6 %**	**2 %**	**2 %**	**3 %**	**2 %**

TOTAL	2017				2018			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
ICE	4,592	4,521	4,596	4,576	4,629	4,626	4,617	4,557
% of variation	3 %	-2 %	2 %	0 %	1 %	0 %	0 %	-1 %
Claro	1,772	1,888	1,891	1,883	1,868	1,705	1,577	1,629
% of variation	8 %	7 %	0 %	0 %	-1 %	-9 %	-8 %	3 %
Movistar	2,181	2,223	2,237	2,324	2,347	2,347	2,382	2,262
% of variation	2 %	2 %	1 %	4 %	1 %	0 %	2 %	-5 %
Fullmóvil	110	106	95	52	43	50	53	46
% of variation	9 %	-3 %	-11 %	-45 %	-18 %	16 %	6 %	-14 %
Tuyo Móvil	7	7	5	4	4	4	2	2
% of variation	-1 %	-1 %	-37 %	-11 %	-2 %	0 %	-44 %	-21 %
TOTAL	**8,663**	**8,746**	**8,823**	**8,840**	**8,891**	**8,732**	**8,632**	**8,496**
% of variation	**4 %**	**1 %**	**1 %**	**0 %**	**1 %**	**-2 %**	**-1 %**	**-2 %**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 61.
Costa Rica. Total subscriptions of the mobile telephony service per form of payment, 2014-2018

(Figures at the closing of each quarter in thousands of subscriptions and percentages of variation)

TOTAL	2014				2015				2016			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Prepaid	5,723	5,590	5,491	5,599	5,602	5,344	5,579	5,951	6,100	6,189	6,379	6,469
% of variation	-2 %	-2 %	-2 %	2 %	0 %	-5 %	4 %	7 %	3 %	1 %	3 %	1 %
Postpaid	1,326	1,366	1,383	1,422	1,459	1,481	1,532	1,584	1,611	1,672	1,751	1,862
% of variation	8 %	3 %	1 %	3 %	3 %	2 %	3 %	3 %	2 %	4 %	5 %	6 %
Total	**7,049**	**6,957**	**6,873**	**7,020**	**7,061**	**6,826**	**7,112**	**7,536**	**7,711**	**7,860**	**8,130**	**8,331**
% of variation	**0 %**	**-1 %**	**-1 %**	**2 %**	**1 %**	**-3 %**	**4 %**	**6 %**	**2 %**	**2 %**	**3 %**	**2 %**

TOTAL	2017				2018			
	IT	IIT	IIIT	IVT	IT	IIT	IIIT	IVT
Prepaid	6,721	6,743	6,841	6,796	6,833	6,617	6,468	6,285
% of variation	4 %	0 %	1 %	-1 %	1 %	-3 %	-2 %	-3 %
Postpaid	1,942	2,002	1,983	2,045	2,057	2,115	2,164	2,210
% of variation	4 %	3 %	-1 %	3 %	1 %	3 %	2 %	2 %
Total	**8,663**	**8,746**	**8,823**	**8,840**	**8,891**	**8,732**	**8,632**	**8,496**
% of variation	**4 %**	**1 %**	**1 %**	**0 %**	**1 %**	**-2 %**	**-1 %**	**-2 %**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 62
Costa Rica. Penetration of the mobile telephony service for each 100 inhabitants, 2014-2018

(Annual figures in percentages)

	2014	2015	2016	2017	2018
Mobile penetration	147 %	156 %	170 %	179 %	170 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 63.
Costa Rica. Participation of mobile telephony subscriptions by operator per form of payment, 2014-2018
(Annual figures in percentages)

	2014	2015	2016	2017	2018
Prepaid					
ICE	58 %	54 %	49 %	48 %	51 %
Claro	17 %	19 %	19 %	22 %	19 %
Movistar	23 %	26 %	30 %	30 %	29 %
Fullmóvil	0.5 %	1.0 %	1.6 %	0.8 %	0.7 %
Tuyo Móvil	1.2 %	0.8 %	0.1 %	0,.1 %	0.0 %
Postpaid					
ICE	76 %	71 %	68 %	64 %	61 %
Claro	15 %	19 %	21 %	20 %	20 %
Movistar	9 %	10 %	11 %	15 %	19 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 64.
Costa Rica. Total income associated to the telephony and mobile network (including Internet) service per component[1] , 2014-2018
(Annual figures in million colones)

	2014	2015	2016	2017	2018
Mobile Network	493,217	528,743	542,202	555,162	553,661
Mobile telephony	366,143	358,377	347,713	347,492	333,466
Voice	342,580	344,057	337,130	336,542	323,835
SMS/MMS	23,562	14,320	10,583	10,950	9,631
Mobile data	127,074	170,366	194,489	207,670	220,195

[1] It does not include roaming income.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 65.
Costa Rica. Total income associated to the mobile network according to form of payment[1], 2014-2018
(Annual figures in million colones)

	2014	2015	2016	2017	2018
Total	493,217	528,743	542,202	555,162	553,661
Prepaid	278,726	252,553	244,181	216,375	189,039
Postpaid	214,490	276,190	298,021	338,787	364,623

[1] It does not include roaming income.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 66.
Costa Rica. Average income per minute in mobile telephony (ARPM)[1], 2014-2018
(Annual figures in colones and Minutes)

	2014	2015	2016	2017	2018
Income from voice	342,580,304,459	344,057,278,461	337,130,465,127	336,541,928,366	323,835,157,683
Total traffic	9,037,291,821	8 ,252,296,345	7,631,673,792	6,827,569,387	6,298,697,425
ARPM	38	42	44	49	51

[1] It only includes traffic and income from voice national and international.
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 67.
Costa Rica. Total traffic and participation according to form of payment per year, 2014-2018
(Figures in millions of Minutes and percentages)

	2014	2015	2016	2017	2018
Total tráfico	9,037	8,252	7,632	6,828	6,299
Prepaid	5,799	4,868	4,210	3,328	2,668
Postpaid	3,238	3,384	3,422	3,499	3,631
Prepaid	64 %	59 %	55 %	49 %	42 %
Postpaid	36 %	41 %	45 %	51 %	58 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 68.
Costa Rica. Distribution in relation to traffic of mobile telephone service according to origin and destination with respect to total traffic, 2014-2018
(Annual figures in millions of Minutes and percentages)

	2014	2015	2016	2017	2018
Total traffic	9,037	8,252	7,632	6,834	6,299
Mobile-mobile (on net)	58 %	55 %	53 %	51 %	50 %
Mobile-mobile (off net)	20 %	23 %	25 %	27 %	28 %
Mobile-fixed	19 %	18 %	18 %	18 %	17 %
Mobile-international	3 %	3 %	4 %	4 %	4 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 69.
Costa Rica. Subscriptions, income and total traffic of fixed Internet access service, 2014-2018
(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	516,337	527,664	537,483	547,558	558,656	570,826	597,025	614,039	636,087
% of variation		1.1 %	0.3 %	2.4 %	2.2 %	1.9 %	1.9 %	2.0 %	2.2 %	4.6 %	2.8 %	3.6 %
Income (millions colones)	23,052	24,351	22,631	22,217	23,556	24,0956	24,314	25,004	25,471	26,892	28,531	29,813
% 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	31,850	38,282	43,401	55,998	60,689	72,942	76,727	84,792	85,233	98,933	118,561
% of variation		27.3 %	20.2 %	13.4 %	29.0 %	8.4 %	20.2 %	5.2 %	10.5 %	0.5 %	16.1 %	19.8 %

	2017				2018			
	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim
Subscriptions	657,407	694,267	718,985	744,041	782,654	805,477	817,390	834,784
% of variation	3.4 %	5.6 %	3.6 %	3.5 %	5.2 %	2.9 %	1.5 %	2.1 %
Income (millions colones)	29,206	31,967	32,265	34,034	36,985	37,195	35,730	37,614
% of variation	-2.0 %	9.5 %	0.9 %	5.5 %	8.7 %	0.6 %	-3.9 %	5.3 %
Traffic (TB)	141,718	147,699	154,217	176,447	182,144	202,162	229,818	251,652
% of variation	19.5 %	4.2 %	4.4 %	14.4 %	3.2 %	11.0 %	13.7 %	9.5 %

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 70.
Costa Rica. Subscriptions, income and total traffic of mobile Internet access service, 2014-2018
(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	3,465,856	3,536,075	3,551,430	3,796,619	3,832,819	3,829,223	3,981,967	4,154,419	4,180,219	4,172,235	4,178,455	4,336,084
% of variation		2.0 %	0.4 %	6.9 %	1.0 %	-0.1 %	4.0 %	4.3 %	0.6 %	-0.2 %	0.1 %	3.8 %
Income (millions colones)	29,052	31,490	31,713	34,944	39,569	42,080	44,499	44,273	45,978	47,694	49,985	50,846
% 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)	8,269	8,426	9,956	11,317	14,663	16,821	19 ,945	23,504	24,737	28,953	31,875	36,623
% of variation		1.9 %	18.2 %	13.7 %	29.6 %	14.7 %	18.6 %	17.8 %	5.2 %	17.0 %	10.1 %	14.9 %

	2017				2018			
	I Trim	II Trim	III Trim	IV Trim	I Trim	II Trim	III Trim	IV Trim
Subscriptions	4,636,451	4,644,695	4,637,919	4,788,964	5,075,650	4,796,389	4,753,160	4,858,940
% of variation	6.9 %	0.2 %	-0.1 %	3.3 %	6.0 %	-5.5 %	-0.9 %	2.2 %
Income (millions colones)	51,553	52,779	51,753	51,579	53,773	53,380	55,264	57,768
% of variation	1.4 %	2.4 %	-1.9 %	-0.3 %	4.3 %	-0.7 %	3.5 %	4.5 %
Traffic (TB)	37,589	33,458	31,940	32,015	32,545	34,476	35,981	38,114
% of variation	2.6 %	-11.0 %	-4.5 %	0.2 %	1.7 %	5.9 %	4.4 %	5.9 %

Source: SUTEL, General Directorate for Markets, Costa Rica, 2018.

Table N° 71.
Costa Rica. Number of subscriptions to the paid television service according to access technology, 2014-2018

Technology	2014				2015				2016			
	I T	II T	III T	IV T	I T	II T	III T	IV T	I T	II T	III T	IV T
Cable television	500,016	505,883	508,268	510,390	510,912	512,431	527,140	532,201	536,335	530,604	535,920	548,113
Satellite television	162,355	171,641	186,591	217,140	226,180	240 ,900	252,908	257,592	252,604	261,102	258,505	257,486
Television over IP	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 multipoint distribution	1,091	1,093	876	825	631	657	605	1,003	892	903	942	1,274
Total	**666,945**	**682,291**	**699,539**	**732,546**	**742,207**	**759,099**	**786,542**	**797,230**	**797,741**	**803,191**	**808,323**	**821,575**

Technology	2017				2018			
	I T	II T	III T	IV T	I T	II T	III T	IV T
Cable television	552,115	556,100	559,012	563,607	568,037	577,288	582,261	594,508
Satellite television	255,434	252,209	247,199	244,881	246,810	256,207	252,979	255,193
Television over IP	16,635	18,302	20,260	22,054	24,460	27,247	30,242	33,075
Ground television through multipoint distribution	1,306	1,193	1,257	1,365	1,247	1,073	1,022	1,107
Total	**825,490**	**827,804**	**827,728**	**831,907**	**840,554**	**861,815**	**866,504**	**883,883**

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table N° 72.
Costa Rica. Total income from the paid television service according to access technology, 2014-2018.
(Quarterly figures in million colones)

Technology	2014				2015				2016			
	I T	II T	III T	IV T	I T	II T	III T	IV T	I T	II T	III T	IV T
Cable television	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	7,207	7,774	7,590	8,150	8,275	8,583	9,303	8,409	7,377	9,034	91,17	8,691
Television over IP	426	463	402	328	287	315	371	398	439	522	653	721
Ground television through multipoint distribution	14	15	14	14	12	12	12	12	13	12	12	12
Total	**30,078**	**30,893**	**31,695**	**31,779**	**32,919**	**33,659**	**34,318**	**33,954**	**34,081**	**35,319**	**35,605**	**35,525**

Technology	2017				2018			
	I T	II T	III T	IV T	I T	II T	III T	IV T
Cable television	25,637	25,707	25,524	26,604	26,933	26,871	26,762	27,277
Satellite television	10,076	10,149	10,521	10 ,123	10,244	10,419	10,115	10,412
Television over IP	866	996	1084	1,171	1,287	1,421	1,592	1,745
Ground television through multipoint distribution	12	12	12	13	12	12	11	12
Total	**36,591**	**36,864**	**37,142**	**37,911**	**38,477**	**38,723**	**38,481**	**39,446**

Source: SUTEL, General Directorate for Markets, Costa Rica, 2018.

Table Nº 73.
Costa Rica. Mobile phone offers associated with user - Quartile 3, 2017
Postpaid Modality

"Date of admission"	Operator	Plan or package name	Services included	Duration or validity of the plan	Registration Fee and / or Deposit	Monthly Price of the Plan or package (tax included)	Amount of Minutes to all nets	Number of Minutes same mobile operator
01/06/2017	Movistar	Plan 4G@3 con terminal	Minutes, SMS, Internet	0,12,18,24 months		₡24,000		unlimited
01/07/2017	Movistar	Plan 4G@3 con terminal	Minutes, SMS, Internet	0,12,18,24 months		₡24,000		unlimited
01/08/2017	Claro	Postpago masivo sin límite 3 (Puro)	Minutes, SMS, Internet, LDI & Roaming	24 y 12 months		₡18,500	300	unlimited
01/08/2017	Movistar	Plan 4G@3 con terminal	Minutes, SMS, Internet	0,12,18,24 months		₡24,000		unlimited
01/08/2017	Movistar	Plan 4G@3 sin terminal	Minutes, SMS, Internet	0,12,18,24 months		₡20,900		unlimited
01/09/2017	Claro	Sin límite 3 (Puro)	Minutes, SMS, Internet, LDI & Roaming	24 y 12 months		₡18,500	300	unlimited
01/10/2017	Claro	Sin límite 3 (Puro)	Minutes, SMS, Internet, LDI & Roaming	24 y 12 months		₡18,500	300	unlimited
01/11/2017	Claro	Sin límite 3 (Puro)	Minutes, SMS, Internet, LDI & Roaming	12 , 24 months		₡18,500	300	unlimited
01/10/2017	Kolbi	Plan 4G k3	Minutes, SMS, Internet	12 o 24 months	₡12,500	₡18,000	300	
01/12/2017	Kolbi	Plan 4G k3	Minutes, SMS, Internet	12 o 24 months	₡12,500	₡18,000	300	
01/12/2017	Movistar	Plan 4G@3 sin terminal	Minutes, SMS, Internet	0,12,18,24 months		₡20,900		unlimited
01/11/2017	Movistar	Plan 4G@3 con terminal	Minutes, SMS, Internet	0,12,18,24 months		₡24,000		unlimited
01/12/2017	Movistar	Plan 4G@3 con terminal	Minutes, SMS, Internet	0,12,18,24 months		₡24,000		unlimited

"Date of admission"	Operator	Plan or package name	Number of Minutes out of network	Quantity of SMS to all networks	Quantity of SMS same operator	Amount of SMS other operator"	3G data download speed	4G data download speed	Amount of data download included 3G
01/06/2017	Movistar	Plan 4G@3 con terminal	250		unlimited	250	4 Mbps		4 Mb
01/07/2017	Movistar	Plan 4G@3 con terminal	250		unlimited	250	4 Mbps		4 Mb
01/08/2017	Claro	Postpago masivo sin límite 3 (Puro)	300	Unlimited to Claro and 300 to other networks	unlimited	300	4 Mbps	up to 40 Mbps	4 GB
01/08/2017	Movistar	Plan 4G@3 con terminal	250		unlimited	250	4 Mbps		8 GB
01/08/2017	Movistar	Plan 4G@3 sin terminal	250		unlimited	250	4 Mbps		5 GB
01/09/2017	Claro	Sin límite 3 (Puro)	300	Unlimited to Claro and 300 to other networks	unlimited	300	4 Mbps	up to 40 Mbps	4 GB
01/10/2017	Claro	Sin límite 3 (Puro)	300	Unlimited to Claro and 300 to other networks	unlimited	300	4 Mbps	up to 40 Mbps	4 GB
01/11/2017	Claro	Sin límite 3 (Puro)	300	Unlimited to Claro and 300 to other networks	unlimited	300	4 Mbps	up to 40 Mbps	4 GB
01/10/2017	Kolbi	Plan 4G k3		300			8 Mbps		5 GB
01/12/2017	Kolbi	Plan 4G k3		300			8 Mbps		5 GB
01/12/2017	Movistar	Plan 4G@3 sin terminal	250		unlimited	250	4 Mbps		5 GB
01/11/2017	Movistar	Plan 4G@3 con terminal	250		unlimited	250	4 Mbps		8 GB
01/12/2017	Movistar	Plan 4G@3 con terminal	250		unlimited	250	4 Mbps		8 GB

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 74.
Costa Rica. Mobile phone offers associated with user - Quartile 4, 2017
Postpaid mode

Date of admission	Operator	Plan or package name	Services included	Duration or validity of the plan	Registration Fee and / or Deposit	Monthly Price of the Plan or package (tax included)	Amount of Minutes to all nets	Number of Minutes same mobile operator	Number of Minutes out of network
01/06/2017	Claro	Postpago masivo sin límite 4 (Puro)				₡34,900	600	unlimited	600
01/07/2017	Claro	Postpago masivo sin límite 4	Minutes, SMS, Internet, LDI y Roaming	12 , 24 months	No	₡34,900	600	unlimited	600
01/08/2017	Claro	Postpago masivo sin límite 4 (Puro)	Minutes, SMS, Internet, LDI y Roaming			₡34,900	600		600
01/09/2017	Claro	Sin límite 4 (Puro)	Minutes, SMS, Internet, LDI y Roaming	24 y 12 months	No	₡34,900	600	unlimited	600
01/10/2017	Claro	Sin límite 3 (Puro)	Minutes, SMS, Internet, LDI y Roaming	24 y 12 months	No	₡24,500	300	unlimited	300
01/10/2017	Claro	Sin límite 4 (Puro)	Minutes, SMS, Internet, LDI y Roaming	24 y 12 months	No	₡34,900	600	unlimited	600
01/11/2017	Claro	Sin límite 4 (Puro)	Minutes, SMS, Internet, LDI y Roaming	12 , 24 months	No	₡34,900	600		600
01/12/2017	Kolbi	Plan 4G k4	Minutes, SMS, Internet	12 o 24 months	¢12,500	₡26,000	800		

Date of admission	Operator	Plan or package name	Quantity of SMS to all networks	Quantity of SMS same operator	Amount of SMS other operator	3G data download speed	4G data download speed	Amount of data download included 3G
01/06/2017	Claro	Postpago masivo sin límite 4 (Puro)	unlimited a Claro y 600 a otras redes	unlimited	600	8 Mbps	Up to 40 Mbps	8 GB
01/07/2017	Claro	Postpago masivo sin límite 4		unlimited	600	8 Mbps	Up to 40 Mbps	8 GB
01/08/2017	Claro	Postpago masivo sin límite 4 (Puro)		unlimited	600	8 Mbps	Up to 40 Mbps	8 GB
01/09/2017	Claro	Sin límite 4 (Puro)	unlimited a Claro y 600 a otras redes		600	8 Mbps	Up to 40 Mbps	8 GB
01/10/2017	Claro	Sin límite 3 (Puro)	unlimited a Claro y 300 a otras redes		300	8 Mbps	Up to 40 Mbps	8 GB
01/10/2017	Claro	Sin límite 4 (Puro)	unlimited a Claro y 600 a otras redes		600	8 Mbps	Up to 40 Mbps	8 GB
01/11/2017	Claro	Sin límite 4 (Puro)	unlimited a Claro y 600 a otras redes	unlimited	600	8 Mbps	Up to 40 Mbps	8 GB
01/12/2017	Kolbi	Plan 4G k4	600			8 Mbps		7 GB

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 75
Costa Rica. Mobile phone offers associated with user - Quartile 3 and 4, 2018
Postpaid mode

Date of admission	Operator	Plan or package name	Services included	Duration or validity of the plan	Registration Fee and / or Deposit	Monthly Price of the Plan or package (tax included)	Amount of Minutes to all nets	Precio minutos excedentes	Number of Minutes out of network	Quantity of SMS to all networks
5/21/18	Claro	Sin límites 3 (14GB)	Minutos, Internet	24 meses	¢18 500	300	Ilimitado	¢ 34	300	300
5/21/18	Claro	Sin límites 3 (16GB)	Minutos, Internet	24 meses	¢21 500	300	Ilimitado	¢ 34	300	300
5/21/18	Claro	Sin límites 3 (18GB)	Minutos, Internet	24 meses	¢24 500	300	Ilimitado	¢ 34	300	300
5/21/18	Claro	Sin límites 4 (14GB)	Minutos, Internet	24 meses	¢28 900	600	Ilimitado	¢ 34	600	600
5/21/18	Claro	Sin límites 4 (16GB)	Minutos, Internet	24 meses	¢31 900	600	Ilimitado	¢ 34	600	600
5/21/18	Claro	Sin límites 4 (18GB)	Minutos, Internet	24 meses	¢34 900	600	Ilimitado	¢ 34	600	600
6/13/18	Kölbi	Plan 4G k3	Minutos, Internet	12, 24 meses	¢18.000	300		¢ 33,90		300
10/24/18	Kölbi	Plan converson K2	Minutos, Internet	12, 24 meses	¢16.000	400		¢ 33,90		300
5/29/18	Movistar	Plan 4G@3 con terminal	Minutos, Internet	18, 24 meses	¢21 500	300	Ilimitado	¢ 34		
5/29/18	Movistar	Plan 4G@3 sin terminal	Minutos, Internet	18, 24 meses	¢21 500	300	Ilimitado	¢ 34		
5/30/18	Movistar	Plan 4G@4 con terminal	Minutos, Internet	18, 24 meses	¢26 500	600	Ilimitado	¢ 34		

Date of admission	Operator	Plan or package name	Quantity of SMS same operator	3G data download speed	4G data download speed	Amount of data download included 3G	Amount of data download included 4G
5/21/18	Claro	Sin límites 3 (14GB)	300	4 Mbps	12 Mbps	10 Gb	4 Gb
5/21/18	Claro	Sin límites 3 (16GB)	300	6 Mbps	12 Mbps	10 Gb	6 Gb
5/21/18	Claro	Sin límites 3 (18GB)	300	8 Mbps	12 Mbps	10 Gb	8 Gb
5/21/18	Claro	Sin límites 4 (14GB)	600	4 Mbps	12 Mbps	10 Gb	4 Gb
5/21/18	Claro	Sin límites 4 (16GB)	600	6 Mbps	12 Mbps	10 Gb	6 Gb
5/21/18	Claro	Sin límites 4 (18GB)	600	8 Mbps	12 Mbps	10 Gb	8 Gb
6/13/18	Kölbi	Plan 4G k3		8 Mbps			
10/24/18	Kölbi	Plan converson K2		5 Mbps			
5/29/18	Movistar	Plan 4G@3 con terminal				9 Gb*	
5/29/18	Movistar	Plan 4G@3 sin terminal				6 Gb*	
5/30/18	Movistar	Plan 4G@4 con terminal				11 Gb*	

* Refers to total download, regardless of technology (3G or 4G)
Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 76.
Costa Rica: Fixed Internet service price according to the provider and selected months, level of oversubscription 1:20, 2017
(Figures in colones)

Date	Operator	Name of the plan or package	Subscription and/or installation charge	Monthly Price of the Plan or package taxes included	Download speed
01/01/2017	Telecable			₡18,500	8 Mb
01/12/2017	Telecable			₡19,250	8 Mb
01/01/2017	Coopelesca	8Mb/1Mb		₡19,925	8 Mb
01/07/2017	Coopelesca	8Mb/2Mb		₡19,925	8 Mb
01/12/2017	Coopelesca	8Mb/2Mb Individual		₡19,925	8 Mb
01/02/2017	ESPH-Ibux	Ibux 8		₡33,561	8 Mb
01/12/2017	ESPH-Ibux	Ibux 8		₡33,561	8 Mb
02/02/2017	Tigo	Internet 8 Mbps		₡18,500	8 Mb
01/12/2017	Tigo	Internet 8 Mbps		₡17,910	8 Mb
01/07/2017	Cabletica	Mega Internet 8Mbps	105,000	₡20,694	8 Mb
01/12/2017	Cabletica	Mega Internet 8Mbps	105,000	₡19,950	8 Mb

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 77.
Costa Rica: Fixed Internet service price according to the provider and selected months, level of oversubscription 1:20, 2018
(Figures in colones)

Date	Operator	Name of the plan or package	Subscription and/or installation charge	Monthly Price of the Plan or package taxes included	Download speed
05/22/18	Cable Caribe S.A.	Internet 8 Megas	¢ 5,000	₡16,500	8 Mbps
04/9/18	Coopeguanacaste, R.L.	Residencial 6 MB		₡19,900	6 Mbps
05/22/18	Coopelesca RL	Internet Residencial 8MB / 2MB		$33.95	8 Mbps
05/28/18	Coopealfaroruiz	Internet 8MB/2MB		₡13,150	8 Mbps
05/10/18	Coopesantos RL	Internet 8 Megas / 2 Megas	¢ 20,000	₡23,405	8 Mbps
05/11/18	Coopesantos RL	Internet por fibra 6 Megas	¢ 14,000	₡24,500	6 Mbps
05/29/18	Cable Zarcero SA	Plan 6 Megas		₡17,500	6 Mbps
05/13/18	Conecta Develpments SA	Internet Plata	¢ 5,705	₡35,750	6 Mbps
04/9/18	ESPH	Ibux 8		₡29,700	8 Mbps
05/16/18	ESPH	Ibux 6		₡23,000	6 Mbps
04/9/18	Jasec	Internet 6Mbps/4Mbps Residencial		₡16,000	6 Mbps

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Date	Operator	Name of the plan or package	Subscription and/or installation charge	Monthly Price of the Plan or package taxes included	Download speed
04/17/18	Jasec	Internet 8Mbps/6Mbps Residencial		₡19,000	8 Mbps
02/21/18	Kölbi	kölbi Internet 6 Mbps		₡17,900	6 Mbps
09/17/18	Kölbi	kölbi Internet 8Mbps (Red Cable Visión)	¢ 10,000	₡17,500	8 Mbps
05/17/18	Metro Wireless Solutions Costa Rica MWS S.A.	Servicio de internet Residencial 6MBPS	¢ 56,900	₡11,300	6 Mbps
11/5/18	Movistar	Avanzado 8MB		₡19,900	8 Mbps
11/5/18	Movistar	Intermedio 6 MB		₡18,900	6 Mbps
05/22/18	Servicios Femaroca TV SA	Internet 6 Mbps	¢ 3,000	₡13,500	6 Mbps
05/22/18	Servicios Femaroca TV SA	Internet Inalámbrico 8 Mbps	¢ 7,500	₡18,000	8 Mbps
05/22/18	Servicios Femaroca TV SA	Internet 8 Mbps	¢ 3,000	₡17,000	8 Mbps
11/30/18	Telecable	@ 6 Mbps		₡18,000	6 Mbps
03/5/18	Transdatelecom	Transdatelecom 3	¢ 14,000	₡18,000	8 Mbps
05/3/18	Transdatelecom	Transdatelecom 2	¢ 14,000	₡16,000	6 Mbps

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 78.
Costa Rica: Price of fixed telephony packages according to the provider and selected months, level of oversubscription 1:20, 2017
(Figures in colones)

Date	Operator	Name of the plan or package	Services includes	Zone or region	Subscription and/or installation charge	Monthly Price of the Plan or package taxes included	Download speed
01/01/2017	Telecable	TV+@	Television, Internet	Todas las zonas con cobertura		₡28,500	8 Mb
01/12/2017	Telecable	TV+@	TV, Internet	Todas las zonas con cobertura		₡29,500	8 Mb
01/02/2017	kölbi	kolbi hogar internet + Tv Avanzada	Internet + television	Todo el país		₡35,800	8 Mb
01/12/2017	kölbi	kolbi hogar internet + Tv Avanzada	Internet, TV	Todo el país		₡35,800	8 Mb
01/07/2017	Cabletica	Super Pack Doble Play + Digital	CATV + @ + TV Digital	Total país	₡105,000	₡30,250	8 Mb
01/12/2017	Cabletica	Triple Play	CATV + @ + VoIP	Total país	₡105,000	₡29,990	8 Mb
01/12/2017	Tigo	TV Digital e Internet	Digital básic + 8 MB			₡26,500	8 Mb

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

Table Nº 79
Costa Rica. Price of fixed telephony packages according to the provider and selected months, level of oversubscription 1:20, year 2018
(Figures in colones)

Date	Operator	Name of the plan or package	Services includes	Zone or region	Subscription and/or installation charge	Monthly Price of the Plan or package taxes included	Download speed
05/22/18	Cable Caribe S.A.	Básico 8 Megas + TV	Internet fijo, Televisión	Limón	¢ 5,000	₡26,500	8 Mbps
04/9/18	Coopeguanacaste, R.L.	TV Digital Estándar + 6 MB Internet	Internet fijo, Televisión	Guanacaste		₡31,900	6 Mbps
04/9/18	Coopeguanacaste, R.L.	TV Digital Premium + 6 MB Internet	Internet fijo, Televisión	Guanacaste		₡38,900	6 Mbps
05/21/18	Coopelesca RL	TV Digital Plus + 8Mbps/2Mbps	Internet fijo, Televisión	Heredia, Alajuela		₡26,940	8 Mbps
05/22/18	Coopelesca RL	TV Digital Económico + 8Mbps/2Mbps	Internet fijo, Televisión	Heredia, Alajuela		₡26,840	8 Mbps
05/22/18	Coopelesca RL	Ultra Plus + 8Mbps/2Mbps	Internet fijo, Televisión	Heredia, Alajuela		₡27,390	8 Mbps
05/10/18	Coopesantos RL	Cablesantos Económico + Internet 8 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡31,025	8 Mbps
05/10/18	Coopesantos RL	Cablesantos Plus + Internet 8 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡36,625	8 Mbps
05/10/18	Coopesantos RL	Cablesantos Plus HD + Internet 8 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡37,625	8 Mbps
05/10/18	Coopesantos RL	Cablesantos Premium + Internet 8 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡43,140	8 Mbps
05/10/18	Coopesantos RL	Cablesantos Full + Internet 8 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡44,140	8 Mbps
05/11/18	Coopesantos RL	Cablesantos Económico + Internet 6 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡31,500	6 Mbps
05/11/18	Coopesantos RL	Cablesantos Plus + Internet 6 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡36,500	6 Mbps
05/11/18	Coopesantos RL	Cablesantos Plus HD + Internet 6 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡38,200	6 Mbps
05/11/18	Coopesantos RL	Cablesantos Premium + Internet 6 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡42,200	6 Mbps
05/11/18	Coopesantos RL	Cablesantos Full + Internet 6 Megas	Internet fijo, Televisión	Cartago, San José	¢ 14,000	₡43,200	6 Mbps
05/15/18	Kölbi	Plan Triple 6Mbps	Telefonía fija, Internet fijo, Televisión	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡32,900	6 Mbps

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Date	Operator	Name of the plan or package	Services includes	Zone or region	Subscription and/or installation charge	Monthly Price of the Plan or package taxes included	Download speed
05/16/18	Kölbi	Plan Dúo Internet + Telefonía 6 Mbps	Telefonía fija, Internet fijo	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡19,900	6 Mbps
05/20/18	Kölbi	Plan Dúo Internet + TV Avanzada 6 Mbps	Internet fijo, Televisión	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡29,900	6 Mbps
05/17/18	Kölbi	Plan Dúo Internet + TV Digital 8Mbps	Internet fijo, Televisión	Cartago, San José, Heredia, Alajuela	¢ 10,000	₡28,000	8 Mbps
05/21/18	Millicom	TV DVB + 6 Megas	Internet fijo, Televisión	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela		₡25,990	6 Mbps
08/31/18	Millicom	TV Análoga + 6 Megas Parrita y Quepos 2018	Internet fijo, Televisión	Puntarenas		₡29,690	6 Mbps
05/22/18	Servicios Femaroca TV SA	Doble Play 6Mbps	Internet fijo, Televisión	Cartago	¢ 7,500	₡29,600	6 Mbps
05/22/18	Servicios Femaroca TV SA	Doble Play 8Mbps	Internet fijo, Televisión	Cartago	¢ 7,500	₡33,100	8 Mbps
05/21/18	Televisora de Costa Rica SA	Triple Play 8Mbps	Telefonía fija, Internet fijo, Televisión	Cartago, San José, Limón, Guanacaste, Puntarenas, Heredia, Alajuela	¢ 10,5000	₡29,990	8 Mbps
06/13/18	Transdatelecom	Super Cable Hogar Conectado	Internet fijo, Televisión	Alajuela		₡26,000	8 Mbps

Source: Sutel, General Directorate for Markets, Costa Rica, 2018.

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Table Nº 80.
Costa Rica. Total of projects in development Fonatel, 2012-2018

Year	Formulation / adjudication	Execution	Production	Development
2012	1	0	0	1
2013	5	2	0	7
2014	4	7	2	13
2015	10	7	4	21
2016	2	19	8	29
2017	2	19	15	36
2018	7	9	20	36

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 81.
Costa Rica. Total number of households, homes and people with availability of telecommunications services in the geographic areas covered by Fonatel cubiertas por Fonatel, 2015-2018

Year	Households	Homes	Persons
2015	23,212	22,799	76,739
2016	82,572	80,830	269,740
2017	120,821	118,606	392,007
2018	282,503	278,616	913,915

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 82
Costa Rica. Number of subscriptions to fixed telecommunications services provided by Fonatel, 2014-2018

	2014	2015	2016	2017	2018
Fixed Telephony + Fixed Internet	31	29	10,645	31,880	86,781

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 83.
Costa Rica. Number of subscriptions to mobile telecommunications services in the geographic areas covered by Fonatel, 2014-2018

	2014	2015	2016	2017	2018
Mobile Telephony	60	812	42,586	36,732	35,602

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 84
Costa Rica. Total number of devices and support products provided by Fonatel, 2016-2018

Año	Total
2016	10,089
2017	36,839
2018	120,272

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 85
Costa Rica. Fonatel Heritage, 2012-2018
(Figures in millions of colones)

Año	Monto
2012	101,630
2013	113,775
2014	131,315
2015	143,265
2016	161,306
2017	171,551
2018	200,979

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 86.
Fonatel projected investment for the development of programs and projects, 2019-2026
(Figures in millions of colones)

Program	Project	2019	2020	2021	2022	2023	2024	2025	2026	Total
Program 1: "Comunidades Conectadas"	Internet access to 183 districts	3,779	20,432	7,283	6,286	5,621	3,726	1,758	0	48,384
	Internet Access in Indigenous Territories	13,506	13,580	6,885	6,940	6,995	7,050	1,797	0	56,754
Program 2: "Hogares Conectados"	Subsidy for Internet access and laptop	17,912	18,550	7,232	3,883	711	0	0	0	48,289
Program 3: "Centros Públicos Equipados"	Provision of access CPSP devices	3,932	1,689	0	0	0	0	0	0	5,621
Program 4: "Espacios Públicos Conectados"	513 digital zones	2,176	5,710	7,340	7,399	6,151	6,199	2,366	566	37,907
Total		**41,304**	**59,961**	**28,740**	**24,509**	**19,478**	**16,976**	**5,920**	**566**	**197,454**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 87.
Costa Rica. Fonatel executed investment according to the program, 2013-2018
(Cumulative figures in millions of colones)

Year	"Comunidades Conectadas" Program	"Hogares Conectados" Program	"Centros Públicos Conectados" Program	Total
2013	49			49
2014	3,077			3,077
2015	2,878			2,878
2016	932	734		1,666
2017	1,971	6,060	4,752	12,783
2018	4,754	17,298	3,357	25,409
Total	**13,661**	**24,092**	**8,109**	**45,862**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 88.
Costa Rica. Investment executed through Fonatel's "Hogares Conectadas" Program, by operador, 2013-2018
(Figures in millions of colones)

Operator	Amount					
	2013	2014	2015	2016	2017	2018
Telefónica	39	537	755	18	33	64
ICE	10	25	2,123	140	2263	5,791
Claro	0	2,516	0	909	724	1,423
Coopelesca	0	0	0	37	194	601
Coopesantos	0	0	0	38	272	577
Telecable	0	0	0	103	1,372	4,416
Cabletica	0	0	0	420	2,978	5,941
Coopeguanacaste	0	0	0	0	6	96
Tigo	0	0	0	0	188	3,143
RACSA	0	0	0	0	4,752	3,357
Total general	**49**	**3,077**	**2,878**	**1,666**	**12,783**	**25,409**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 89.
Costa Rica. Total amount of projects executed though the "Comunidades Conectadas" Program, 2012 - 2018

Year	Projects
2012	1
2013	7
2014	13
2015	19
2016	26
2017	32
2018	32

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 90.
Costa Rica. Number of people with the availability of telecommunication services in the areas covered by the Programa Comunidades Conectadas, 2014-2018

Year	Persons
2014	28,224
2015	76,739
2016	237,639
2017	293,407
2018	640,044

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 91.
Costa Rica. Number of CPSP with fixed services provided through the Programa Comunidades Conectadas according to the 2014-2018 project

Project	2014	2015	2016	2017	2018
Roxana	4	4	4	4	4
Siquirres	11	11	11	11	11
Guatuso	0	0	48	47	46
Los Chiles	0	0	76	75	74
San Carlos	0	0	78	68	91
Sarapiquí	0	0	97	57	111
Upala	0	0	116	62	119
Pérez Zeledón	0	0	0	125	144
Total	**15**	**15**	**430**	**449**	**600**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 92.
Costa Rica. Number and percentage of subscriptions to telecommunications services in the areas covered by the Programa Comunidades Conectadas, 2014-2018

Servicio	2014		2015		2016		2017		2018	
	Amount	Percentage	Amount	Percentage	Amount	Percentage	Amount	Percentage	Amount	Percentage
Fixed Telephony	13	14 %	10	1 %	116	0 %	372	1 %	999	3 %
Fixed Internet	18	20 %	19	2 %	441	1 %	1,090	3 %	1,514	4 %
Mobile Telephony	60	66 %	812	97 %	42,586	99 %	36,732	96 %	35,602	93 %
Total	**91**	**100 %**	**841**	**100 %**	**43,143**	**100 %**	**38,194**	**100 %**	**38,115**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 93
Costa Rica. Number and percentage of mobile phone service subscriptions in the geographic areas covered by the Programa Comunidades Conectadas, according to the 2017-2018 project

Project	2017		2018	
	Figures	%	Figures	%
Los Chiles	13,831	38 %	14,406	40 %
Guatuso	5,471	15 %	5,764	16 %
San Carlos	5,152	14 %	4,683	13 %
Sarapiquí	3,875	11 %	3,523	10 %
Upala	3,319	9 %	3,016	8 %
Pérez Zeledón	2,646	7 %	2,213	6 %
Siquirres	2,438	7 %	1,997	6 %
Total	**36,732**	**100 %**	**35,602**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 94
Costa Rica. Number and percentage of subscriptions to the fixed telephony service provided by the Fonatel Programa Comunidades Conectadas according to the project, 2017-2018

Project	2017		2018	
	Figures	%	Figures	%
Upala	103	28 %	315	32 %
Sarapiquí	30	8 %	260	26 %
San Carlos	135	36 %	215	21 %
Pérez Zeledón	102	27 %	207	21 %
Roxana	1	0 %	1	0 %
Siquirres	1	0 %	1	0 %
Total	**372**	**100 %**	**999**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 95.
Costa Rica. Number and percentage of subscriptions to the fixed internet access service provided by the Fonatel Programa Comunidades Conectadas according to the project, 2017-2018

Project	2017		2018	
	Figures	%	Figures	%
Upala	240	22 %	467	31 %
Sarapiquí	109	10 %	376	25 %
San Carlos	526	48 %	339	22 %
Pérez Zeledón	202	19 %	322	21 %
Roxana	12	1 %	10	1 %
Siquirres	1	0 %	1	0 %
Total	**1,090**	**100 %**	**1,514**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 96.
Costa Rica. Investment executed through the Programa Comunidades Conectadas, 2013-2018
(Figures accumulated in millions of colones)

Operador	2013	2014	2015	2016	2017	2018
Telefónica	39	2,516	755	18	33	64
ICE	10	25	2,123	5	1,213	3,267
Claro	0	537	0	909	724	1,423
Total	**49**	**3,077**	**2,878**	**932**	**1,971**	**4,754**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 97.
Costa Rica. Total number of households registered in the System for the Administration of Program Beneficiaries by state, 2016-2018
(Cumulative figures of beneficiaries)

State	Dec-16	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Agu-18	Sep-18	Oct-18	Nov-18	Dec-18
Assets	9,947	28,806	30,855	34,523	37,468	42,442	48,376	51,142	54,622	56,226	63,418	68,734	74,662	78,815
Benefited	10,089	30,418	32,627	36,430	39,871	44,949	50,995	53,888	57,619	59,681	67,210	73,215	79,635	84,268
Contacted	12,787	37,212	41,708	46,130	49,988	56,548	61,751	65,023	67,809	70,126	79,198	85,436	92,853	97,189
Drop	142	1,601	1,747	1,812	2,141	2,261	2,470	2,585	2,787	3,250	3,577	4,255	4,732	5,190
Administrative changes	0	25	37	99	266	246	149	161	212	205	215	226	241	263

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 98.
Costa Rica. The number of households benefited through the Programa Hogares Conectados according to income quintile, 2016-2018

Income quintile	Dec-16	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Agu-18	Sep-18	Oct-18	Nov-18	Dec-18
Quintile 1	9,832	24,981	26,711	29,890	32,851	37,035	42,016	44,400	47,474	49,922	56,420	61,728	67,458	71,431
Quintile 2	256	4,283	4,625	5,078	5,499	6,199	7,033	7,432	7,947	7,781	8,670	9,301	9,948	10,536
Quintile 3	2	1,154	1,291	1,462	1,521	1,715	1,945	2,056	2,198	1,978	2,120	2,186	2,229	2,301
Total	**10,089**	**30,418**	**32,627**	**36,430**	**39,871**	**44,949**	**50,995**	**53,888**	**57,619**	**59,681**	**67,210**	**73,215**	**79,635**	**84,268**
Porcentual distribution														
Quintile 1	97 %	82 %	82 %	82 %	82 %	82 %	82 %	82 %	82 %	84 %	84 %	84 %	85 %	85 %
Quintile 2	3 %	14 %	14 %	14 %	14 %	14 %	14 %	14 %	14 %	13 %	13 %	13 %	12 %	13 %
Quintile 3	0 %	4 %	4 %	4 %	4 %	4 %	4 %	4 %	4 %	3 %	3 %	3 %	3 %	3 %
Total	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 99.
Costa Rica. Number and percentage of households benefited through the Programa Hogares Conectados by province, 2016-2018

Province	IIS 2016		IS 2017		IIS 2017		IS 2018		IIS 2018	
	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage	Quantity	Percentage
San José	3,259	32 %	5,780	33 %	9,173	30 %	16,883	32 %	28,102	33 %
Alajuela	1,721	17 %	3,273	18 %	5,224	17 %	9,174	17 %	13,335	16 %
Cartago	812	8 %	998	6 %	1,872	6 %	3,718	7 %	7,533	9 %
Heredia	1,624	16 %	1,538	9 %	2,942	10 %	4,421	8 %	6,997	8 %
Guanacaste	492	5 %	2,482	14 %	4,183	14 %	7,350	14 %	10,458	12 %
Puntarenas	510	5 %	2,533	14 %	4,903	16 %	8,209	15 %	12,106	14 %
Limón	1,672	17 %	1,172	7 %	2,121	7 %	4,134	8 %	5,737	7 %
Total general	**10,089**	**100 %**	**17,776**	**100 %**	**30,418**	**100 %**	**53,889**	**100 %**	**84,268**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 100.
Costa Rica. Amount and percentage of the investment executed through the Programa Hogares Conectados according to operator, 2016-2018
(cifras en millones de colones y en porcentaje)

Operator	2016		2017		2018	
	Amount	Percentage	Amount	Percentage	Amount	Percentage
Cabletica	420	57 %	2,978	49 %	5,941	35 %
ICE	136	19 %	1,050	17 %	2,524	15 %
Telecable	103	14 %	1,372	23 %	4,416	26 %
Coopelesca	37	5 %	194	3 %	601	3 %
Coopesantos	38	5 %	272	4 %	577	3 %
Tigo	0	0 %	188	3 %	3,143	18 %
Coopeguanacaste	0	0 %	6	0 %	96	1 %
Total	**734**	**100 %**	**6,060**	**100 %**	**17,298**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 101.
Costa Rica. Number of devices and support products for the use of telecommunications services provided through the Fonatel Programa Centros Públicos Conectados, 2017-2018

Year	2017	2018
Devices delivered	6,407	36,004

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 102.
Costa Rica. Distribution of devices and support products for the use of telecommunications services provided through the Programa Centros Públicos Conectados by institution, 2018

Institution	Devices	Percentage
MEP	25,678	71 %
MICITT	4,941	14 %
CCSS	4,318	12 %
CENCINAI	1,067	3 %
Total	**36,004**	**100 %**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 103.
Costa Rica. Level of compliance with the goal of the Programa Centros Públicos Equipados in the PNDT by the institution, 2018

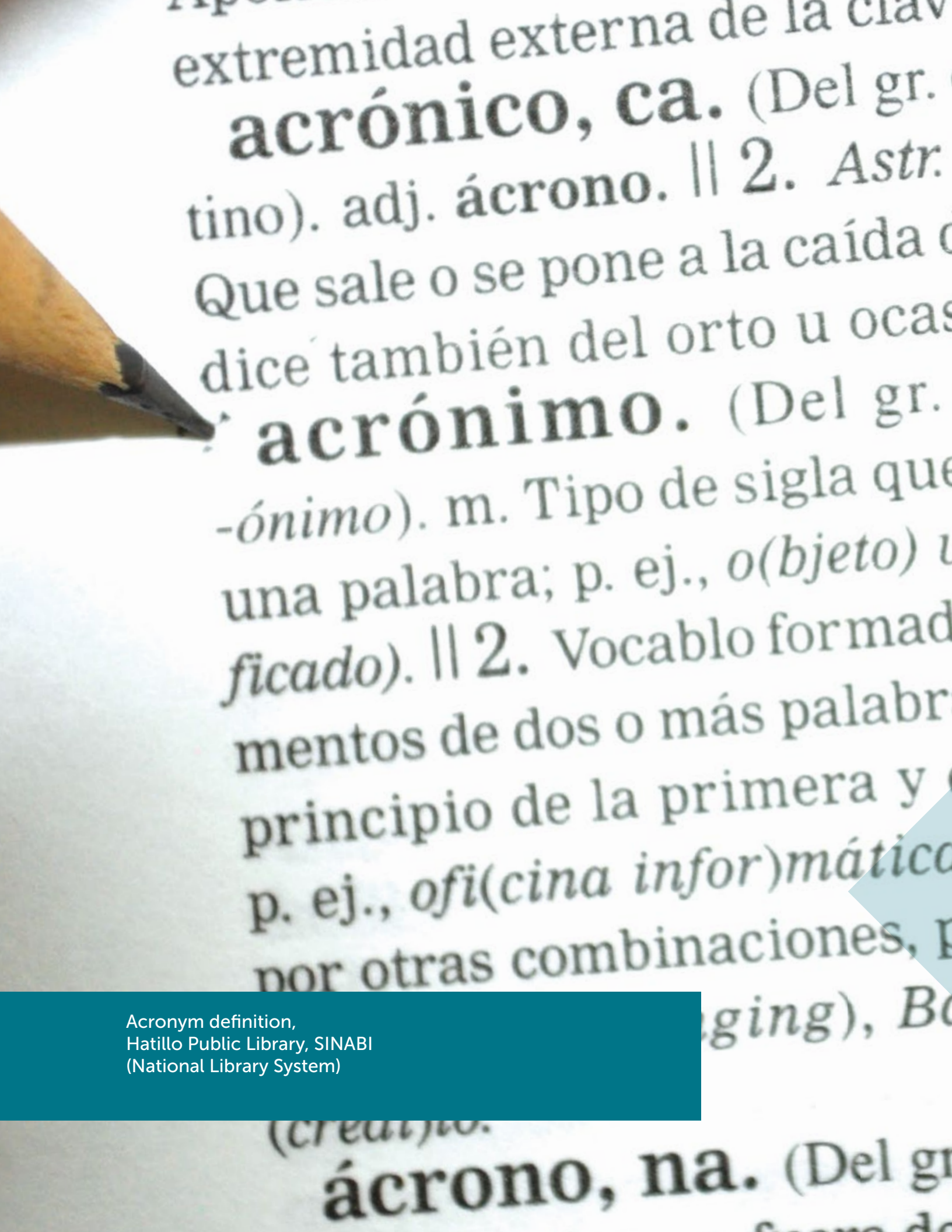
Institution	Goal	Delivered	Pending
MEP	26,388	25,678	710
MICITT	5,058	4,941	117
CCSS	4,318	4,318	0
CENCINAI	1,067	1,067	0
Total	**36,831**	**36,004**	**827**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.

Table Nº 104.
Costa Rica. Investment executed in the Fonatel Programa Centros Públicos Conectados
(Cumulative figures to 2018)

	2017	2018	Total
Budget Executed	4,752	3,357	**8,109**

Source: Sutel, General Directorate for Fonatel, Costa Rica, 2018.



Acronym definition,
Hatillo Public Library, SINABI
(National Library System)

ACRONYMS

Acronyms

A4AI	Alliance for Affordable Internet.
AON	Active optical networks.
ARPU	Average Revenue per User.
BCCR	Banco Central de Costa Rica (Central Bank of Costa Rica)
CCSS	Caja Costarricense de Seguro Social (Costa Rican Social Security Fund)
CECI´s	Centros Comunitarios Inteligentes (Intelligent Community Centers)
Cen Cinai	Centros de Educación y Nutrición y Centros Infantiles de Atención Integral (Children's Comprehensive Care Centers)
CEPF	Contribución Especial Parafiscal (Parafiscal Special Contribution)
CGR	Contraloría General de la República (The Comptroller General of the Republic)
CPSP´s	Centros de Prestación de Servicios Públicos (Public Service Provision Centers)
DBM	Unit of measurement of the signal power expressed in decibels (dB)
DGC	Dirección General de Calidad (General Directorate for Quality)
DGF	Dirección General de Fonatel (General Directorate for Fonatel)
DGM	Dirección General de Mercados (General Directorate for Markets)
DWDM	Dense wavelength division multiplexing.
EBAIS	Equipos Básicos de Atención Integral en Salud (Comprehensive Basic Health Care Teams)
ENAHO	Encuesta Nacional de Hogares (National Household Survey)
ENIGH	Encuesta Nacional de Ingresos y Gastos de los Hogares (National Household Revenues and Expenditure Survey)
FAC	Quality adjustment factor
FTTx	Fiber to the X, generic term for the provision of last mile networks on fiber optics
Fonatel	Fondo Nacional de Telecomunicaciones (National Telecommunications Fund)
GB	Gigabyte
GSM	Global System for Mobile Communications.
HFC	Hybrid fibre-coaxial. Hybrid fiber and copper networks, those that use DOCSIS or similar technologies to offer their services.
HHI	Herfindahl-Hirschman index to measure the concentration of a market
ICE	Instituto Costarricense de Electricidad (Costa Rican Institute of Electricity)
ICG	Global Competitiveness Index
IMAS	Instituto Mixto de Ayuda Social (Joint Social Welfare Institute)
INEC	Instituto Nacional de Estadística y Censos (National Institute of Statistics and Census of Costa Rica)

IP	Internet Protocol: Set of rules and standards for digital data communication, classified on the Network Layer according to the international OSI model
IPIF	Fixed Internet Price Index
IPTM	Mobile telecommunications price index
IPTV	Internet Protocol Television.
ISO	International Standards Organization
Kbps	Kilobits per second
LGT	General Telecommunications Law, Law 8642
LTE	Long Term Evolution: wireless broadband technology that is designed, mainly, to support the access of mobile phones and portable devices to the Internet
Mbps	Megabits per second
MEP	Ministerio de Educación Pública (Ministry of Public Education)
MH	Ministerio de Hacienda (National Treasury)
MICITT	Ministerio de Ciencia, Tecnología y Telecomunicaciones (Ministry of Science, Technology and Telecommunications of Costa Rica)
MIDEPLAN	Ministerio de Planificación Nacional y Política Económica (Ministry of National Planning and Economic Policy)
MMDS	Multichannel Multipoint Distribution Services.
MMS	Multimedia Messaging System.
MS	Ministerio de Salud (Ministry of Health)
Off-net	The origin of voice traffic or short messaging is a different network to the destination network.
On-net	The destination of voice traffic or short messaging is the same network where the traffic originated.
PAPyP	Plan Anual de Proyectos y Programas (Annual Project and Programs Plan)
PBAS	Programa Banda Ancha Solidaria (Solidary Broadband Program)
PCC	Programa Comunidades Conectadas (Connected Communities Program)
PCiC	Programa Ciudadano Conectado (Connected Citizen Program)
PCPE	Programa Centros Públicos Equipados (Public Equipped Centers Program)
PEPC	Programa Espacios Públicos Conectados (Connected Public Spaces Program)
PHC	Programa Hogares Conectados (Connected Homes Program)
PIB	Producto Interno Bruto (Gross domestic product)
PNDT	Plan Nacional de Desarrollo de las Telecomunicaciones (National Development Plan for Telecommunications)
PNUD	Programa de las Naciones Unidas para el Desarrollo (United Nations Development Program)

PON	Passive optical networks
QoSE	Quality of service experienced by the user
RPCS	Reglamento de prestación y calidad de servicios (Regulation of provision and quality of services)
SDH	Synchronous Digital Hierarchy: protocol to transfer bit streams in a synchronized way over fiber
SMS	Short Message Service
SITEL	Telecommunications Indicators System
Sutel	Superintendencia de Telecomunicaciones (Superintendency of Telecommunications)
TB	Terabyte
UG	Management Unit for the execution of Fonatel programs and projects
UIT	International Telecommunication Union: Specialized Organization of the United Nations Organization in charge of regulating telecommunications at international level between the different administrations and operating companies
USB	Universal Serial Bus. Device with a universal serial port for data storage
VoIP	Voice over Internet Protocol
VPN	Virtual private Networks
XDSL	Digital Subscriber line. Technologies that use the copper telephone platform for access

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