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DIGITAL ECONOMY AND SOCIETY IN THE BASQUE COUNTRY. DESI 2019

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ABSTRACT

For the third consecutive year, the annual report on Digital Economy and Society of the Basque Country, DESI 2019, is presented. As in previous reports, the Basque situation is analysed in comparative with the countries of the European Union as well as its evolution during the last three years. In addition, and as a novelty this year, a section on the digitalisation of women, based on another European index, WiD (Women in Digital), is included.

RESUMEN

Por tercer año consecutivo se presenta el informe anual de Economía y Sociedad Digitales del País Vasco, DESI 2019 (*Digital Economy and Society Index*). Como en informes anteriores, se analiza la situación vasca en comparación con los países de la Unión Europea así como su evolución en los últimos tres años. Además, y como novedad este año, se incluye un apartado relativo a la digitalización de las mujeres a partir de otro índice europeo: WiD (*Women in Digital*).

LABURPENA

Hirugarren urtez aurkezten dugu Euskal Autonomia Erkidegoko Ekonomia eta Gizarte Digitalaren urteko txostena, DESI 2019 (*Digital Economy and Society Index*). Aurreko txostenetan bezala, EAEko egoera Europar Batasuneko herrialdeekin alderatu dugu eta azken hiru urteetan izan duen bilakaera ere jaso dugu. Gainera, aurten, lehenengo aldiz, emakumeen digitalizazioari buruzko atal bat landu dugu, Europako beste indize batean oinarrituta: WiD (*Women in Digital*).

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Likewise, and for the third consecutive year, we have found the cooperation with Anna Armengol and Balazs Zorenyi of the European Commission very valuable.

Finally, we want to thank the work developed by Javier Porrúa, collaborator of the Lab of Digital Economy of Orkestra.

1. PRESENTATION

For the third consecutive year, the DESI (*Digital Economy and Society Index*) of the Basque Country is presented. This report, which follows a format very similar to last year's, submits in a structured way the results obtained for the final index as well as for its intermediate levels. These values compare the relative position of the Basque Country with those of the other Member States of the European Union. Besides the updated data for 2019, and as in the previous report, it also shows the evolution of all the indicators over the last three years, so that it is possible to analyse the progress and setbacks since 2017.

DESI 2019 maintains the same five dimensions of past years: connectivity, human capital, use of Internet services, integration of digital technology and digital public services. The distribution of weights of each dimension with respect to the final indicator does not vary either (connectivity counts for 25%, human capital another 25%, the use of Internet services 15%, the integration of digital technology 20% and digital public services 15%). The sub-dimensions are also preserved, although with modifications in some of their denominations. The main changes occur at the level of indicators, especially with the incorporation of new ones, in all dimensions. Thus, the DESI goes from thirty-three to a total of forty-four indicators. This implies that, for intertemporal comparative, it has been necessary to recalculate the DESI 2017 and DESI 2018 indexes, applying such methodological changes.

A new second European digital indicator has been included in this report, the *Women in Digital* (WiD) index. This index, also produced by the European Commission, helps measuring and monitoring women's participation in the digital economy and society. As with the DESI, from the WiD index a diagnosis of the performance of European Union countries is obtained that allows for comparative and classification. Besides the result that reflects the greater or lesser representation of women in the digital environment at a given time, the final objective of having a robust and systematic measurement method, such as this index, seeks to assess the extent to which the efforts that are being made succeed in having an effect in reducing the persistent gender gap that, is already known to exist, and that must be combated with the promotion of an increasing inclusion of women in the digital environment.

The WiD index is composed of thirteen indicators grouped into three dimensions: Internet use, Internet user skills and specialist skills and employment. Unlike the DESI, in the WiD index there is no intermediate level of sub-dimensions, but the calculation method, with the processes of normalization and weightings from the absolute value of the indicator to the final index, is analogous. In the case of the WiD index, the weight of each dimension is equal (33.33%).

The structure of the DESI and WiD analyses in this report is the same, starting from the final result of the index, then moving on to the dimensions, then to the sub-dimensions (or directly to the indicators in the case of WiD) and finally to the indicators (in the case of DESI). Results at the dimensional level are presented in graphs while, for the sub-dimensional and indicator levels, the information is more detailed and synthesized in tables.

The following section shows the evolutionary comparative of these indexes, between 2017 and 2019 for the DESI and between 2018 and 2019 for the WiD. In addition, the WiD includes a gender comparative based on the calculation of differentials between women and men data for the Basque Country, Spain and the EU-28 average.

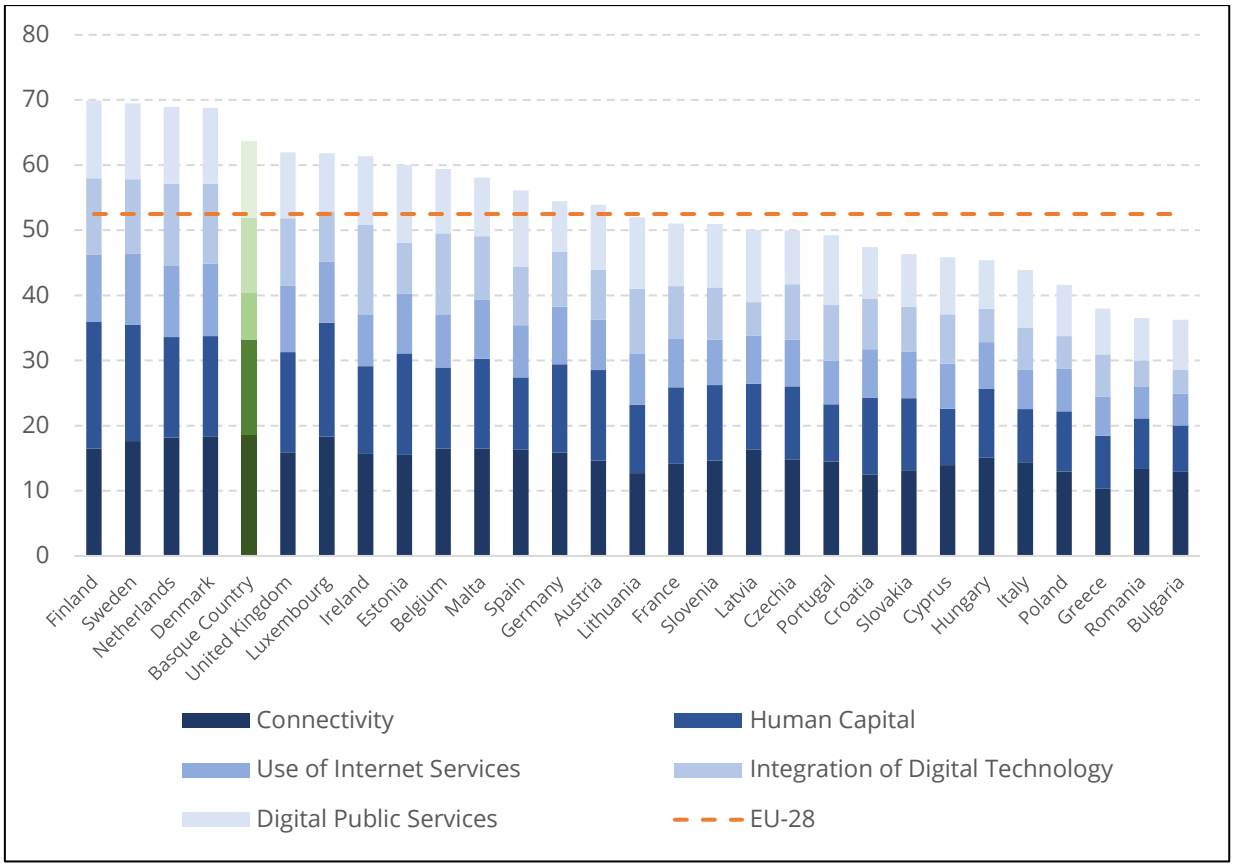
2. DIGITALISATION IN THE BASQUE COUNTRY 2019

2.1 DESI 2019 Index

The DESI indicator allows measuring the level of digitalisation of the economy and society of the Basque Country. In 2019, this territory reaches 63.61%, which places it in fifth place in the ranking that groups the EU-28 countries. The average value of these countries is 52.49%.

This ranking is represented in Graph 1 and shows the DESI value that each country reaches and which is broken down into five dimensions. The group of leading countries, with values close to 70%, is led by Finland (69.93%) and followed by Sweden (69.48%), Holland (68.94%) and Denmark (68.80%). Among the countries behind the Basque Country are the United Kingdom (61.95%), Luxembourg (61.79%) and Ireland (61.35%).

Graph 1 DESI 2019 (%)



Source: EUROSTAT[1], CNMC (National Commission on Markets and Competition, Ministry of Economy and Business, EUSTAT (Basque Institute of Statistics), INE (National Institute of Statistics)

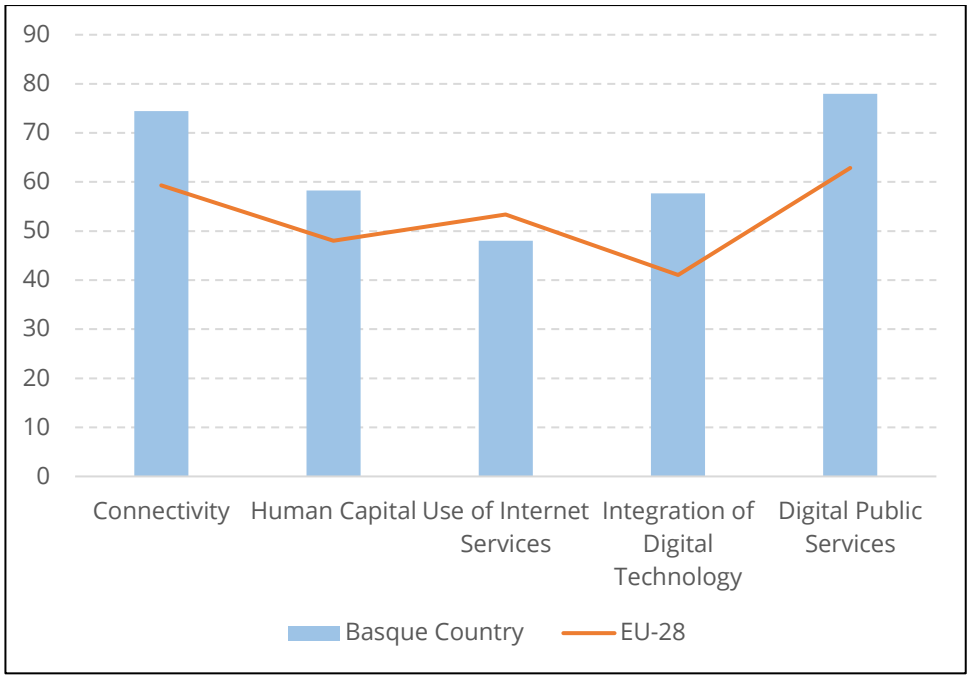
2.2 Dimensions

The following graph shows the dimensions of the DESI through the value that each one reaches, in relation to the EU-28 average. Except in the third dimension on the use of Internet services, the Basque Country obtains

[1] It refers to data from other EU countries. Applies to all graphics and tables in the document.

values higher than average, with considerable margins. The dimension that reaches the highest value is the one related to digital public services, followed by the connectivity one.

Graph 2 Basque Country DESI 2019 Dimensions (%)



Source: EUSTAT, INE

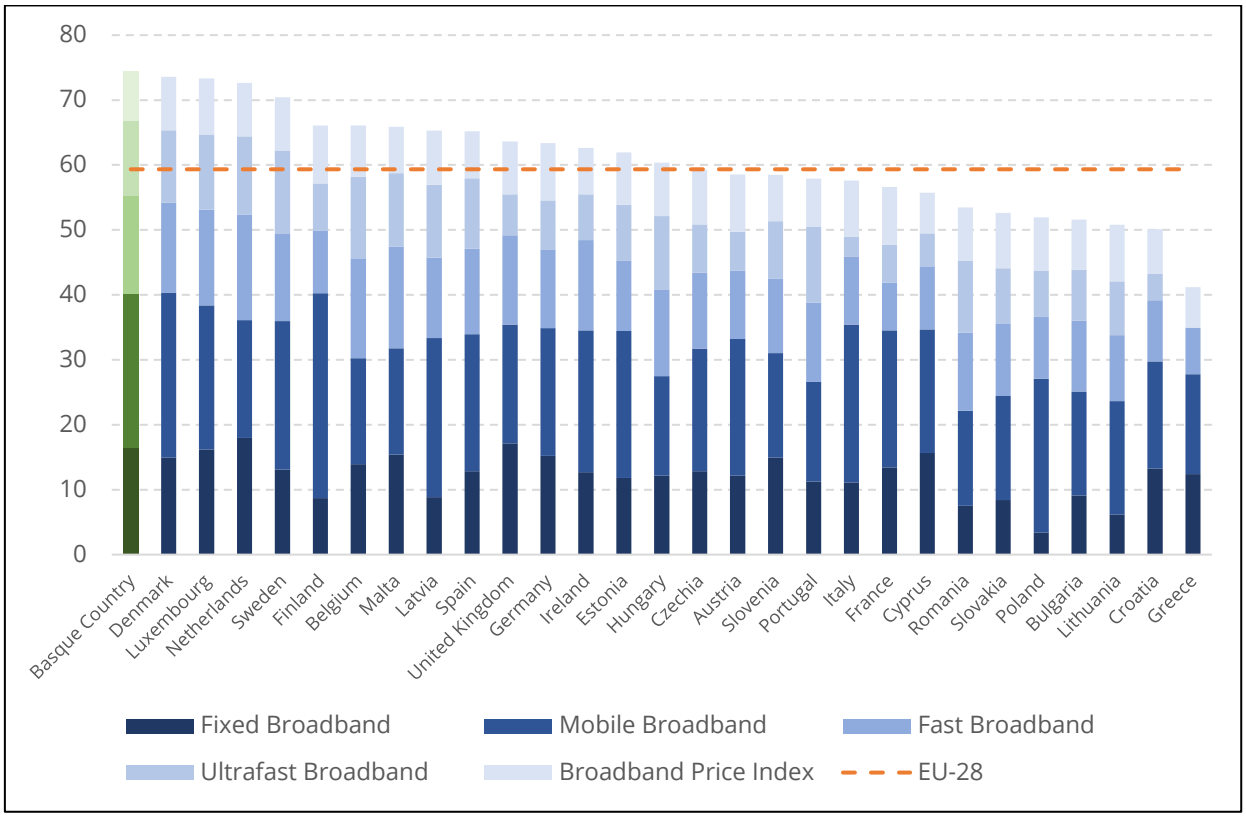
The following sub-sections detail the results of the five dimensions together with those of their respective sub-dimensions, considering the whole of the countries and placing the Basque Country in its corresponding position of the ranking. The average value of the EU-28 of each dimension is also included.

2.2.1 Connectivity

This dimension[2] includes five sub-dimensions: fixed, mobile, fast, ultra-fast broadband (all with coverage and take-up measures) and the broadband price index, which measures the affordability of its access price. In this dimension, the Basque Country occupies its second best position.

In connectivity, the Basque Country stands out as a leader among the EU-28 countries, with a value of 74.42%, ahead of countries such as Denmark (73.60%), Luxembourg (73.31%), Holland (72.65%) and Sweden (70.42%).

Graph 3 Connectivity (%)



Source: CNMC, Ministry of Economy and Business, EUSTAT, INE

2.2.2 Human capital

This dimension[3] includes two sub-dimensions: Internet user skills and advanced skills and development. The first refers to the ability of citizens to use digital products and services and the second is related to the ability

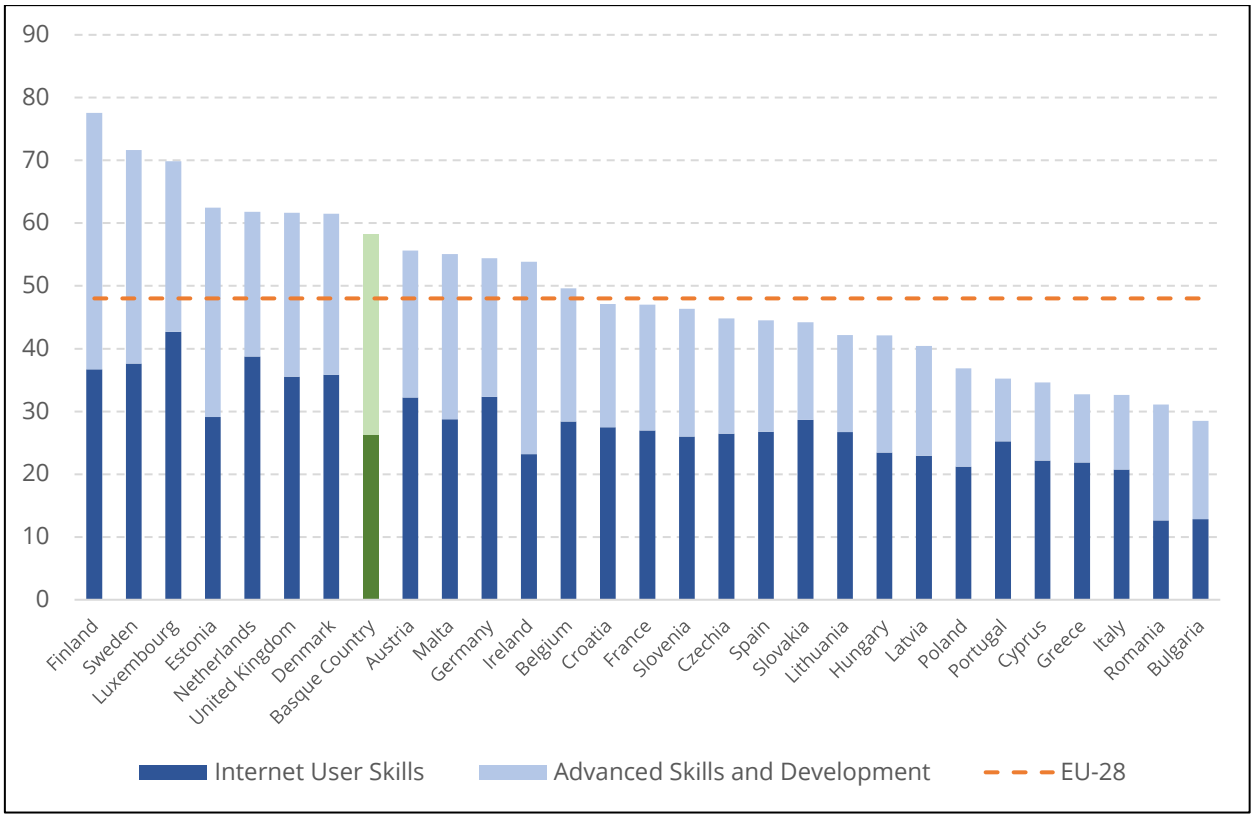
[2] In this dimension the new readiness 5G readiness indicator (1.b.3) has been added.
For more information, see *5. Methodological note* and *6.1 DESI indicators and definitions*.

[3] Dimension 2 has four new indicators; above basic digital skills (2.a.2), at least basic software skills (2.a.3), female ICT specialists (2.b.2) and ICT graduates (2.b.3).
For more information, see *5. Methodological note* and *6.1 DESI indicators and definitions.*

to produce such goods and services. Taking into account the position hold by the Basque Country, this is the third dimension in terms of the result achieved.

The Basque Country reaches 58.28% in human capital for digitalisation, ranking eighth, in a dimension where Finland (77.54%), Sweden (71.63%) and Luxembourg (69.88%) occupy the first positions. Again, the Basque.

Graph 4 Human Capital (%)



Source: EUSTAT, INE

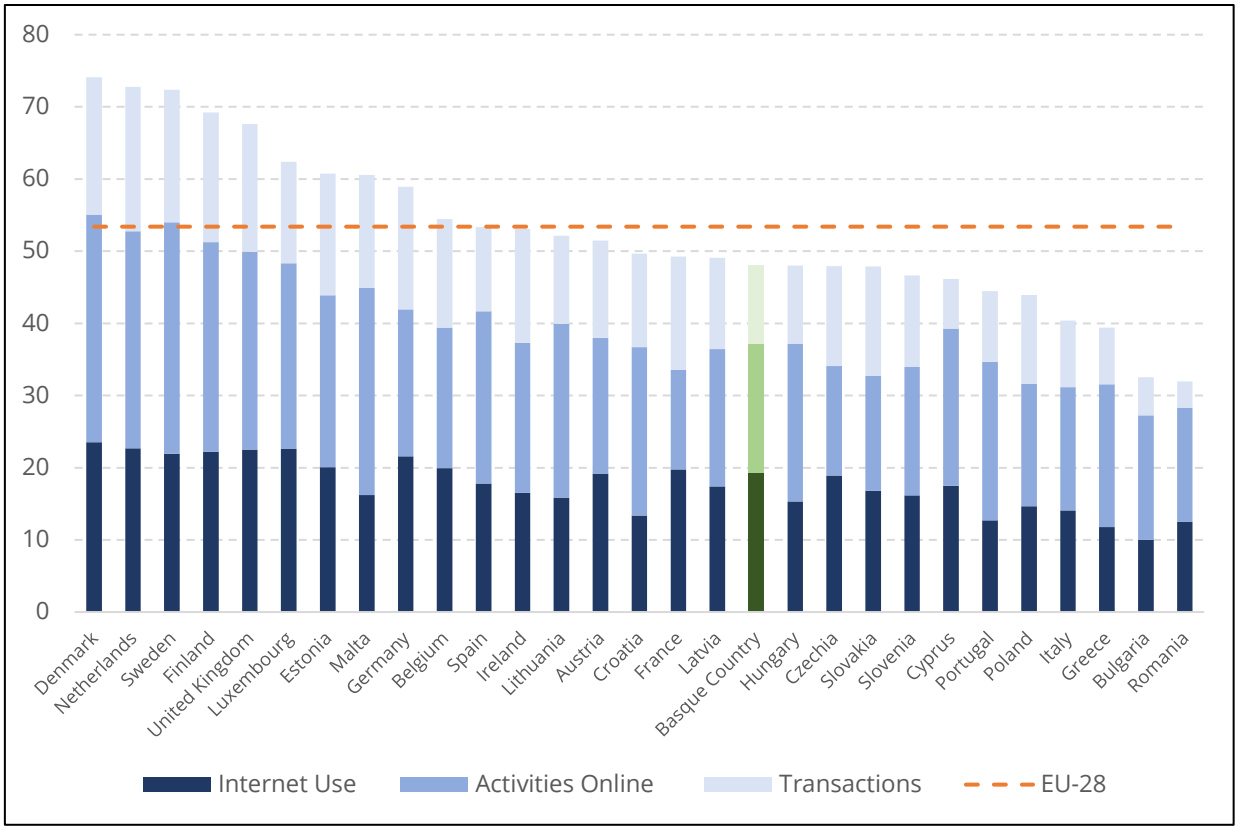
2.2.3 Use of Internet services

This dimension[4] includes three sub-dimensions that measure, from a generic to a more specific way, the use that citizens make of the Internet: use of the Internet, online activities and transactions.

In the use of Internet services at homes, the Basque Country is below the EU-28 average, with a value of 48.05% compared to 53.40%. This leads him to occupy position 18, so it is the dimension in which the Basque Country holds its most backward position. Among the leading countries, Denmark (74.09%), Holland (72.75%) and Sweden (72.36%) stand out.

[4] Five new indicators have been incorporated into dimension 3: people who never used the Internet (3.a.1), professional social networks (3.b.6), online courses (3.b.7), online consultations and voting (3.b.8) and online sales (3.c.3).
For more information, see *5. Methodological note* and *6.1 Indicators and DESI definitions*.

Graph 5 Use of Internet Services (%)



Source: EUSTAT, INE

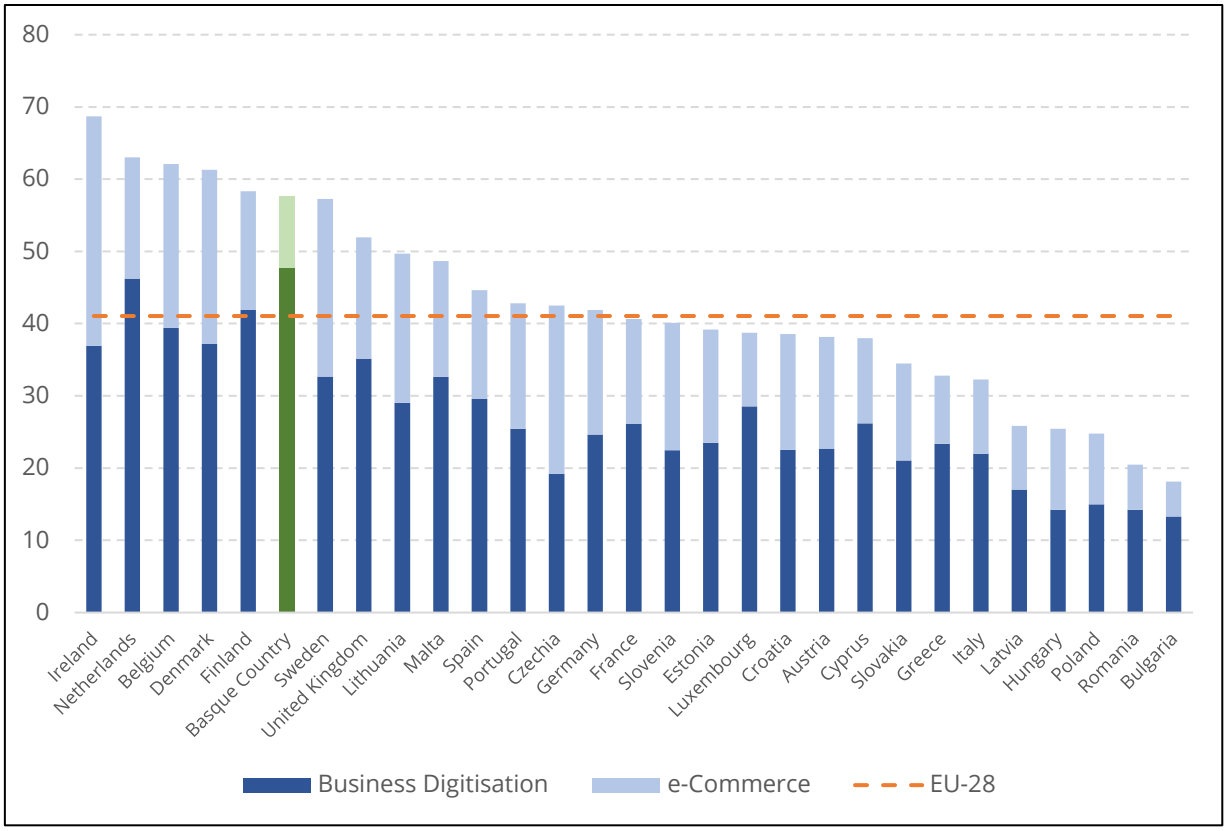
2.2.4 Integration of digital technology

This dimension[5] includes two sub-dimensions: digitalisation of business and e-Commerce. The first considers the use of a number of technologies in companies and the second is related, more specifically, to the online sales of SMEs. This is the fourth dimension in terms of the position occupied by the Basque Country.

As regards to the integration of digital technology in companies, the Basque Country reaches a value of 57.68%, holding the sixth position, with an important advantage over the European average of 41.05%. Ireland (68.71%), Holland (63.00%) and Belgium (62.11%) are the countries that acquire the highest levels of technological integration.

[5] In dimension 4 big data indicator has been included (4.a.3).
For more information, see *5. Methodological note* and *6.1 DESI indicators and definitions*.

Graph 6 Integration of Digital Technology (%)



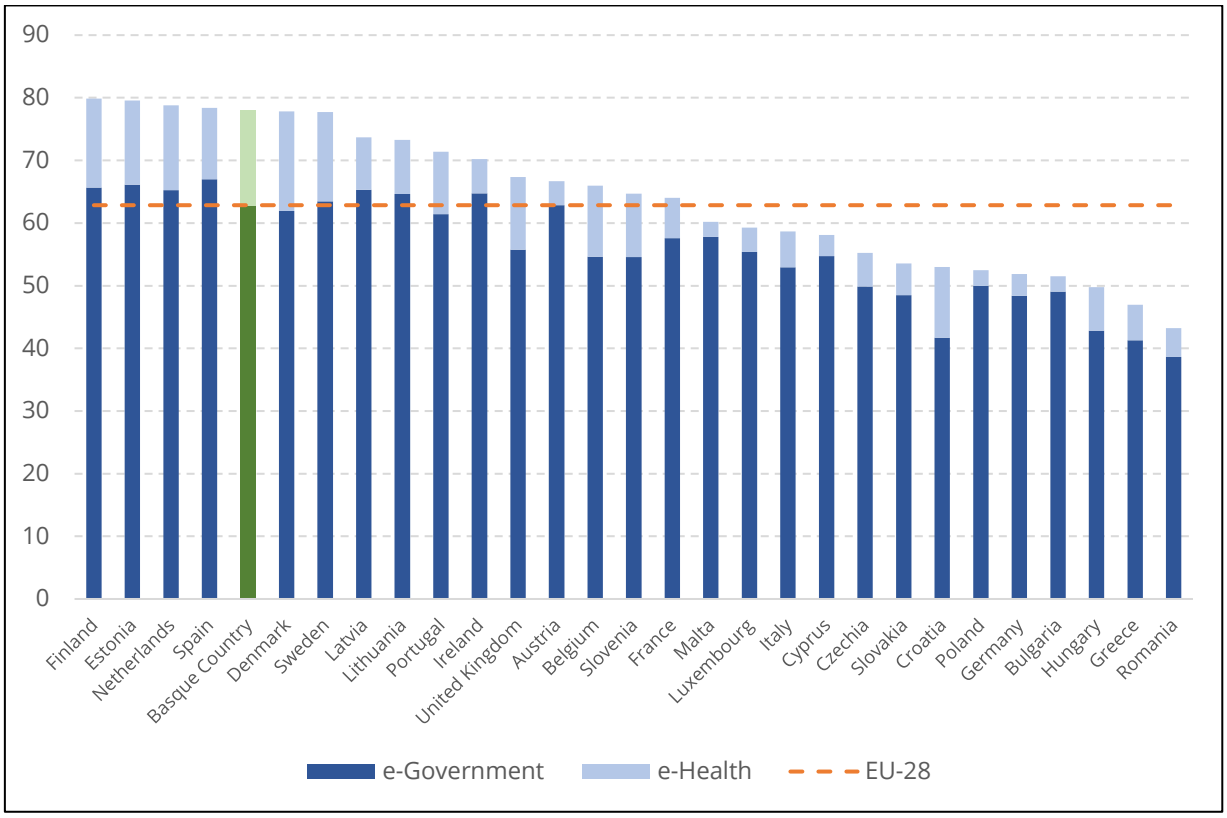
Source: EUSTAT, INE

2.2.5 Digital public services

The digitalisation of Public Administrations[6] considers two sub-dimensions, which are e-Government and e-Health. This is the second dimension in which the Basque Country occupies its highest position.

Overall, digital public services in the Basque Country have an advanced level with respect to the EU-28 average, 77.96% versus 62.86%, which allows it to obtain the fifth rank. The countries that are ahead are Finland (79.87%), Estonia (79.54%), Holland (78.81%) and Spain (78.40%).

Graph 7 Digital Public Services (%)



Source: INE, author's calculations

2.3 Sub-dimensions and indicators

In the following sections the sub-dimensions and indicators of each of the dimensions are presented. The analysis includes both the value of the sub-dimension or indicator for the Basque Country and the position it ranks, as well as the corresponding values for Spain, the country with the best result and the EU-28.

2.3.1 Connectivity

All broadband sub-dimensions have two indicators that measure both the coverage and the adoption of each of these technologies. A third indicator has been included in the mobile broadband dimension that represents the amount of spectrum allocated and prepared to make use of the 5G network at the end of 2020. Regarding the price index, as in previous years, it includes only one indicator that measures the percentage of household income needed to afford a broadband connection.

[6] In dimension 5 there are two new e-Health indicators: exchange of medical data (5.b.2) and electronic prescription (5.b.3). For more information, see *5. Methodological note* and *6.1 DESI indicators and definitions*.

Table 1 presents the values and positions of each of the sub-dimensions of the connectivity dimension.

Table 1 Connectivity sub-dimensions comparative

Dimension 1 – Connectivity	Basque Country		Spain	Leader	EU-28
	Value	Position			
1.a – Fixed broadband	88.71	3	69.39	97.26	69.95
1.b – Mobile broadband	67.90	5	60.30	90.13	55.10
1.c – Fast broadband	81.92	4	71.12	87.96	61.87
1.d – Ultrafast broadband	61.68	6	58.66	69.00	39.91
1.e – Broadband price index	80.79	21	76.31	94.08	87.21

Source: Author's calculations

In line with the good result in connectivity, the sub-dimensions also show that in all types of technology analysed, the Basque Country is among the top positions. Only in the broadband price indicator does it fail to reach the EU-28 average.

The contribution of each of the sub-dimensions is as follows: 18.5%, 35%, 18.5%, 18.5% and 9.5%.

Table 2 presents the results of the indicators of the five connectivity sub-dimensions[7].

Table 2 Connectivity indicators comparative

	Basque Country		Spain	Leader	EU-28
	Value	Position			
Sub-dimension 1.a – Fixed Broadband					
1.a.1 – Fixed broadband coverage	99.22	11	96.06	100	96.68
1.a.2 – Fixed broadband take-up	90.27	3	77.27	97.26	76.58
Sub-dimension 1.b – Mobile Broadband					
1.b.1 – Mobile broadband coverage	99.89	1	93.68	99.89	94.26
1.b.2 – Mobile broadband take-up	117.28	8	96.53	162.56	95.99
1.b.3 – 5G readiness[8]	30.00	8	30.00	66.67	14.25
Sub-dimension 1.c – Fast Broadband					
1.c.1 – Fast broadband coverage	95.11	8	88.19	99.95	83.15
1.c.2 – Fast broadband take-up	68.73	2	54.06	76.13	40.60
Sub-dimension 1.d – Ultrafast Broadband					
1.d.1 – Ultrafast broadband coverage	94.34	4	87.24	99.95	59.90
1.d.2 – Ultrafast broadband take-up	29.01	11	30.09	53.93	19.91
Sub-dimension 1.e – Broadband Price Index					
1.e.1 – Broadband price index	80.79	21	76.31	94.08	87.21

Source: Author's calculations

The Basque Country is a leader in mobile broadband coverage and also stands out in the fixed and fast broadband (speed greater than or equal to 30 Mbps) take-up, as well as ultra-fast broadband coverage (speed greater than or equal to 100 Mbps). In all indicators it has values higher than those of the EU-28 average, except for the price index.

[7] To obtain the take-up indicators, estimations have been made based on data related to Spain.
[8] Same data as Spain since tenders are held at national level.

2.3.2 Human capital

Two sub-dimensions shape the analysis of human capital: Internet user skills and advanced skills and development. Both contribute to the same extent to the dimension.

Table 3 presents the values and positions of these two sub-dimensions.

Table 3 Human capital sub-dimensions comparative

Dimension 2 – Human Capital	Basque Country		Spain	Leader	EU-28
	Value	Position			
2.a – Internet user skills	52.58	18	53.51	85.35	54.81
2.b – Advanced skills and development	63.99	4	35.48	81.66	41.21

Source: Author's calculations

Both sub-dimensions include three indicators that measure on the one hand the digital competences of citizens in general and, on the other, those of the workforce. The fourth position of the Basque Country in advanced skills is to be highlighted. In the case of Internet user skills, the result is not so positive, being below the EU-28 average.

Table 4 shows the results of the human capital indicators.

Table 4 Human capital indicators comparative

	Basque Country		Spain	Leader	EU-28
	Value	Position			
Sub-dimension 2.a – Internet User Skills					
2.a.1 – At least basic digital skills	63.39	9	54.77	85.18	57.19
2.a.2 – Above basic digital skills	31.05	14	31.61	55.25	31.19
2.a.3 – At least basic software skills	47.29	25	57.88	87.15	60.00
Sub-dimension 2.b – Advanced Skills and Development					
2.b.1 – ICT specialists[9]	2.43	23	2.90	6.80	3.70
2.b.2 – Female ICT specialists	1.27	16	1.04	3.07	1.38
2.b.3 – ICT graduates	12.55	1	3.90	12.55	3.97

Source: Author's calculations

The first two indicators of user skills refer, at different levels (basic or above basic), to digital skills related to information, communication, problem solving or the use of a "software" for the creation of contents, such as the use of word processors, spreadsheets, the creation of presentations or documents that integrate texts, drawings, tables or graphics, or programming language. The results shown are very different; while, in the case of general skills of basic or higher level, the position of the Basque Country is correct and the value is above the average of the EU-28, in those related to "software", for the same level , the value is noticeably lower than the average and the position, more backwards. In the case of higher level skills, the rank of the Basque Country is intermediate, for a value just below the EU-28 average.

This uneven behaviour can also be seen in the indicators of advanced skills and development: with ICT graduates, the Basque Country holds the first place in the ranking, but this is not the case with the ICT specialist

[9] Information and Communication Technologies.

employees, who are below the average of the EU-28. In the case of female ICT specialists, the results are somewhat better in positional terms.

2.3.3 Use of Internet services

The measurement of Internet use by households is based on generic indicators and a selection of available online services that fall into three sub-dimensions: Internet use, online activities and transactions. The one that contributes with greater weight in the dimension is the activities one (50%) while the other two share 25% each.

Table 5 presents the values and ranks of the three sub-dimensions included in the dimension of use of Internet services in households.

Table 5 Use of Internet services sub-dimensions comparative

Dimension 3 – Use of Internet Services	Basque Country		Spain	Leader	EU-28
	Value	Position			
3.a – Internet use	77.32	11	71.26	94.17	73.43
3.b – Online activities	35.75	21	47.75	64.17	41.72
3.c – Transactions	43.40	22	46.64	79.90	56.72

Source: Author's calculations

The Internet usage sub-dimension consists of two indicators that measure both the proportion of regular users and non-Internet users. The second sub-dimension refers to online activities and is the largest in terms of number of indicators, adding up eight. This sub-dimension includes activities of various types, from leisure, communication, social interaction, etc. Finally, a last sub-dimension measures some of the transactions that can be carried out on the Internet such as the purchase and sale of goods and services or electronic banking.

The Basque Country is above the EU-28 average only in the first sub-dimension. Both in the use of the Internet for online activities and for transactions, it occupies relegated positions.

The indicators that measure the use of the Internet are detailed below[10].

[10] Indicator 3.a.1 is inverse, that is, the lower, the better.

Table 6 Use of Internet services indicators comparative

	Basque Country		Spain	Leader	EU-28
	Value	Position			
Sub-dimension 3.a – Internet Use					
3.a.1 – People who never used the Internet	10.25	13	12.75	1.67	11.25
3.a.2 – Internet users	86.45	10	82.51	95.23	83.12
Sub-dimension 3.b – Online Activities					
3.b.1 – News	66.51	25	77.50	93.02	72.50
3.b.2 – Music, videos and games	54.34	29	85.61	93.55	80.60
3.b.3 – Video on demand	30.70	10	39.36	60.66	31.07
3.b.4 – Video calls	20.82	29	38.15	83.20	49.15
3.b.5 – Social networks	54.40	28	67.42	85.97	65.42
3.b.6 – Professional social networks	15.50	15	16.48	35.58	15.36
3.b.7 – Online courses	26.58	1	14.75	26.58	8.79
3.b.8 – Online consultations and voting	13.60	8	13.26	32.86	10.28
Sub-dimension 3.c – Transactions					
3.c.1 – Online banking	55.59	20	56.51	93.98	63.68
3.c.2 – Shopping online	63.92	16	61.54	87.22	68.73
3.c.3 – Selling online	6.41	26	13.11	37.09	22.65

Source: Author's calculations

The dimension related to the use of Internet services is the weakest for the Basque Country and this is reflected in most of the indicators that make up the dimension. Of the thirteen indicators, only three have values above the EU-28 average. The online courses indicator stands out, as the Basque Country occupies the first rank and with a wide margin compared to the average. The worst results in terms of positions are in music, videos and games, video calls and social networks.

2.3.4 Integration of digital technology

The integration of digital technology dimension is broken down into two sub-dimensions, one related to the degree of the existing digitalisation in companies and another one at the level of SMEs online commerce. The first has four indicators and a relative weight on the dimension of 60% and the second one consists of three indicators and contributes to 40%.

Table 7 shows the values and positions of the Basque Country in each of these sub-dimensions.

Table 7 Integration of digital technology sub-dimensions comparative

Dimension 4 – Integration of Digital Technology	Basque Country		Spain	Leader	EU-28
	Value	Position			
4.a – Business digitisation	79.57	1	49.38	79.57	42.99
4.b – e-Commerce	24.84	24	37.55	79.47	38.15

Source: Author's calculations

The Basque Country is a leader in business digitalisation, occupying the first position of the ranking. On the other hand, the degree of e-commerce of Basque SMEs could be improved, since it currently reaches only the twenty-fourth place.

Table 8 offers the results at the level of indicators.

Table 8 Integration of digital technology indicators comparative

	Basque Country		Spain	Leader	EU-28
	Value	Position			
Sub-dimension 4.a – Business Digitisation					
4.a.1 – Electronic information sharing	62.50	1	45.97	62.50	33.75
4.a.2 – Social media	43.60	1	27.87	43.60	21.42
4.a.3 – Big data	20.30	4	10.72	24.40	12.26
4.a.4 – Cloud	32.70	6	16.32	50.24	17.85
Sub-dimension 4.b – e-Commerce					
4.b.1 – SMEs selling online	11.40	24	18.20	30.77	16.57
4.b.2 – e-Commerce turnover	5.40	20	9.61	25.99	10.13
4.b.3 – Selling online cross-border	5.90	23	7.09	16.80	8.38

Source: Author's calculations

The analysis of technology implementation indicators in companies reflects the same contrast detected at the level of sub-dimensions. On the one hand, in the four indicators of business digitalisation the Basque Country is among the leading positions in all of them, with two highlighted first ranks in the electronic information exchange (ERP) and in the use of social media (at least two of them). On the opposite, the proportion of Basque SMEs that conduct electronic commerce at national and international level is lower than the EU-28 average, which is reflected in a low turnover for this type of sales.

2.3.5 Digital public services

The two sub-dimensions considered in the digitalisation of public services have to do with the Administration and with health. While the services of the Administration have a weight of 80% in the dimension, those of health contribute with the remaining 20%.

Table 9 shows the values and positions for these two sub-dimensions.

Table 9 Digital public services sub-dimensions comparative

Dimension 5 – Digital Public Services	Basque Country		Spain	Leader	EU-28
	Value	Position			
5.a – e-Government	78.44	10	83.75	83.75	69.32
5.b – e-Health	76.03	2	57.00	79.33	37.00

Source: Author's calculations

The services available electronically from the Public Administrations of the Basque Country show correct levels, almost ten points above the EU-28 average, in the tenth position, in the case of certain general services, and more than twice as many the average, in the second position, in the case of specific health services.

Table 10 below details the electronic government and health indicators[11].

[11] The questionnaire used for the preparation of indicator 5.a.5 has changed compared to last year.
Indicator 5.b.1 has been estimated from data of Spain.
For more information see *5. Methodological note*.

Table 10 Digital public services indicators comparative

	Basque Country		Spain	Leader	EU-28
	Value	Position			
Sub-dimension 5.a – e-Government					
5.a.1 – e-Government users	73.51	12	75.69	93.14	64.27
5.a.2 – Pre-filled forms	78.99	9	73.57	100	57.91
5.a.3 – Online service completion	91.49	12	94.63	100	87.41
5.a.4 – Digital public services for business	93.50	7	93.17	100	85.14
5.a.5 – Open data	62.00	18	87.00	88.00	64.00
Sub-dimension 5.b – e-Health					
5.b.1 – e-Health	28.09	6	29.00	49.00	18.00
5.b.2 – Medical data exchange	100	1	68.00	100	43.00
5.b.3 – e-Prescription	100	1	74.00	100	50.00

Source: Author's calculations

The sub-dimension related to electronic government reflects good results, even without occupying leading positions. For several indicators there are leading countries that reach 100%, and although it is not the case of the Basque Country, their results are above those of the EU-28 average. The exception is found in the open data indicator, two percentage points lower than the average.

The sub-dimension focused on health services has very remarkable values, especially in the exchange of medical data and electronic prescription, where it reaches 100% and positions itself as a leader.

2.4 Analysis of results

The 2019 DESI allows the Basque Country to obtain a fifth place within the EU-28 group of countries, with a wide margin with respect to the average.

The Basque Country stands out with its position of leader in connectivity. This position is supported by very positive results in mobile broadband coverage and in fixed and fast broadband take-up. All indicators are above the EU-28 average except for the one related to the price of broadband.

In human capital, the Basque Country occupies a notable eighth position but that translates into disparate results regarding the type of skills analysed. Thus, in the field of skills that go beyond those of the Internet user, the Basque Country shows intermediate levels, while in the field of ICT skills there is some advantage. However, in this last point it is convenient to distinguish between the educational and labour framework; the Basque Country stands out as a leader only in the case of ICT graduates.

The use of Internet services at home is where the Basque Country obtains the lowest result (eighteenth), which represents a position below the EU-28 average. In general, the use of the Internet by citizens, measured both from those who are regular users and from those who have never used the Internet, is correct. However, in most of the online activities and transactions contemplated, the use of the Internet by Basque households is lower than the EU-28 average.

In the field of business, the Basque Country is positioned as a leader in business digitisation, in a dimension in which it occupies the sixth position. However, in the case of SMEs, this incorporation of technology is not transferred to their electronic sales activities (nationally and internationally), reflecting a low proportion of revenues from electronic commerce.

The dimension of digital public services ranks the Basque Country in fifth position, leading aspects of health such as the exchange of medical data or the electronic prescription. The offer of services by the electronic government, both for citizens and businesses, is high. The only caveat is in the open data available by the Administration, which shows opportunities for improvement.

2.5 2017-2019 DESI evolution in the Basque Country

In this section, the temporal progression of DESI and its components in the last three years is analysed in detail. In order to compare each of the indicators, a homogenization work has been carried out, both on the methodology applied and on the sources used. In this sense, as noted in the 2018 DESI report, the methodological changes incorporated each year represent a recalculation of the DESI of previous years, so the final values of the DESI 2017 and DESI 2018 presented in the following table do not coincide with those obtained last year.

Below are the results of the DESI for years 2017, 2018 and 2019, both at the level of values and positions and at their respective variations.

Table 11 DESI comparative analysis (2017-2019)

	Value					Position				
	2019	2018	2017	Δ 18-19	Δ 17-18	2019	2018	2017	Δ 18-19	Δ 17-18
DESI	**63.61**	**60.35**	**58.45**	**5.41**	**3.24**	**5**	**5**	**5**	=	=
Dimension 1 - Connectivity	**74.42**	**68.62**	**65.60**	**8.45**	**4.60**	**1**	**3**	**3**	**2**	=
Sub-dimension 1.a - Fixed broadband	**88.71**	**86.22**	**81.02**	**2.89**	**6.42**	**3**	**4**	**5**	**1**	**1**
1.a.1 - Fixed broadband coverage	99.22	99.10	98.80	0.12	0.30	11	11	12	=	1
1.a.2 - Fixed broadband take-up	90.27	88.02	83.42	2.56	5.51	3	4	6	1	2
Sub-dimension 1.b - Mobile broadband	**67.90**	**57.13**	**56.89**	**18.86**	**0.42**	**5**	**7**	**4**	**2**	**-3**
1.b.1 - Mobile broadband coverage	99.89	99.00	97.90	0.90	1.12	1	3	2	2	-1
1.b.2 - Mobile broadband take-up	117.28	115.48	115.96	1.56	-0.41	8	7	5	-1	-2
1.b.3 - 5G readiness	30.00	-	-	-	-	8	-	-	-	-
Sub-dimension 1.c - Fast broadband	**81.92**	**76.75**	**68.71**	**6.74**	**11.69**	**4**	**3**	**5**	**-1**	**2**
1.c.1 - Fast broadband coverage	95.11	94.50	92.50	0.65	2.16	8	6	6	-2	=
1.c.2 - Fast broadband take-up	68.73	58.99	44.92	16.51	31.32	2	3	6	1	3
Sub-dimension 1.d - Ultrafast broadband	**61.68**	**59.14**	**58.12**	**4.30**	**1.75**	**6**	**5**	**4**	**-1**	**-1**
1.d.1 - Ultrafast broadband coverage	94.34	93.60	91.70	0.79	2.07	4	3	3	-1	=
1.d.2 - Ultrafast broadband take-up	29.01	24.67	24.54	17.59	0.53	11	9	7	-2	-2
Sub-dimension 1.e - Broadband price index	**80.79**	**79.30**	**76.20**	**1.88**	**4.07**	**21**	**21**	**21**	=	=

1.e.1 - Broadband price index	80.79	79.30	76.20	1.88	4.07	21	21	21	=	=
Dimension 2 - Human Capital	**58.28**	**58.38**	**58.75**	**-0.17**	**-0.62**	**8**	**7**	**6**	**-1**	**-1**
Sub-dimension 2.a - Internet User Skills [12]	**52.58**	**52.58**	**53.20**	**0.00**	**-1.17**	**18**	**18**	**12**	**=**	**-6**
2.a.1 - At least basic digital skills	63.39	63.39	65.87	0.00	-3.76	9	9	8	=	-1
2.a.2 - Above basic digital skills	31.05	31.05	30.32	0.00	2.41	14	14	14	=	=
2.a.3 - At least basic software skills	47.29	47.29	47.78	0.00	-1.03	25	25	24	=	-1
Sub-dimension 2.b - Advanced Skills and Development	**63.99**	**64.19**	**64.30**	**-0.31**	**-0,17**	**4**	**3**	**2**	**-1**	**-1**
2.b.1 - ICT specialists[13]	2.43	2.43	2.12	0.00	14.62	23	24	26	1	2
2.b.2 - Female ICT specialists [14]	1.27	1.27	1.10	0.00	15.45	16	15	17	-1	2
2.b.3 - ICT graduates	12.55	12.61	13.51	-0.48	-6.66	1	1	1	=	=
Dimension 3 - Use of Internet Services	**48.05**	**45.28**	**44.21**	**6.12**	**2.43**	**18**	**20**	**19**	**2**	**-1**
Sub-dimension 3.a - Internet Use	**77.32**	**69.45**	**68.90**	**11.33**	**0.80**	**11**	**13**	**12**	**2**	**-1**
3.a.1 - People who never used the Internet	10.25	13.90	14.26	-26.26	-2.52	13	13	13	=	=
3.a.2 - Internet users	86.45	81.87	81.69	5.59	0.22	10	12	12	2	=
Sub-dimension 3.b - Online Activities	**35.75**	**34.41**	**32.99**	**3.89**	**4.30**	**21**	**20**	**20**	**-1**	**=**
3.b.1 - News	66.51	61.96	66.25	7.34	-6.48	25	27	21	2	-6
3.b.2 - Music. videos and games	54.34	50.90	59.27	6.76	-14.12	29	29	29	=	=
3.b.3 - Video on demand[15]	30.70	20.60	20.60	49.03	0.00	10	12	12	2	=
3.b.4 - Video calls	20.82	18.03	15.42	15.47	16.93	29	29	29	=	=
3.b.5 - Social Networks	54.40	55.69	59.42	-2.32	-6.28	28	28	24	=	-4
3.b.6 - Professional social networks[16]	15.50	15.50	11.70	0.00	32.48	15	15	16	=	1
3.b.7 - Online courses	26.58	31.91	21.80	-16.70	46.38	1	1	1	=	=
3.b.8 - Online consultations and voting[17]	13.60	13.60	15.90	0.00	-14.47	8	8	3	=	-5
Sub-dimension 3.c - Transactions	**43.40**	**42.87**	**41.96**	**1.24**	**2.16**	**22**	**22**	**22**	**=**	**=**

[12] Sub-dimension 2.a indicators do not vary between 2018 and 2019 due to the lack of updated published data.

[13] and [14] No updated data are available for 2019.
[15] No updated data are available for 2018.
[16] No updated data are available for 2019.
[17] No updated data are available for 2019.

3.c.1 - Online banking	55.59	52.25	52.32	6.39	-0.13	20	20	21	=	1
3.c.2 - Shopping online	63.92	60.72	64.02	5.27	-5.15	16	16	14	=	-2
3.c.3 - Selling online	6.41	9.38	5.73	-31.66	63.70	26	24	27	-2	3
Dimension 4 - Integration of Digital Technology	**57.68**	**54.55**	**49.43**	**5.74**	**10.35**	**6**	**6**	**7**	**=**	**1**
Sub-dimension 4.a - Business Digitisation	**79.57**	**76.24**	**68.30**	**4.37**	**11.63**	**1**	**1**	**1**	**=**	**=**
4.a.1- Electronic information sharing	62.50	63.30	60.20	-1.26	5.15	1	1	1	=	=
4.a.2 - Social Media	43.60	41.30	35.50	5.57	16.34	1	2	4	1	2
4.a.3 - Big Data	20.30	18.50	15.40	9.73	20.13	4	3	4	-1	1
4.a.4 - Cloud	32.70	30.40	27.60	7.57	10.14	6	3	5	-3	2
Sub-dimension 4.b - e-Commerce	**24.84**	**22.00**	**21.13**	**12.87**	**4.14**	**24**	**25**	**24**	**1**	**-1**
4.b.1 - SMEs selling online	11.40	10.60	10.20	7.55	3.92	24	23	22	-1	-1
4.b.2 - e-Commerce turnover	5.40	4.98	4.78	8.43	4.18	20	24	23	4	-1
4.b.3 - Selling online cross-border	5.90	4.70	4.50	25.53	4.44	23	25	23	2	-2
Dimension 5 - Digital Public Services	**77.96**	**72.64**	**72.33**	**7.31**	**0.44**	**5**	**7**	**5**	**2**	**-2**
Sub-dimension 5.a - e-Government	**78.44**	**71.73**	**71.34**	**9.35**	**0.56**	**10**	**12**	**9**	**2**	**-3**
5.a.1 - e-Government users	73.51	59.87	69.60	22.78	-13.98	12	15	10	3	-5
5.a.2 - Pre-filled forms	78.99	72.63	71.40	8.76	1.72	9	9	8	=	-1
5.a.3 - Online service completion	91.49	87.57	86.10	4.48	1.71	12	16	14	4	-2
5.a.4 - Digital public services for business	93.50	93.50	87.37	0.00	7.02	7	5	13	-2	8
5.a.5 - Open data[18]	62.00	55.01	54.64	12.71	0.68	18	12	7	-6	-5
Sub-dimension 5.b - e-Health	**76.03**	**76.29**	**76.29**	**-0.34**	**0.00**	**2**	**2**	**2**	**=**	**=**
5.b.1 - e-Health	28.09	28.87	28.87	-2.70	0.00	6	6	6	=	=
5.b.2 - Medical data exchange[19]	100	100	100	0.00	0.00	1	1	1	=	=
5.b.3 - e-Prescription[20]	100	100	100	0.00	0.00	1	1	1	=	=

Source: Author's calculations

The analysis of the temporal evolution of the DESI index is baes on a comparative of the last three years. As indicated above, the DESI methodological changes entail an update of the index of previous years so that this temporary comparative is possible. Two periods are thus established: 2017-2018 and 2018-2019, for which the

[18] Data for 2017 and 2018 estimated based on the data update from other countries.
[19] and [20] As these are new indicators, it has not been possible to obtain data for 2017 and 2018, so 2019 data is taken.

percentage of evolution of the values of indicators, sub-dimensions, dimensions and final index is calculated, as well as their position variations.

The evolution of the DESI index shows a growing sign over the three years, with a higher speed of progress in the third year compared to the previous year, from 58.45% in 2017 to 60.35% in 2018 and finally to 63.61% in 2019. However, this has not been enough to improve positions, so it maintains, continuously, the fifth place.

A comparative between dimensions shows that, out of the total of five, four of them grow. Of those four, only the digital technology integration dimension does so at a lower percentage in the last period, so it does not improve position. The remaining ones have a greater growth in 2019 than in 2018, which allows them to be two ranks ahead compared to the previous year. The exception to this trend happens in the human capital dimension, which shows decreases and loss of position in both periods, although the decline is smaller in the second one. In this regard, it is pertinent to note that there is no updated data between 2018 and 2019 for the sub-dimension of Internet user skills indicators as well as for the ICT specialists indicators of the advanced skills and development sub-dimension, so it has not been possible to analyse the real evolution of these sub-dimensions.

Of all the dimensions of the DESI of the Basque Country, connectivity is the one that grows the most in 2019 and does so in a higher percentage than in 2018 (8.45% vs. 4.60%). The rise of positions of the whole dimension until reaching the first place, two positions in advance with respect to the previous years, should be noted. The sub-dimensions also show growth, although not in all cases these are higher in 2019 than in the previous year. The positions, on the other hand, offer more disparate results: while in fixed and mobile broadband one and two positions are improved respectively, in fast and ultra-fast broadband one position in each is lost. In the case of the price index there are no changes. As for the indicators, of the ten that exist in connectivity, all with positive growth, only the fixed and fast broadband take-up and mobile broadband coverage have improved positions. On the other hand, there are two indicators with a successive loss of positions: mobile and ultra-fast broadband take-up.

The human capital dimension is the only one that shows decreases in the two periods, although the decrease is smaller between 2018 and 2019 (-0.17% and -0.62%). In each period the Basque Country has retreated one position. As mentioned above, it should be taken into account that for most indicators of this dimension there is no updated data for 2019, which limits the analysis of its evolution. On the other hand, the sub-dimension related to ICT skills decreases during the two periods and, in this case, more in the second one. This decrease is due to the lower number of graduates in ICT although the wide margin allows retaining the first rank. As for the ICT specialists, no updated data are available in 2019, but between 2018 and 2018 they grow, improving one position in the case of the specialists in general and losing another in regards to women specialists.

The use of Internet services evolves positively throughout the period. The overall dimension increases more in 2019 than in 2018 (6.12% and 2.43%) and rises two positions. At the level of sub-dimensions, although they all grow, only in the general use of Internet it improves two positions. In online activities and transactions, the position is lowered or remains the same. In the previous period, on the contrary, no position is improved within the sub-dimensions. At the indicators level, of the total of thirteen, eight increase, but only Internet users (which does not vary the previous year), news (which last year recedes six positions) and video on demand indicators (for this Indicator there is no updated data for 2018) improve their positions.

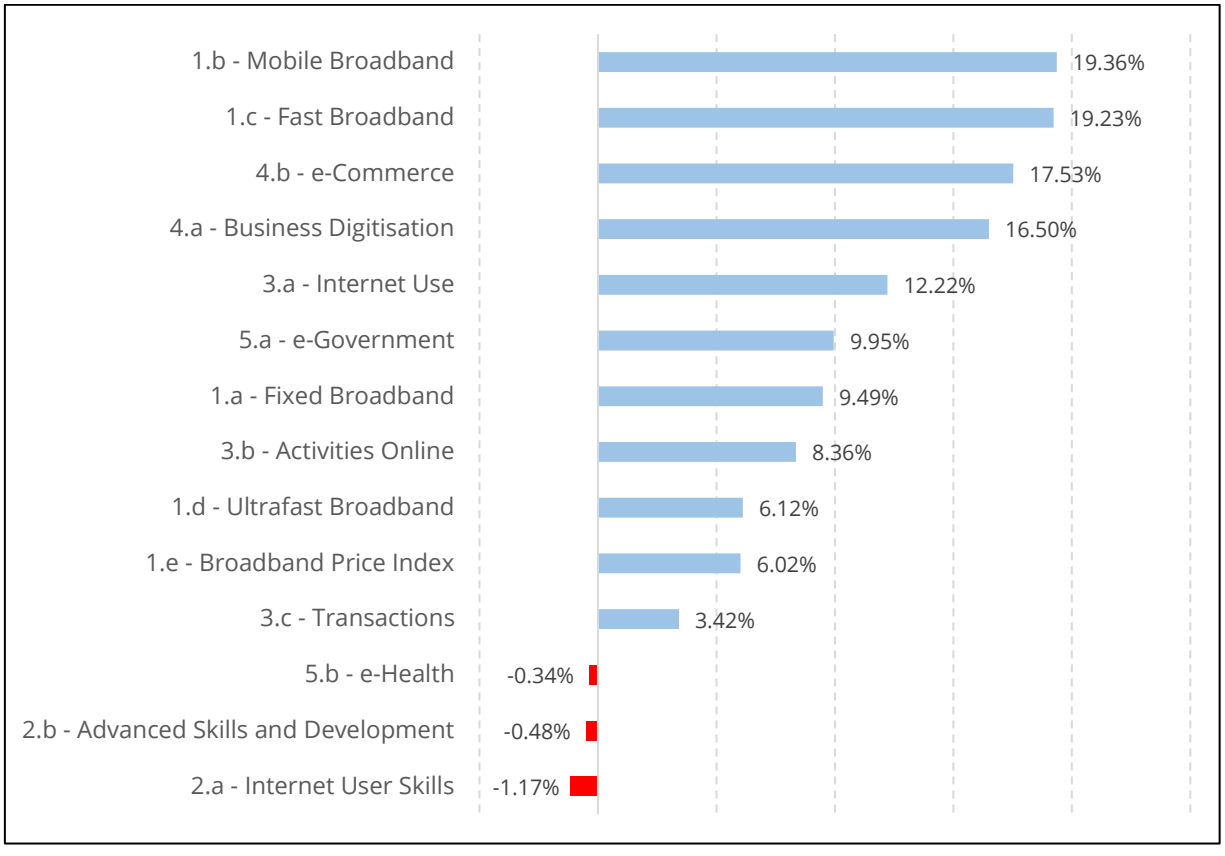
In the field of companies, growth results are again obtained for the period although, unlike the other dimensions, the increase is lower in 2019 (5.74% vs. 10.35%) and there is no change in rank. The same happens with the sub-dimension of business digitalisation, where the Basque Country maintains the first position. Only negative growth occurs in the electronic information exchange indicator, although, as for the sub-dimension,

the Basque Country remains in first rank. The new first position in social networks, despite a lower growth than the previous period, is also to be highlighted. In the case of electronic commerce, the higher growth is reflected in the improvement of one position, despite the fact that one indicator (SMEs that conduct electronic commerce) loses another one and does so for the second consecutive year. Those referring to turnover and cross-border sales grow with upgraded positions.

The dimension of digital public services is the second in terms of growth (7.31% and 0.44%), after connectivity. It is a much higher growth than the previous period, which allows it to recover the two positions lost then. In the sub-dimensions the behaviour is uneven amongst them: in the case of electronic government there is considerable growth and it rises two positions, however the electronic health decreases in the second period although it retains the second position. Four out of the eight indicators grow but it is convenient to specify that, for the new indicators (exchange of medical data and electronic prescription) it is not possible to obtain data from past years, so the latest data obtained is taken. Electronic health services decrease but the sixth position is maintained. Positions in digital public services for companies and open data are receded, in the latter case it is the second consecutive decline in positions despite the continued growth of the indicator.

Graph 8 shows the sub-dimensions with their respective growths or decreases in the period between 2017 and 2019.

Graph 8 Sub-dimensions evolution (2017-2019)



Source: Author's calculations

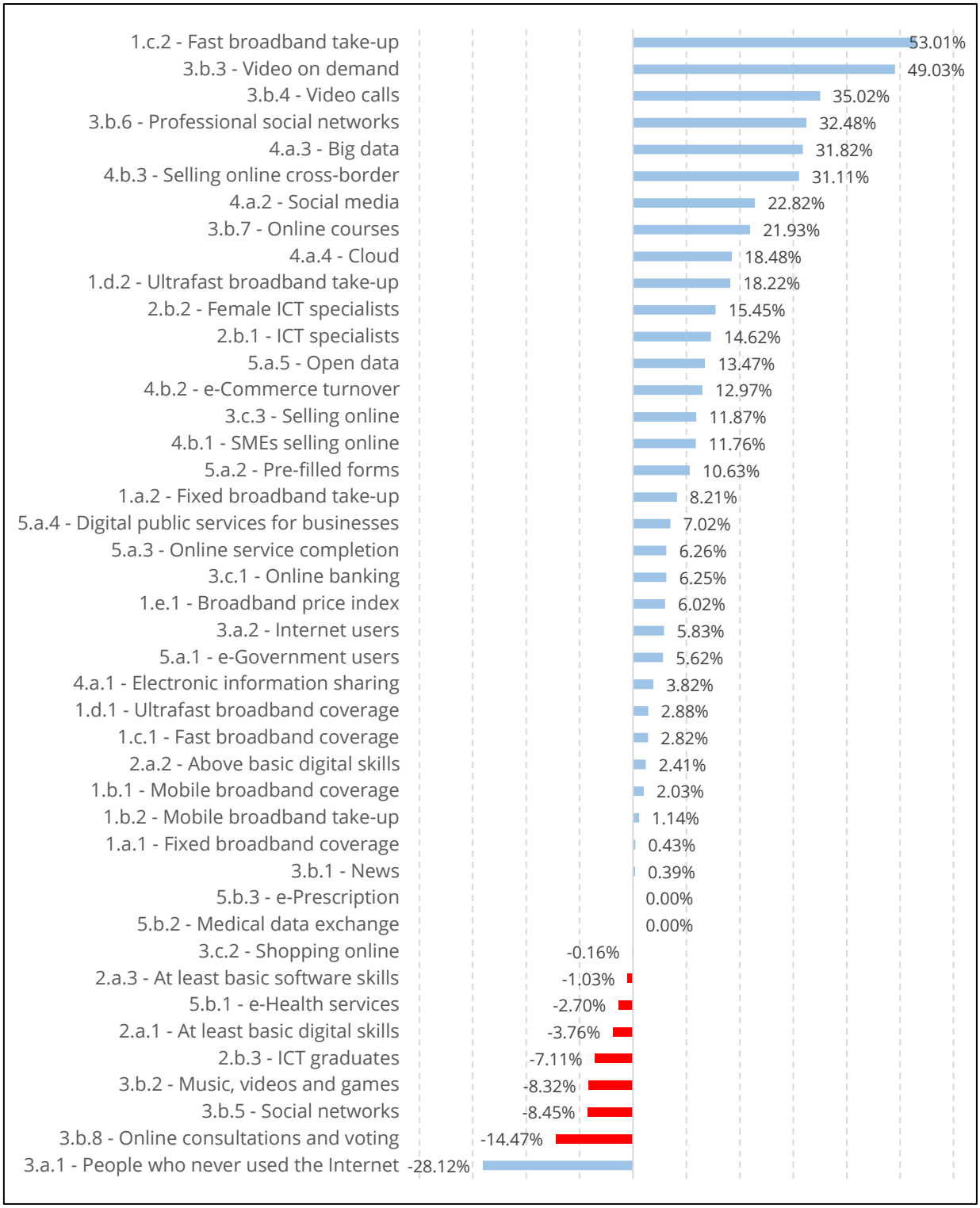
From the whole period perspective, the sub-dimensions with higher growing results belong to connectivity (mobile (19.36%) and fast (19.23%) broadband) and integration of digital technology in companies dimensions (e-Commerce (17.53%) and business digitisation (16.50%)). On the other hand, of the total fourteen sub-

dimensions, three decrease (e-Health (-0.34%), advanced skills and development (-0.48%) and Internet user skills (-1.17%)).

In Graph 9 shown below[21], in the case of the indicators, during the period between 2017 and 2019, from the forty-three indicators, eight decrease[22]. The ones with higher reductions are online consultations or voting (-14.47%), social networks (-8.45%) and music, videos and games (-8.32%), all of them belonging to the dimension related to the use of the Internet in households. At the other extreme, there are also indicators from this dimension such as video on demand (49.03%), video calls (35.02%) or professional social networks (32.48%). The fastest growing indicator in the period is fast broadband take-up (53.01%). There is no indicator from the connectivity dimension or the one related to the integration of technology that decreases.

[21] The new indicator "5G readiness" (1.b.3) is not taken into account in the evolution of indicators.
[22] "People who never used the Internet" indicator goes in the opposite direction, so a decrease implies an evolution of the indicator in a positive sense.

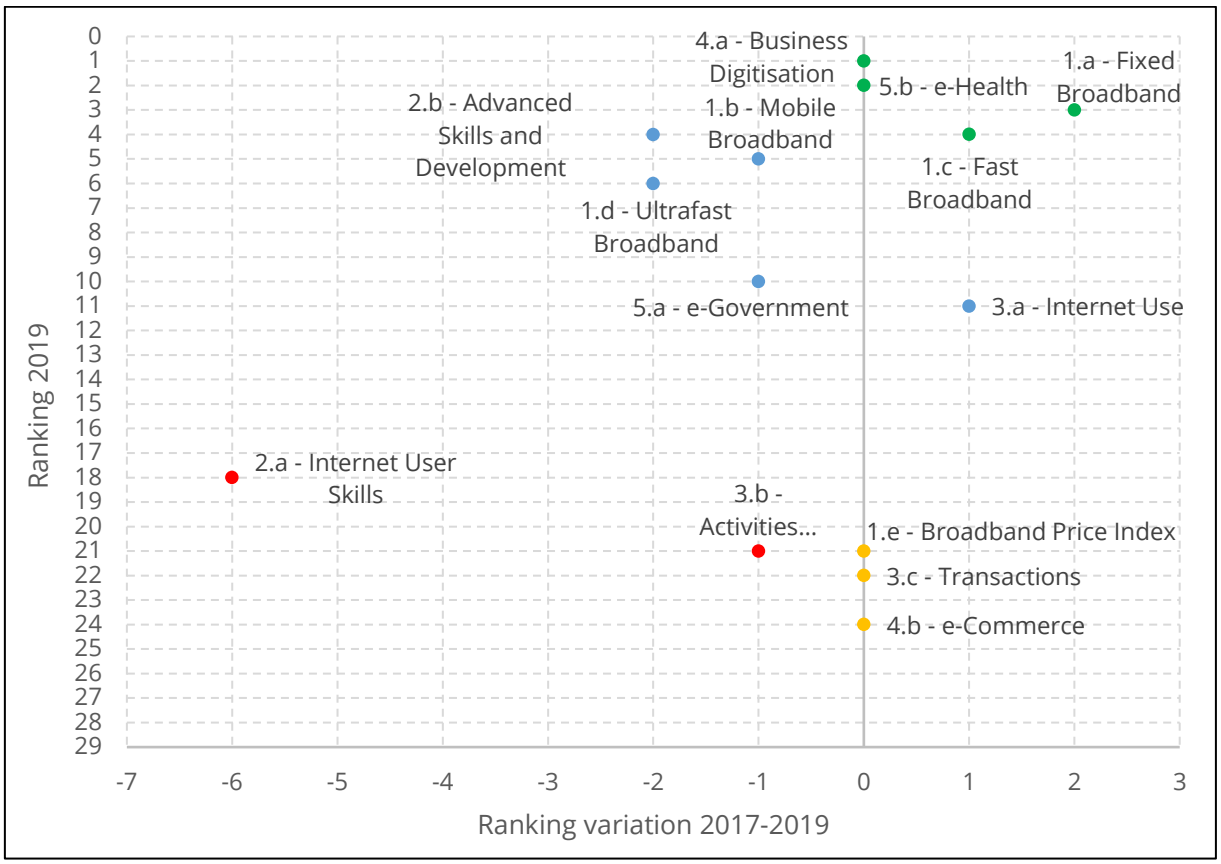
Graph 9 Indicators evolution (2017-2019)



Source: Author's calculations

The following chart compares the sub-dimensions through their position in the year 2019 and their value evolution during the period 2017-2019. The horizontal axis represents the rise, fall or maintenance of positions and the vertical one, the current position.

Graph 10 Sub-dimensions ranking evolution (2017-2019)



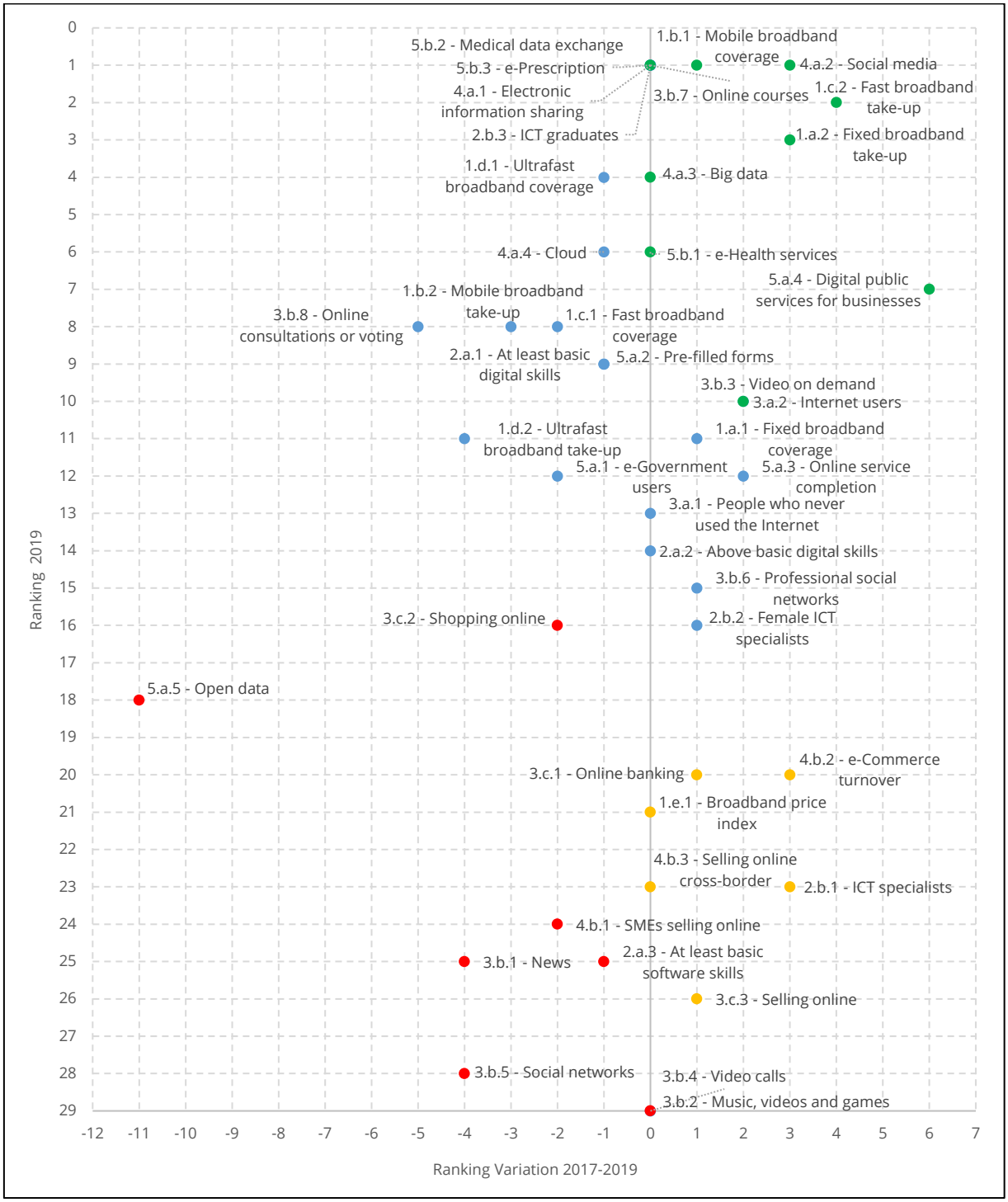
Source: Author's calculations

It is possible to establish four different groups; first, there are some sub-dimensions in the upper right quadrant. These sub-dimensions have high or relatively high positions and also improve their positions, as it is the case for fixed and fast broadband. In other cases, they maintain those leading positions, such as business digitisation or e-Health. Secondly, also at the top, but to the left of the graph, there are sub-dimensions that recede in the period although they retain correct positions (advanced skills and development, mobile and ultra-fast broadband and e-Government). In this left part of the graph, but below, there are two sub-dimensions with lagging positions which, in addition, fall into the ranking (Internet user skills, which loses six positions, and online activities, which loses one). Finally, below and in the centre are three sub-dimensions

with the most backward positions, all of them are constant throughout the period (broadband price index, transactions and e-Commerce). No sub-dimensions with lagging positions that improve are observed.

Below is Graph 11, equivalent for the indicators.

Graph 11 Indicators ranking evolution (2017-2019)

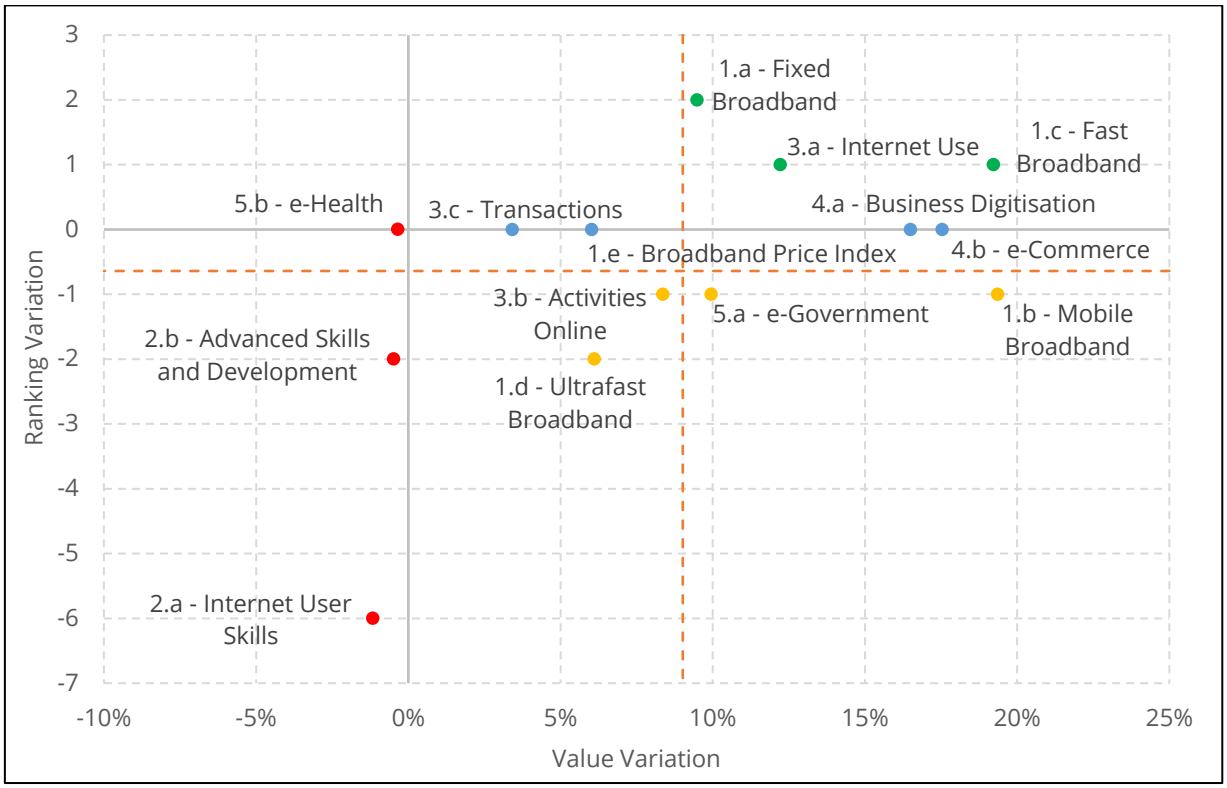


Source: Author's calculations

The division in terms of groups would be analogous to that for the sub-dimensions; on the one hand, those indicators with outstanding positions that, in addition, enhance positions (social media or fast broadband take-up, among others) and on the other, those that, while maintaining correct positions, deteriorate (ultra-fast broadband coverage, cloud technologies ...). Among the indicators with less favourable positions, there are again those that improve them (online banking and sales, e-commerce turnover ...) as well as those that lose positions (news, social networks ...). The indicator that improves the higher number of positions in the period is digital public services for companies (five) and the one that loses the most, open data (eleven).

The following Graph 12 combines the evolution of the value and position of the sub-dimensions. On the horizontal axis the variation of the sub-dimensions is represented and on the vertical axis, the improvement or worsening of positions. The horizontal dotted line indicates the average variation of the value of the sub-dimensions (9.02%) and the vertical one, the average variation of its position (-0.6).

Graph 12 Sub-dimensions value and ranking evolution comparative (2017-2019)



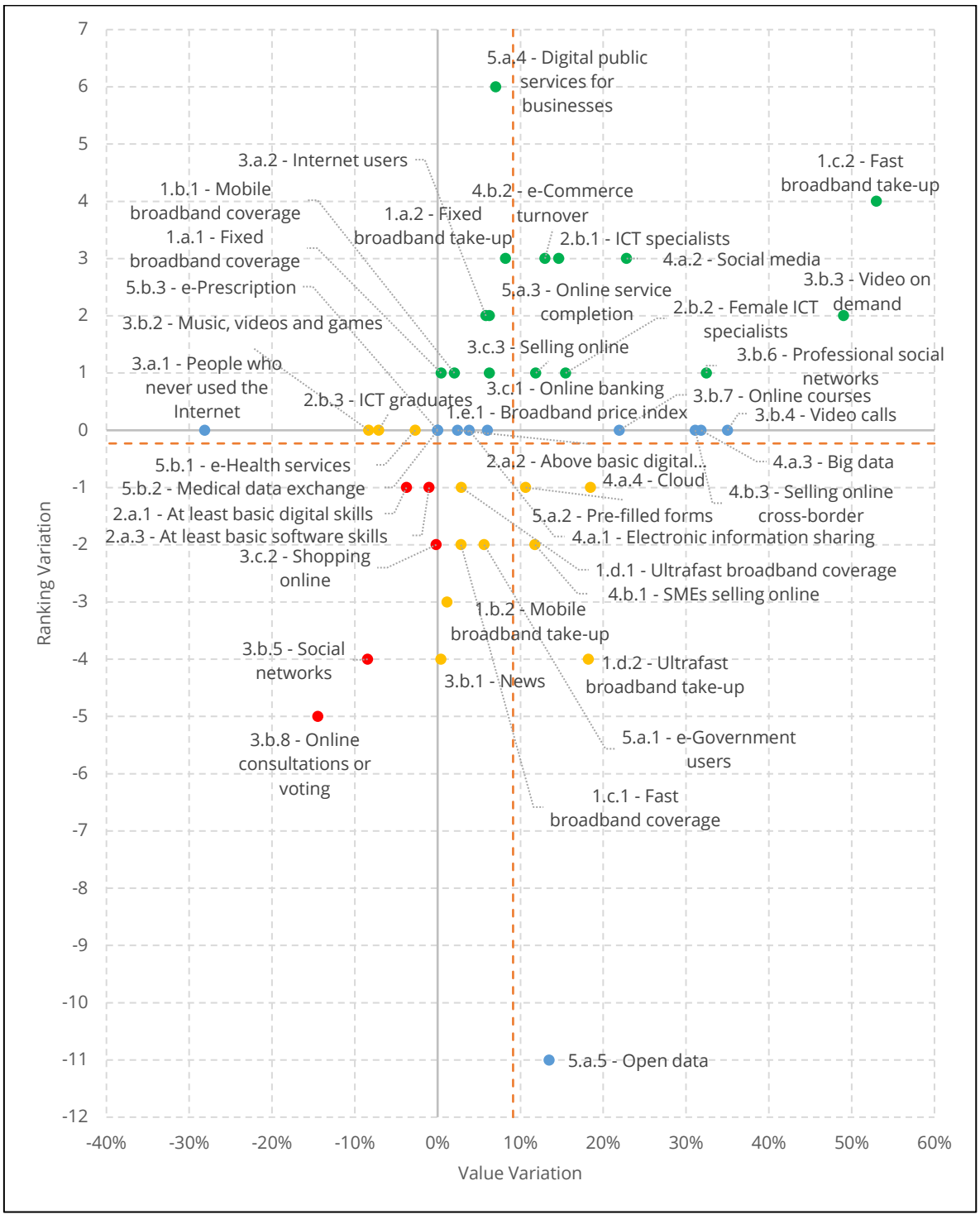
Source: Author's calculations

When comparing the evolution of sub-dimensions in terms of value and position, the fact that there is no relationship between growth and improvement of positions stands out. Thereby, there is the case of sub-dimensions that grow between 2017 and 2019 and yet stagnate in their positions (e-commerce, business digitisation, broadband price index or transactions). It even happens that growth is accompanied by a loss of positions (mobile or ultra-fast broadband, e-government or online activities). As for the decreases, although in no case they imply an upturn in positions, they do not necessarily cause a worsening of positions; it does happen in Internet user skills, which recedes six positions with a decrease of just over 1%, and in advanced and development skills, which loses two positions, but in e-health there are no positional setbacks despite the

digression. All sub-dimensions that gain positions as they grow, they do so above the average growth of the whole set of sub-dimensions.

The same comparative at the level of indicators is shown below in Graph 13.

Graph 13 Indicators value and ranking evolution comparative (2017-2019)



Source: Author's calculations

The analysis for the indicators is equivalent. Among those that do not vary in position (30%, located on the horizontal axis), there are increasing but also decreasing ones. On the other hand, 74% of the indicators have a positive growth, and from them 47% manage to raise positions (upper right quadrant) while 31% falls positions (lower right quadrant). Lastly, 12% of the indicators decrease while losing positions (lower left quadrant).

Some examples of these behaviours; the greatest growth is for the broadband take-up indicator (53.01%), that earns four positions, while the most important improvement of positions is for digital public services for companies (five positions), with a growth of 7,02%. On the other hand, the indicator that decreases the most is online consultations or voting (-14.47%) but goes back five positions, while the one with the highest number of positions reduction is the open data indicator (eleven), despite of a growth of 13.47%.

In relation to the average variations, 23% of the indicators grow above the average value (9.11%). The average variation in terms of positions is -0.2, so all indicators that lose positions are below it.

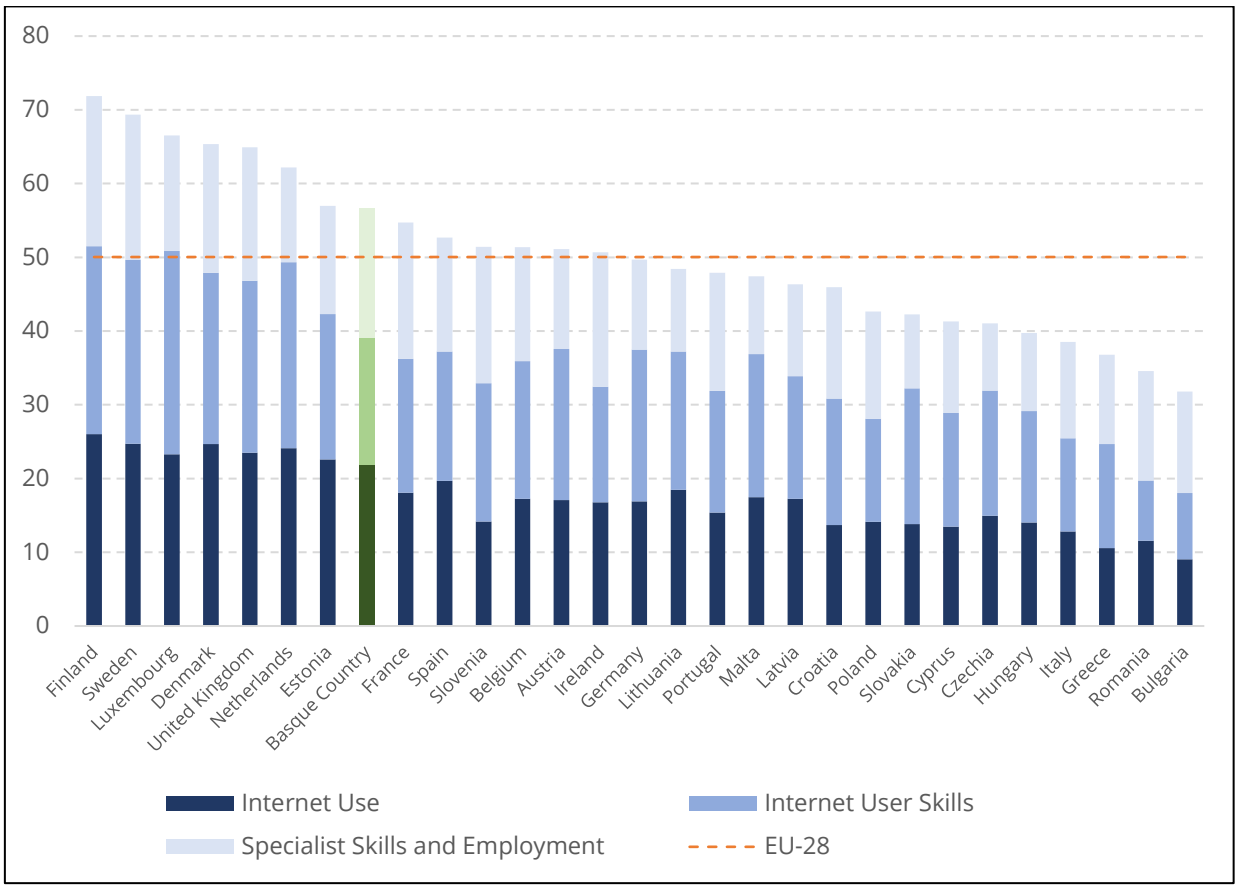
3. WOMEN DIGITALISATION IN THE BASQUE COUNTRY 2019

3.1 WiD 2019 Index

The participation of women in the digitalisation of the Basque society and economy is expressed through the WiD index. According to it, the Basque Country occupies the eighth place in the ranking, with a value equal to 56.60%, above the EU-28 average (50.04%).

Finland (71.87%), Sweden (69.37%), Luxembourg (66.51%), Denmark (65.38%), the United Kingdom (64.92%), the Netherlands (62.20%) and Estonia (56.96%) are the leaders. The Basque Country follows Estonia and is ahead of France (54.72%), in the group of countries that is just behind the leaders.

Graph 14 WiD 2019 (%)



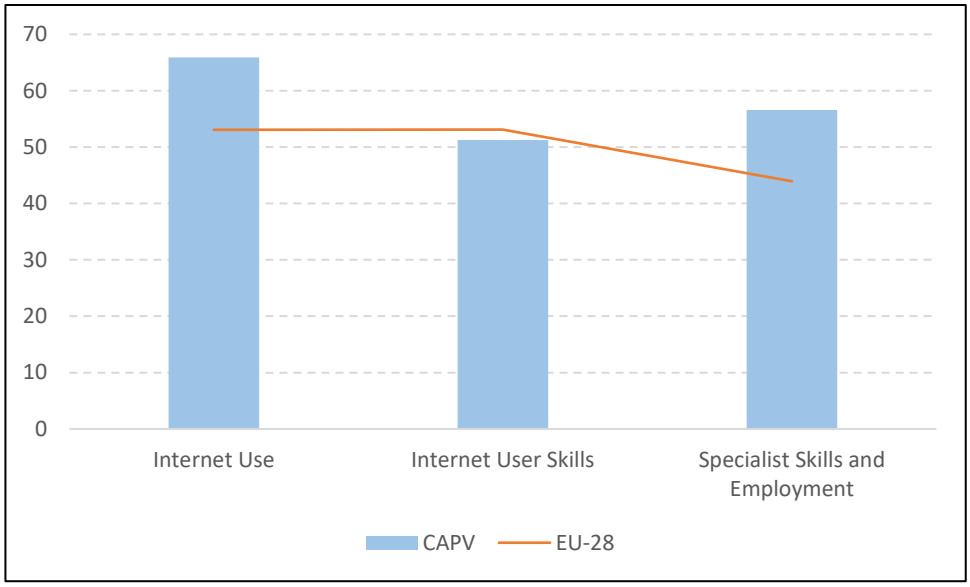
Source: EUSTAT, INE

3.2 Dimensions

The WiD index is composed of three dimensions: Internet use, Internet user skills and specialist skills and employment. The following sections describe the degree of digitalisation of women in the Basque Country for each of these dimensions.

As can be seen in Graph 15, the situation of the Basque Country with respect to the EU-28 average is somewhat disparate between the dimensions; it maintains levels of digitalisation above the average and with a certain margin of advantage in two of them, although somewhat greater in the use of Internet than in specialist skills and employment. The dimension of Internet user skills, however, does not reach the EU-28 average, although the difference is limited.

Graph 15 Basque Country WiD 2019 Dimensions (%)



Source: EUSTAT, INE

Each of the three dimensions, represented by their respective components (indicators), is detailed below for all the countries and positioning the Basque Country in its corresponding rank. The EU-28 average of each dimension is also included.

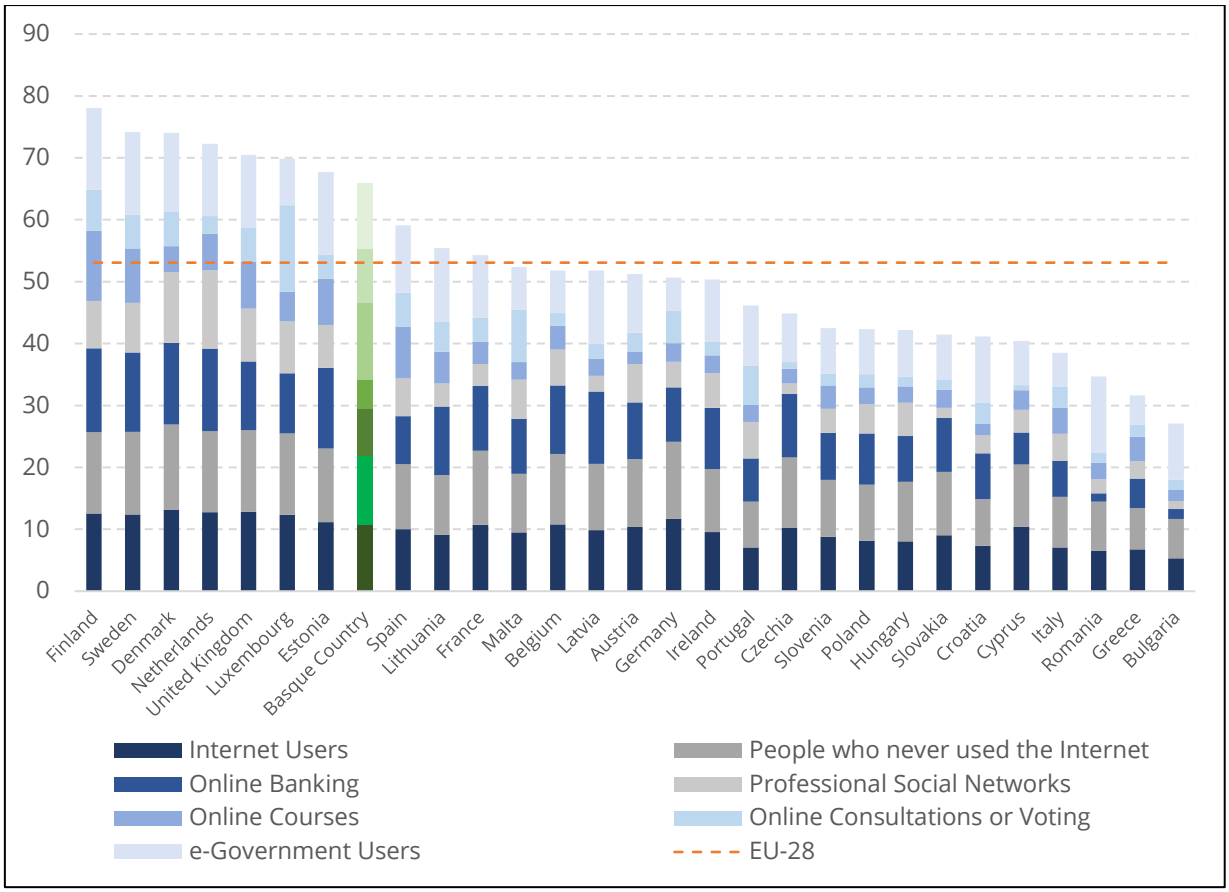
3.2.1 Internet use

This dimension includes seven indicators: Internet users, people who never used the Internet, online banking, professional social networks, online courses, online consultations or voting and e-government users. All indicators have the same weight within the dimension.

Graph 16 shows that the use of Internet by women in the Basque Country ranks eighth, with a value of 65.91%, above the EU-28 average (53.07%). Thus, it is among the last positions of the leading group led by Finland (78.06%) and followed by Sweden (74.22%), Denmark (74.03%), Holland (72.28%), United Kingdom (70.48%), Luxembourg (69.87%) and Estonia (67.74%). The same seven countries are leaders in the total indicator. In

Internet use, most countries are below the EU-28 average. In this dimension the Basque Country obtains its second best position in relation to the rest of the dimensions.

Graph 16 Internet Use (%)



Source: EUSTAT, INE

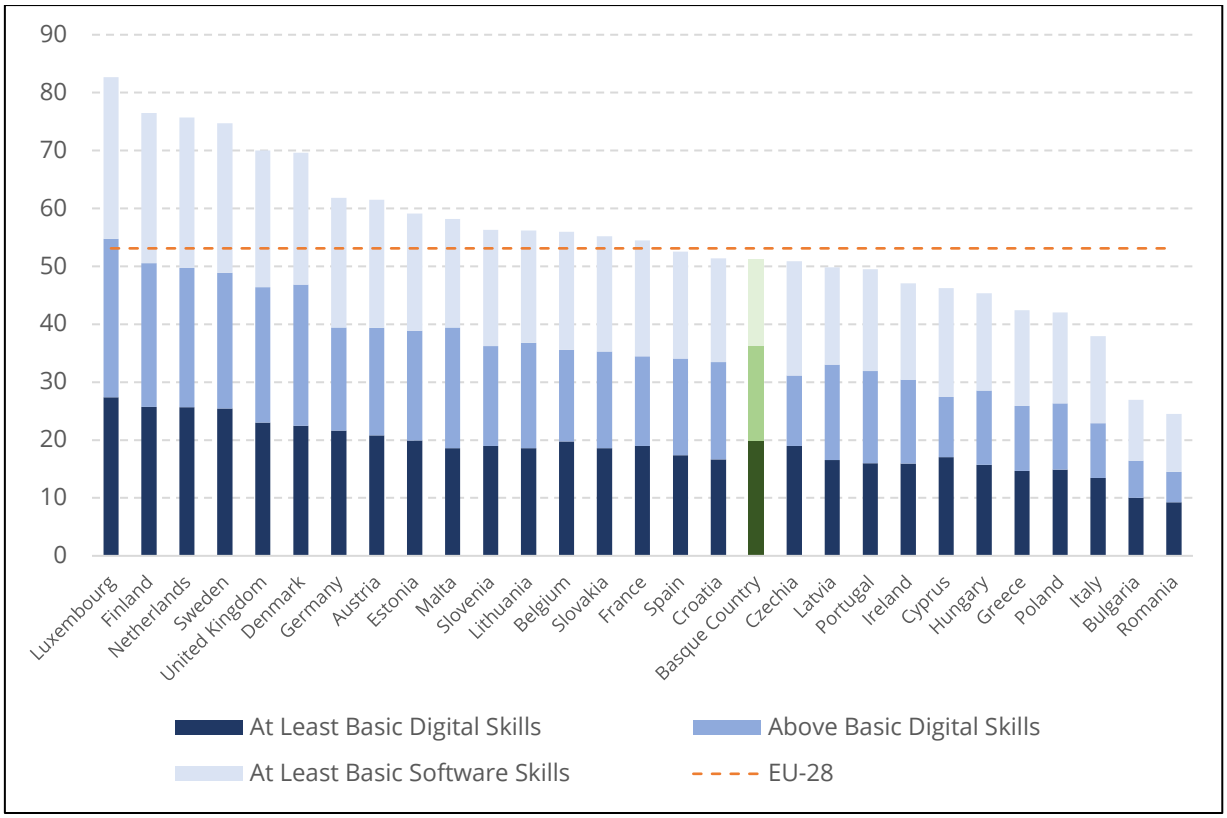
3.2.2 Internet user skills

This dimension includes three indicators: at least basic digital skills, above basic digital skills, at least basic software skills. They all have the same weight within the dimension.

As can be seen in Graph 17, the Basque Country reaches 51.26% in Internet user skills, occupying the eighteenth rank in a dimension where Luxembourg, with certain advantage (82.69%), Finland (76.49%), Holland (75.70%) and Sweden (74.72%) dominate the top positions. The position of the Basque Country indicates that

it is far from the leading group and below the EU-28 average (53.11%). This is the dimension in which the Basque Country obtains its worst position among all the dimensions.

Graph 17 Internet User Skills (%)



Source: INE

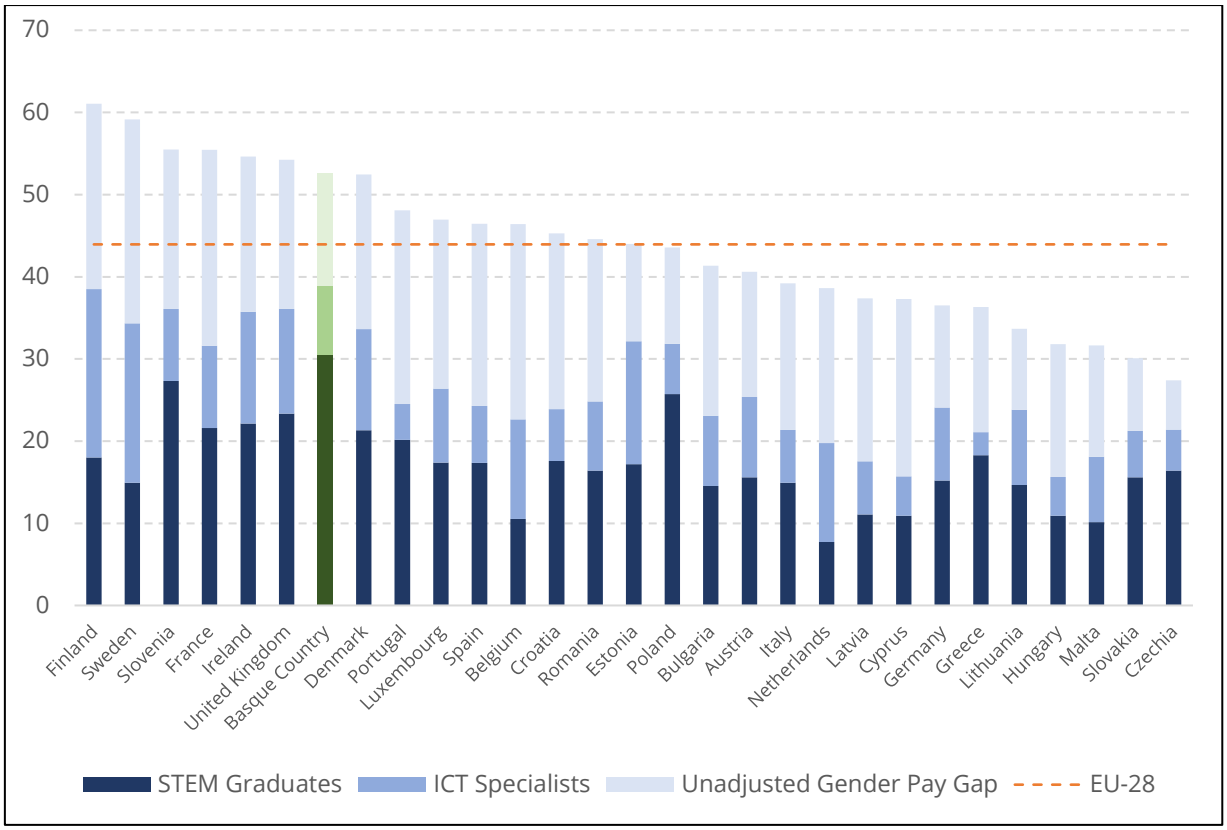
3.2.3 Specialist skills and employment

This dimension includes three indicators: STEM graduates, ICT specialists and unadjusted gender pay gap. All three indicators have the same weight within the dimension.

In Graph 18, which represents the specialist skills and employment of women, the Basque Country is above the EU-28 average, with a value of 52.62% compared to the average of 43.94%. The position it occupies in the ranking is the seventh. Countries at the top of the ranking are Finland (61.07%), Sweden (59.16%), Slovenia

(55.49%), France (55.45%), Ireland (54.64%) and the United Kingdom (54.24%). In this dimension, the Basque Country obtains its best position with respect to the whole of the three dimensions.

Graph 18 Specialist Skills and Employment (%)



Source: EUSTAT, INE

3.3 Indicators

The following sections present the indicators for each of the three dimensions. The analysis includes both the value of the indicator for the Basque Country and the position it occupies, as well as the corresponding values for Spain, the country with the best result and the EU-28.

3.3.1 Internet use

Table 12 presents the values and positions of each of the seven indicators of Internet use. These same indicators (but for the population as a whole) are found in dimensions 3 (use of Internet services) and 5 (digital public services) of the DESI.

Table 12 Internet use indicators comparative (%)

Dimension 1 – Internet Use	Basque Country		Spain	Leader	EU-28
	Value	Position			
1.1 – Internet users	85.55	9	82.04	95.10	82.28
1.2 – People who never used the Internet [23]	11.53	12	13.24	1.67	11.97
1.3 – Online banking	53.28	20	54.50	94.76	63.13
1.4 – Professional social networks	11.67	15	14.94	30.97	13.10
1.5 – Online courses	21.51	1	14.64	21.51	8.08
1.6 – Online consultations or voting	21.67	2	13.46	34.14	9.94
1.7 – e-Government users	73.94	12	75.75	94.04	63.72

Source: EUSTAT, INE

The Basque Country is above the EU-28 average in most of the indicators of the dimension of Internet use by women. Worth noting are the values of online courses and online consultations or voting, where the Basque Country ranks first and second respectively, well above the EU-28 value. In the rest of the indicators, the positions are rather intermediate, despite having values higher than the average for all European countries, such as the frequent use of the Internet or e-government. In two indicators, however, the data do not reach the EU-28 average, specifically in the use of electronic banking and professional social networks.

3.3.2 Internet user skills

Internet skills are analysed based on three indicators. These are the same indicators from the sub-dimension 2.a of the DESI, which are part of the second dimension (human capital). Table 13 presents the values and positions of all of them.

Table 13 Internet user skills indicators comparative (%)

Dimension 2 – Internet User Skills	Basque Country		Spain	Leader	EU-28
	Value	Position			
2.1 – At least basic digital skills	59.72	9	52.21	82.14	54.68
2.2 – Above basic digital skills	29.44	17	29.97	49.28	28.28
2.3 – At least basic software skills	45.00	27	55.46	83.80	57.52

Source: INE

Indicators of women's Internet use skills show mixed results in relation to the EU-28 average and do not place the Basque Country in leading positions, but rather in intermediate or distant ones.

In the first indicator (at least basic digital skills), the Basque Country has a higher value than the EU-28 average and is placed in a favourable position. In the following indicator, relating to a more sophisticated level of skills, the difference with the EU-28 average is reduced but the relative position moves away from the top of the ranking. The third indicator relates more precisely to specific tasks when using software. In this case, the position of the Basque Country is at the bottom of the ranking and its value is significantly below the EU-28 average.

[23] This indicator is inverse, that is, the lower, the better.

3.3.3 Specialist skills and employment

The measurement of specialist skills and employment is also based on three indicators. In this case, only one indicator is repeated from the DESI sub-dimension 2.b; female ICT specialists. Table 14 presents the values and positions of each of the indicators.

Table 14 Specialist skills and employment indicators comparative (%)

Dimension 3 – Specialist Skills and Employment	Basque Country		Spain	Leader	EU-28
	Value	Position			
3.1 – STEM graduates [24]	22.85	1	13.00	22.85	13.10
3.2 – ICT specialists	1.27	16	1.04	3.07	1.38
3.3 – Unadjusted gender pay gap [25]	23.57	22	13.40	10.20	19.30

Source: EUSTAT, INE

In the field of education and labour market, the Basque Country shows very acceptable results. The first position regarding the proportion of women graduates in STEM branches stands out, with a wide margin above the EU-28 average. The percentage of ICT specialists, however, is below the EU-28 average, farther away from the top positions. The indicator that measures the gender wage gap in terms of the difference between the average gross earnings of men and women as a percentage of the average gross earnings of men, places the Basque Country below the EU-28 average (see footnote) and in a more distant position.

3.4 Analysis of results

The 2019 WiD index gives a correct result for the Basque Country, which ends up in eighth position and more than six points above the EU-28 average.

In terms of women's use of Internet, the Basque Country ranks eighth, twelve percentage points above the EU-28 average. This position is supported by positive results (higher than the average) in more than half of its indicators, even achieving top positions in the ranking in two of them, related to training and participation in civic or political issues. At the other end are the use of online banking and professional social networks.

Regarding the skills of women for Internet use, the eighteenth position for the Basque Country is the result of improvable results at the most advanced levels of digital skills, but particularly in the specific software skills area. In this last indicator, the Basque Country is at the bottom of all the EU-28 countries, at a clear disadvantage. The best value in this dimension can be found in the indicator that takes into account a more basic level of digital skills, ranking ninth.

Finally, the results are slightly more favourable in terms of specialist skills and employment, where the Basque Country ranks seventh, with higher results than the EU-28 average. The degree of female ICT specialists in the labour market is correct, but really worth noting is the first position of the indicator that measures the level of women graduates in the STEM field. The pay gap between men and women presents a more backward position.

[24] Science, Technology, Engineering, Mathematics.

[25] This indicator is inverse, that is, the lower, the better.

3.5 Basque Country gender digitalisation comparative 2019

This section compares the WiD index indicators obtained for women with their equivalents for men in the Basque Country, in Spain and in the EU-28. The following tables group the indicators for each dimension. The differential has been calculated as a percentage of men.

Table 15 Internet use indicators gender comparative (%)

Dimension 1 – Internet Use	Basque Country			Spain			EU-28		
	Women	Men	Differential	Women	Men	Differential	Women	Men	Differential
1.1 – Internet users	85.55	87.40	-2.12	82.04	82.99	-1.14	82.28	84	-2.05
1.2 – People who never used the Internet[26]	11.53	8.90	29.55	13.24	12.24	8.17	11.97	10.5	14.00
1.3 – Online banking	53.28	58.00	-8.14	54.50	58.53	-6.89	63.13	64.23	-1.71
1.4 – Professional social networks	11.67	15.79	-26.09	14.94	18.00	-17.00	13.10	17.50	-25.14
1.5 – Online courses	21.51	20.90	2.92	14.64	14.86	-1.48	8.08	9.45	-14.50
1.6 – Online consultations or voting	21.67	21.35	1.50	13.46	13.06	3.06	9.94	10.60	-6.23
1.7 – e-Government users	73.94	74.52	-0.78	75.75	75.62	0.17	63.72	64.83	-1.71

Source: EUSTAT, INE

In the first dimension, represented in Table 15 and referring to the use of Internet services, some peculiarities of the Basque Country data are revealed when comparing them to the results of Spain and the EU-28. On the one hand, in the online courses, the positive differential presented by the Basque Country indicates that there are 2.92% more women than men who take them. This is not the case in Spain, where the differential is negative, nor in the EU-28, which has a much larger negative differential. Something similar happens with votes or consultations made over the Internet by women, where 1.5% more women than men voted or did consultations online in the Basque Country. In Spain, this proportion of women is higher than in the Basque Country, while in the EU-28 it is negative.

In the rest of the indicators, the comparative reflects similar patterns between the Basque Country and the other territories. This is the case of the indicator of people who make use of electronic government, where the gender gap that exists in the Basque Country is close to the one observed in the EU-28, although lower. However, while in both territories the differential is negative (the proportion of women is lower than that of men), in Spain it is positive.

However it is in the indicators that show a greater use of online services by men (negative differentials) that the situation of the Basque Country is more comparable to the one of Spain and the EU-28. This happens with the frequency of Internet use, people who never used the Internet (see footnote), online banking and

[26] Positive values indicate a negative differential as this indicator is inverse.

professional social networks, with the gap between both genders being greater in the Basque Country than in the other compared territories.

Table 16 Internet user skills indicators gender comparative (%)

Dimension 2 – Internet User Skills	Basque Country			Spain			EU-28		
	Women	Men	Differential	Women	Men	Differential	Women	Men	Differential
2.1 – At least basic digital skills	59.72	67.25	-11.20	52.21	57.36	-8.98	54.68	59.64	-8.32
2.2 – Above basic digital skills	29.44	30.99	-5.00	29.97	33.27	-9.9	28.28	34.03	-16.90
2.3 – At least basic software skills	45.00	49.71	-9.47	55.46	60.33	-8.07	57.52	62.43	-7.86

Source: INE

The three indicators of the second dimension, presented in Table 16, measure the digital skills required to make use of the Internet and show higher percentages among men than among women in the Basque Country, in Spain and in the EU-28 average.

The gender gap is smaller in the Basque Country compared to Spain and the EU-28 only in the indicator that takes into account higher levels of skills. In the indicator that measures the level of less developed digital skills and in the one that measures specific "software" skills, the differential is more pronounced in the Basque Country.

Table 17 Specialist skills and employment indicators gender comparative (%)

Dimension 3 – Specialist Skills and Employment	Basque Country			Spain			EU-28		
	Women	Men	Differential	Women	Men	Differential	Women	Men	Differential
3.1 – STEM graduates	22.85	55.84	-59.08	13.00	30.10	-56.81	13.10	24.90	-47.39
3.2 – ICT specialists	1.27	3.48	-63.51	1.04	4.53	-77.04	1.38	5.66	-75.62
3.3 – Unadjusted gender pay gap	23.57	-	-	13.20	-	-	19.30	-	-

Source: EUSTAT, INE

Table 17 contains the comparative of the third and last dimension and, like the previous one, it shows a fairly homogeneous situation between the three territories. Again, in all indicators the gender gap is negative, indicating that there are higher proportions of both STEM men graduates and ICT men specialists in relation to the proportions of women in these fields. The last indicator, which measures the wage gap between men and women, has no gender comparative but, as seen above, in the Basque Country it is higher than in Spain or in the EU-28.

The gender difference margin is higher in the case of STEM graduates from the Basque Country than from Spain and the EU-28, while the one of ICT specialists is lower in this territory than in the rest.

3.6 2018-2019 WiD evolution in the Basque Country

As with the DESI, a comparative of the evolution of WiD over the last two years in terms of values and positions is made.

Table 18 WiD comparative analysis 2018-2019

	Value			Position		
	2019	2018	Δ	2019	2018	Δ
WiD	**56.60**	**55.76**	**1.48**	**8**	**8**	**=**
Dimension 1 - Internet Use	**65.91**	**63.75**	**3.38**	**8**	**8**	**=**
1.1 - Internet users	85.55	81.47	5.01	9	11	2
1.2 - People who never used the Internet	11.53	14.57	-20.86	12	14	2
1.3 - Online banking	53.28	52.13	2.21	20	18	-2
1.4 - Professional social networks	11.67	11.67	0.00	15	15	=
1.5 - Online courses	21.51	24.23	-11.23	1	1	=
1.6 - Online consultations or voting	21.67	21.67	0.00	2	2	=
1.7 - e-Government users	73.94	62.00	19.26	12	14	2
Dimension 2 - Internet User Skills [27]	**51.26**	**51.26**	**0.00**	**18**	**18**	**=**
2.1 - At least basic digital skills	59.72	59.72	0.00	9	9	=
2.2 - Above basic digital skills	29.44	29.44	0.00	17	17	=
2.3 - At least basic software skills	45.00	45.00	0.00	27	27	=
Dimension 3 - Specialist Skills and Employment	**52.62**	**52.27**	**0.68**	**7**	**8**	**1**
3.1 - STEM graduates	22.85	23.12	-1.17	1	1	=
3.2 - ICT specialists	1.27	1.27	0.00	16	16	=
3.3 - Unadjusted gender pay gap	23.57	24.43	-3.52	22	23	1

Source: Author's calculations

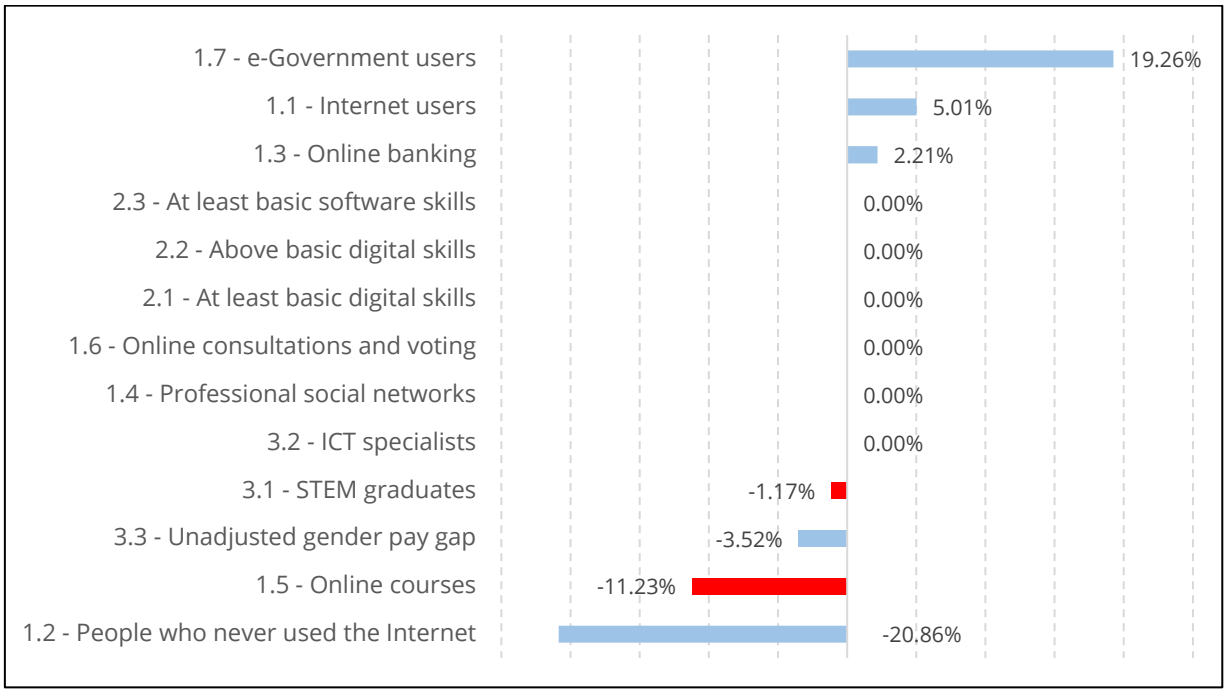
Between 2018 and 2019 the WiD index grows from 55.76% to 56.60% but that does not allow the Basque Country to improve positions, remaining in the eighth rank. In terms of dimensions, the greatest increase occurs in the use of Internet, 3.38%. This increase is however not enough to raise the ranking beyond the previous year's position, the eighth as well. In general, the Basque Country maintains or increases positions in Internet use indicators, losing only two positions in online banking.

In the case of the third dimension, the low increase in specialist skills and employment of 0.68% does have an impact on an increase in positions from eighth to seventh. Indicators for education and labour market fall, but only those relating to ICT specialists go backwards. The salary gap, on the other hand, improves one position.

[27] For dimension 2 it is not possible to make a temporary comparative due to the lack of updated data in the year 2019.

Graph 19 is presented below with the percentage evolution of each indicator in the last year[28].

Graph 19 Indicators evolution (2018-2019)



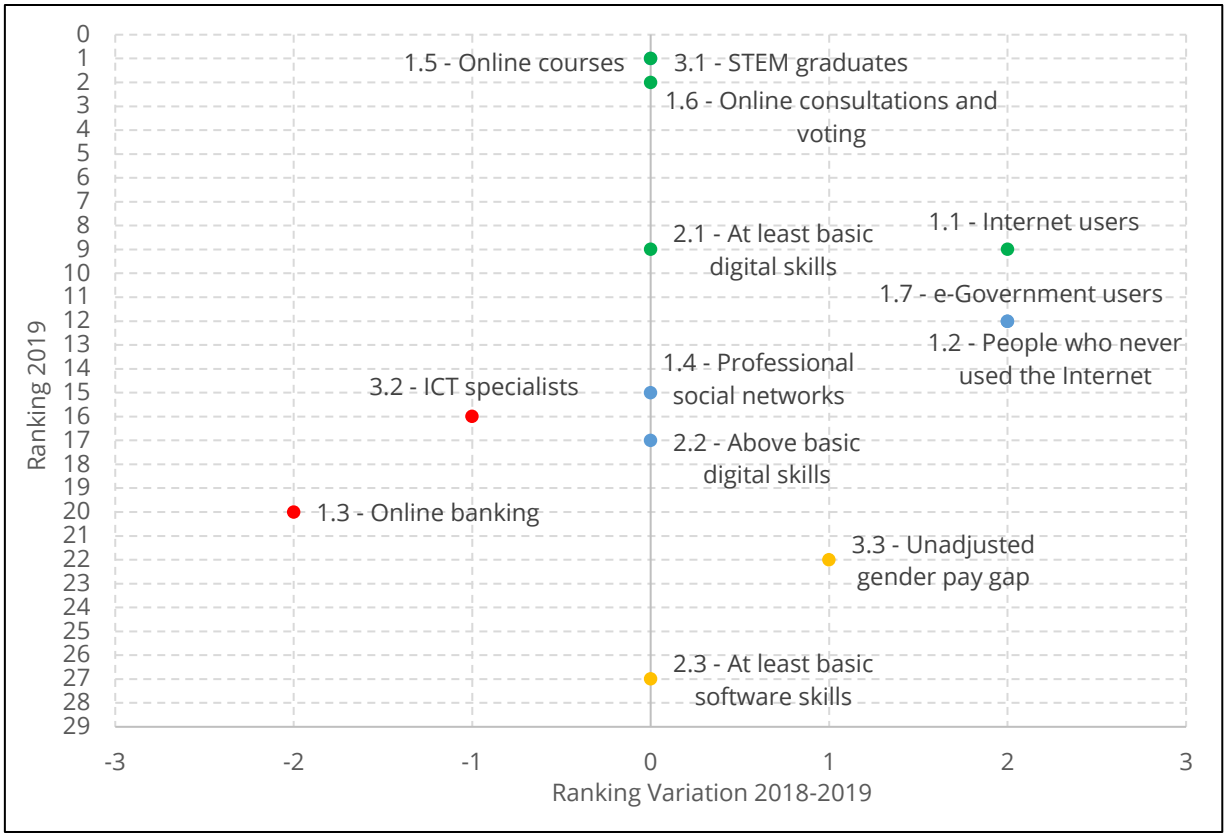
Source: Author's calculations

This comparative of the WiD index indicators shows which are the ones that have grown and which have not. Due to the lack of updated data, the indicators of the Internet user's skills dimension do not evolve. The ICT specialists and the online consultations or voting and professional social networks do not evolve either because of the same reason. Only three indicators have grown, mainly the ones relating to the use of e-government (19.26%) and, to a lesser extent, Internet users (5.01%) and online banking (2.21%). The fact that the indicators measuring the percentage of people who have never used the Internet (-20.86%) or the gender wage gap (-3.52%) have decreased is positive because they are indicators that go in the opposite direction. Among those that have decreased are online courses (-11.23%), STEM graduates (-1.17%) and ICT specialists (-1.10%).

Graph 20 below shows the evolution of the indicators at the positional level.

[28] "Unadjusted gender pay gap" and "People who never used the Internet" indicators are inverse, so a decrease means a positive evolution of the indicator.

Graph 20 Indicators ranking evolution (2018-2019)

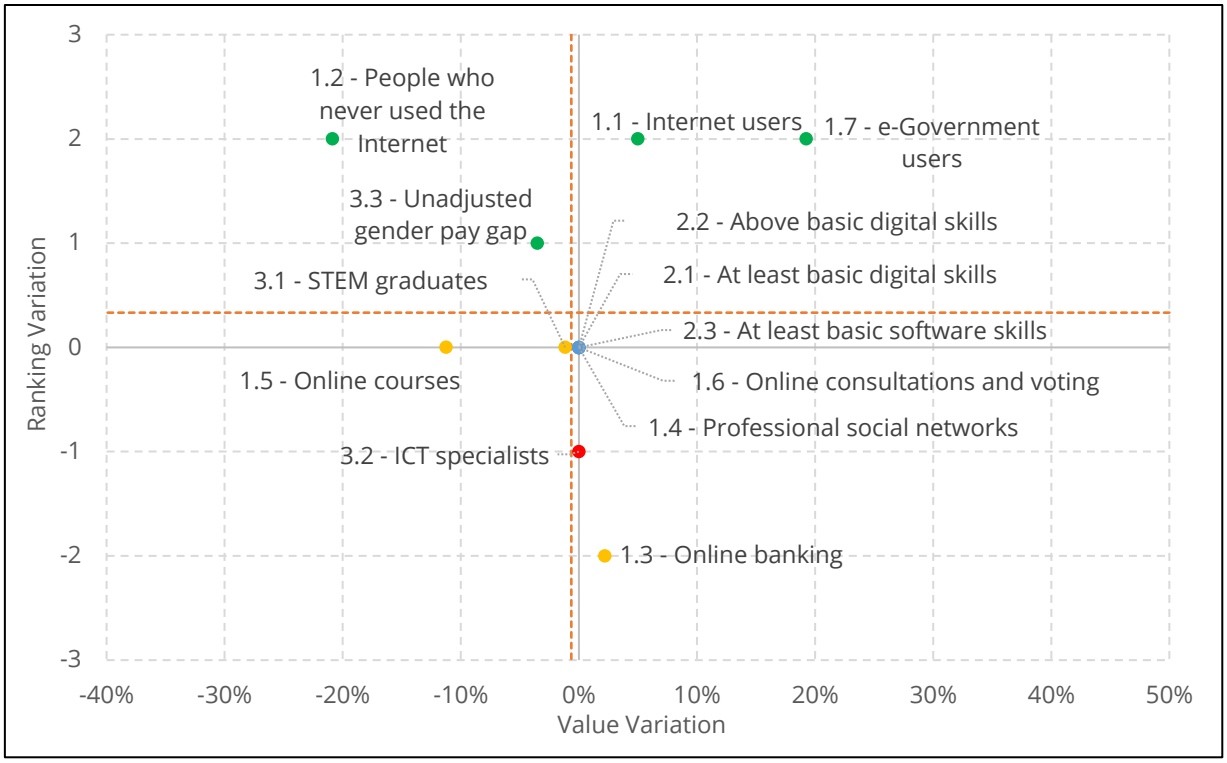


Source: Author's calculations

The positional analysis of indicators makes it possible to distinguish between four groups. On the one hand, there are indicators with high positions that have improved or have not varied their positions in the countries ranking (STEM graduates, at least basic digital skills, Internet and e-government users, online courses or online consultations or voting). On the other hand, the same for those indicators that have more intermediate positions (women who have never used the Internet, professional social networks and above basic digital skills). Thirdly, the same idea but for indicators with low positions (gender pay gap and at least basic software skills). Finally, there are two indicators that have lost one and two positions respectively, which are ICT specialists and the use of online banking.

Graph 21 below combines the evolution of the value and position of the indicators. The horizontal axis shows the variation of the indicators and the vertical axis shows the advance or withdrawal of positions. Dotted lines indicate the average variations of these two variables.

Graph 21 Indicators value and ranking evolution comparative (2018-2019)



Source: Author's calculations

All the indicators that evolved favourably in the period show positive moves in positions (the indicators for people who have never used the Internet and the gender pay gap are decreasing but this implies that they improve), except for online banking, which has weak growth and loses two positions. Two indicators decrease but maintain positions (online courses and STEM graduates). The only indicator that loses positions, although does not decrease, is ICT specialists. Finally, there are a series of indicators for which there are no variations in their values and which do not vary their positions either.

4. CONCLUSIONS

Considering the analysis of the previous results, a number of conclusions is raised.

- Consolidation and progress towards convergence with the digital leaders

The Basque Country reaches and consolidates an advanced fifth position in the digitalisation of its economy and society in the environment of the European Union measured through the DESI index, in line with what was observed in 2017 and 2018. The Basque Country is placed one step back behind the group of digital leaders, the Nordic countries, towards which the Basque Country converges with increasing speed and at a certain distance from the next country, the United Kingdom. To overcome this step it will be necessary to improve in several of the indicators for which the opportunities to grow are considerable.

This fifth position is based on very good connectivity capabilities, advanced digital public services and a remarkable integration of digital technology in companies. On the other hand, there is a decrease in the level of human capital, as is the case in the EU-28 as a whole. The use of digital services by citizens continues to be the least advanced aspect and, despite improving, remains below the European average.

Likewise, the participation of women in the digitisation of the Basque Country is moderate, according to the WiD index. As per this indicator, the Basque Country occupies an eighth position in the EU-28, ahead of a group of countries among which are the Nordic ones (Sweden, Finland, Denmark and Holland) in addition to Luxembourg, the United Kingdom and Estonia, which in the DESI are ranked behind the Basque Country. This index, which began to be monitored by the European Commission in 2018, seeks to challenge gender stereotypes, promote digital skills and education, as well as encourage female entrepreneurship.

The reading of both indices (DESI and WiD) in an integrated way shows that the digitalisation of the Basque economy and society is progressing favourably, although it is true that the participation of women in the digital sphere is slightly below the society as a whole, so there is growth potential.

- Positive evolution of dimensions, sub-dimensions and indicators between 2018 and 2019

During the last year, the Basque Country increases its DESI index by 5.41%. This improvement in performance takes place at all levels. First, there are substantial uprises in four of the five dimensions (connectivity (8.45%), digital public services (7.31%), Internet use (6.12%) and business integration of digital technology (5.74%)), which is reflected, for the most part, into progress in the respective upgradings of the Basque Country. On the other hand, it goes backwards in relation to human capital (-0.17%) in the same way as the European Union, probably as a result of the methodological change that aims to adapt this dimension to the challenge assumed by the European institutions around the skills and qualifications of the Digital Single Market.

Similarly, at the sub-dimension level, out of the total of fourteen, there is improvement in eleven of them, with advances well above the setbacks in those where it occurs. These sub-dimensions could be grouped around four groups: advanced in progress, sustained leaders, advanced in retreat and laggards.

Regarding the individual indicators, the pattern is similar: twenty-seven out of forty-three[29] improve, eight remain constant and only eight go down. All of them can be classified into different groups: (i) “advanced in progress”; those that consolidate their leading or advanced positions (take-up of fixed and fast broadband, mobile broadband coverage, social media …), (ii) “advanced in retreat”; those who, even occupying prominent or middle positions, fall back in their relative positions (digital public services to companies, use of cloud technologies, fast and ultra-fast broadband coverage, big data …), (iii) “potential”; located in the middle zone, they maintain or improve throughout the period (completion of online services, e-government users …) and, in the lower area, a dual behaviour is observed between (iv) “lagging backwards” ; those with low positions that

[29] The new indicator “5G readiness” has not been taken into account in the temporal analysis.

fall back (female ICT specialists, open data, SMEs that sell online, online sales ...) and (v) "lagging in recovery"; those who have low positions but improve (volume of e-commerce including cross-border, ICT specialists, news ...).

- Progress of the DESI index and the dimensions that support it throughout the 2017-2019 period

From a broader perspective, in the three years for which DESI is available in the Basque Country, its value has been increasing continuously, with a weighted average growth rate (CAGR) of 4.41%, highlighting its acceleration in the last year.

Over the entire period, significant weighted average growths take place in three dimensions: 6.72% in connectivity, 4.34% in Internet use and 3.89% in digital public services, having thus accelerated its improvement process. In human capital there is an advance in the sense that, from a 0.62% decline in 2018, it goes to 0.17% in 2017. Finally, the improvement in digital technology integration is decelerated (from growing 10.34% in 2018 to 5.34% in 2019), but even so, CAGR growth is 8.35% in two years.

During the entire period the results are improved in eleven of the fourteen sub-dimensions, retreating in two others and remaining in one. These can be organized into four groups: leaders, unstable advanced, stable lags and backward lags.

Likewise, thirty-three of the individual indicators grow or remain, while ten have a negative evolution. Based on the same previous classification of indicators, the groups would be the following: (i) “advanced in progress”; The Basque Country occupies a leading or very advanced position that improves or is maintained throughout the period (mobile broadband coverage, fixed and fast broadband take-up, digital public services for companies, online courses, big data ...), (ii) “advanced in retreat”; those in which, despite being in a correct position, the Basque Country has been surpassed by other countries (business use of cloud technologies, coverage and take-up of ultra-fast broadband ...), (iii) linked to these two, the group of “potential”; they experience progress or maintenance of position but continue to find themselves in intermediate positions (fixed broadband coverage, completion of digital public services, female ICT specialists, people who have never used the Internet ...) and, finally, in relation to the indicators with poorer results, there is a duality between (iv) the "lagging backwards"; those that not only do not advance, but even regress (open data, SMEs that make electronic sales, online purchases ...), and (v) "lagging in recovery"; with a low position in the ranking that does improve (online banking, ICT specialists, turnover in electronic commerce, online sales ...).

- Relative improvement vs advance in the ranking

As was observed in 2018, it is found that incremental improvements in dimensions do not necessarily ensure an improvement in annual positions. Thus, it is observed that with growths below 3%, positions fall back, between 3% and 6% the position is maintained, and only from that percentage, progress is made in the classification of the dimensions. Likewise, with the same percentage increase, in 2019 there are greater advances in positions, which contributes to the evolution in this direction.

- Looking after the indicators for a more balanced digital growth

In a detailed analysis of the evolution of the indicators, it is found that the subset of indicators where the Basque Country obtains good results is larger than the core of indicators with the worst performance.

There is a solid group of “advanced in progress” indicators that during the last year maintain the same trend as in the period, so they reinforce their situation (online courses, social media, mobile broadband coverage ...). These are twelve indicators and, in the last year, another three added which, from the perspective of the whole period, are part of the group of “advanced in retreat” (online consultations or voting, at least level basic digital skills and pre-filled forms). Conversely, in the last year two indicators that would be “advanced” throughout the period pass to this group “in retreat” (digital public services for companies and big data).

Of the fourth group of "lagging in recovery" indicators for the entire period (broadband price index, online banking, ICT specialists, electronic business turnover, cross-border electronic sales and online sales), only online sales has passed, in the last year, to a "lagging backwards" behaviour. In the shift towards the other direction, that is, from "lagging in retreat" during the period to "lagging in recovery" in the last year, the online purchases, news, social networks and at least basic software skills stand out.

The indicators in which the Basque Country is positioned as a leader must continue their evolution so that progress remains continuous. Among those who improve, the impact of digital public services for companies or social media stands out. In the same way, it could be interesting to influence in the potential indicators to "convert them" into advanced ones and, thus, new pillars for a good overall result of the index. This would be the case of above basic digital skills, the completion of digital public services, professional social networks or non-Internet users.

In addition, in order to strengthen indicators, clearly the open data and SMEs electronic sales deserve special attention, and also online purchases or at least basic software skills, as all of them are at low levels both in the full period and in the last year. Likewise, it is advisable to promote progress of those lagging indicators that show signs of recovery, such as online sales or volume of e-commerce business.

- Progress in the participation of women in the digital economy and society is modest

In the WID index use of Internet and specialist skills and employment, the Basque Country is above the European average, while in the general skills for the Internet user, female Basque citizens are below their European counterparts.

During the last year, both in the WiD index and the dimensions the increases in relation to 2018 are slight, with nearly no progress in the position that the Basque Country occupies in relation to the EU-28 countries.

In view of the evolution of the WiD index since 2018, it can be observed that the participation of women in the digital economy of the Basque Country is unequal between the three dimensions of the index: it is based mainly on a correct level of advanced skills and in an intermediate use of Internet services, while Internet users basic skills are improvable. Harmonizing these three pillars could result in a more balanced female participation in the digital transition.

By dimensions, regarding the use of the Internet, the Basque Country occupies an eighth position, after progressing 3.38%, maintaining the position of 2018. On the other hand, in the general women skills for Internet use, the Basque Country is located in the eighteenth position, slightly below the European average. Finally, in the dimension of specialist skills and employment, women of the Basque Country are in seventh place, with a high relevance of STEM specialisation of women in relation to other professions.

- Integrating the perspective of women in digitalisation will contribute to the reduction of digital gender inequality

When analysing the relationship between both indicators (DESI and WiD), in order to improve the performance of the Basque society and economy as a whole, it is necessary to improve the participation of women in areas such as Internet use (professional social networks, online consultations and voting, in addition to increasing the online courses). This can contribute to the improvement of this dimension for the whole of the Basque society and translate it into a better result of the DESI index. In addition, although the gender gap in the Internet access is significantly reduced, the value for women is still quite poor.

From a comparative analysis of gender, in relation to the use of the Internet, in those indicators where women have better performance (use of the Internet, e-government and online banking), in the Basque Country the inequality between women and men has been narrowing.

Also, in those areas where the degree of women is lower (professional social networks, people who never used the Internet and online courses), inequality in the Basque Country is reduced faster than in Spain and the rest of Europe. On the other hand, female participation in voting or consultation processes, not only is not reduced, but it increases.

5. METHODOLOGICAL NOTE

The DESI 2019 has several changes with respect to the versions of previous years. All of them are included in the guide published by the European Commission (E.C.): *DESI 2019. Digital Economy and Society Index. Methodological note June 2019*[30]. The main novelty is the inclusion of thirteen new indicators, distributed throughout the five dimensions. The following table presents the new indicators (for their definition, see Annex 6.1):

Table 19 DESI 2019 new indicators

Dimension	Sub-dimension	Indicator
1 – Connectivity	1.b – Mobile Broadband	1.b.3 – 5G readiness
2 – Human Capital	2.a – Internet User Skills	2.a.2 – Above basic digital skills
2 – Human Capital	2.a – Internet User Skills	2.a.3 – At least basic software skills
2 – Human Capital	2.b – Advanced Skills and Development	2.b.2 – Female ICT specialists
2 – Human Capital	2.b – Advanced Skills and Development	2.b.3 – ICT graduates
3 – Use of Internet Services	3.a – Internet Use	3.a.1 – People who have never used the Internet
3 – Use of Internet Services	3.b – Online Activities	3.b.6 – Professional social networks
3 – Use of Internet Services	3.b – Online Activities	3.b.7 – Online courses
3 – Use of Internet Services	3.b – Online Activities	3.b.8 – Online consultations and voting
3 – Use of Internet Services	3.c – Transactions	3.c.3 – Selling online
4 – Integration of Digital Technology	4.a – Business Digitisation	4.a.3 – Big data
5 – Digital Public Services	5.b – e-Health	5.b.2 – Medical exchange data
5 – Digital Public Services	5.b – e-Health	5.b.3 – e-Prescription

Source: DESI 2019. Digital Economy and Society Index. Methodological note. June 2019

[30] https://ec.europa.eu/digital-single-market/en/desi

As for indicators from previous years, in the human capital dimension, “Graduates in STEM” has been replaced by “Graduates in ICT” (2.b.3) and in the integration of digital technology, “RFID” and "e-invoice" indicators have been removed.

There are no new sub-dimensions but some of them are renamed: sub-dimension 2.a changes from "Basic skills and use", with two indicators, to "Internet user skills", with three. All indicators of this sub-dimension have been calculated following the methodology of the E.C. (*Digital Skills Indicator - derived from Eurostat survey on ICT usage by individuals. Methodological note., 2015*). As for sub-dimension 3.a is not "Content" anymore but "Internet use", with two indicators instead of three, and, finally, 3.b does not refer to "Communication" but evolves to a series of "Online activities”, going from two indicators to eight. The dimensions remain unchanged.

Beyond these modifications in the DESI structure, there are no methodological alterations in obtaining the indicators. Only in the case of “Open data” (5.a.5) the questionnaire has been updated[31].

With regard to the sources of information consulted, almost all of the data of dimensions 2, 3 and 4 come from the “Survey of the Information Society-ESI-Families” and the “Survey of the Society of the Information-ESI-Companies” of the Basque Institute of Statistics (EUSTAT). In cases where the data does not exist or does not conform to the definition, the National Institute of Statistics (INE), which carries out the “Survey on equipment and use of information and communication technologies in homes” and the "Survey on the use of ICT and electronic commerce in companies", has been consulted. Data in dimension 1 come from other sources such as the National Commission for Markets and Competition (CNMC)[32] and the Ministry of Economy and Business[33]. In dimension 5 data have been collected mostly from primary sources.

Data are relative to 2018 except for cases where there is no updated data. In such cases the most recent data has been taken. For some indicators of the digital public services dimension, data refer to the present time as they have been obtained from primary sources.

Some indicators have had to be partially estimated based on data from Spain. This is the case of “Mobile broadband take-up” (1.b.2), “Fast broadband take-up” (1.c.2) and “Ultra-fast broadband take-up” (1.d.2) indicators, for which it has been necessary to estimate the percentage of mobile subscriptions and fast and ultra-fast technologies for the Basque Country. The indicators of “5G readiness” (1.b.3) and “e-Health” (5.b.1) have also been obtained from data from Spain due to the impossibility of obtaining specific information regarding the Basque Country.

In the update of DESI 2017 and DESI 2018, regarding the new indicators, when it has not been possible to obtain the data retrospectively, the same data have been used as for DESI 2019. This is the case of “5G readiness” (1.b.3), “Exchange of medical data” (5b.2) and “e-Prescription” (5.b.3) indicators. In other cases data are also the same as in DESI 2018 because the source does not provide an updated data, as with “Above basic digital skills” (2.a.2), “At least basic software skills” (2.a.3), “Professional social networks” (3.b.6), “Online consultations and voting” (3.b.8). This also occurs with indicators that are not new. Other indicators have changed with respect to the previous year for a reason of homogenization of sources in the temporal analysis.

With regard to the calculation of “ICT Specialists” (2.b.1) and “Female ICT Specialists” (2.b.2), data on the employed population from the “Population and Housing Statistics” have been taken for the relevant sections of the following CNO11 classification codes: “Production and operations directors” (13), “Physical, chemical, mathematical and engineering professionals” (24), “Technology professionals information” (27), “Information

[31] https://www.europeandataportal.eu/sites/default/files/method-paper_insights-report_n4_2018.pdf
[32] data.cnmc.es
[33] www.mincotur.gob.es

and communications technology technicians (ICT)" (38), and "Workers specialized in electricity and electrotechnology" (75).

Regarding the indicator "Graduates in ICT" (2.b.3), data come from the "Classification of programs, degrees and certifications in study sectors, (CNED-F)". University graduates and professional training graduates are taken into account in the specific ICT categories of the following fields: "Arts, humanities and languages" (02), "Natural, chemical, physical and mathematical sciences" (05), "Technologies of information and communications (ICT)" (06) and "Mechanics, electronics and other technical training; industry and construction" (07). These are the categories considered as ICT according to the Eurostat *Fields of Training manual*[34].

The indicators of dimension 5 "Pre-filled forms" (5.a.2), "Completion of online services" (5.a.3) and "Digital public services for companies" (5.a.4) are based on the methodology included in the E.C. *eGovernment Benchmark 2018*. The "Electronic health services" indicator (5.b.1) follows what is established in the *Eurobarometer 460: Attitudes towards the impact of digitisation and automation on daily life*. The two new indicators "Medical data exchange" (5.b.2) and "e-Prescription" (5.b.3) have as reference the *Benchmarking Deployment of eHealth among General Practitioners 2018*.

Regarding the elaboration of the WiD index of the Basque Country 2019, the methodology used comes from the E.C. (*Women in Digital Index 2018. Methodological note*).

As for the DESI, most of the data used have been provided by EUSTAT from the "Information Society Survey-ESI-Families" and the "Personal and family income statistics" ("Gender pay gap" (3.3)). For seven specific indicators, due to lack of information or to a greater adaptation of its definition, data have been obtained from the National Institute of Statistics (INE) ("Survey on equipment and use of information and communication technologies in homes"). Most of the data are from 2018 except in cases where the last available data is from 2017.

The methodology used to calculate the three indicators of the second dimension is the same as the one used to obtain the Digital Economy and Society Index (DESI) (*Digital Skills Indicator - derived from Eurostat survey on ICT usage by Individuals. Methodological note., 2015)*, since these are the same indicators.

In reference to the calculation of STEM graduates (3.1), both the results of professional training and those of university education of students of science, mathematics, technology, engineering, manufacturing and construction have been considered. Based on the "Classification of programs, degrees and certifications in sectors of study, (CNED-F)", certain items have been taken from the following categories: "Natural, chemical, physical and mathematical sciences" (05), "Technologies of information and communications (ICT)" (06), "Mechanics, electronics and other technical training; industry and construction" (07) and "Health" (09).

The indicator "ICT Specialists (3.2)" is the same as the DESI (2.b.2.) indicator.

The indicator of the "Gender pay gap" (3.3) has been obtained from the average salary distribution of the salaried population. It has not been possible to discriminate between employees working in companies with 10 or more employees, as defined by the E.C.

[34] "*Fields of Training – Manual*", Eurostat (1999).

6. ANNEX

6.1 DESI indicators and definitions

Dimension	Sub-dimension	Indicator	Description	Breakdown	Unit	Source and year
1 - Connectivity	1.a - Fixed Broadband	1.a.1 - Fixed broadband coverage	Percentage of households covered by broadband: xDSL, cable (basic and NGA), FTTP or WiMax networks	Total number of households	% of households	Ministry of Economy and Business (2018)
1 - Connectivity	1.a - Fixed Broadband	1.a.2 - Fixed broadband take-up	Percentage of households subscribing to broadband: xDSL, cable (basic and NGA), FTTP or WiMax networks	Total number of households with at least one member aged 16-74	% of households	EUSTAT (2018)
1 - Connectivity	1.b - Mobile Broadband	1.b.1 - Mobile broadband coverage	Percentage of populated areas coverage by 4G - measured as the average coverage of telecom operators in each country	Total number of households	% of households	Ministry of Economy and Business (2018)
1 - Connectivity	1.b - Mobile Broadband	1.b.2 - Mobile broadband take-up	Number of mobile data subscriptions per 100 people	Total number of subscriptions	Number of subscriptions per 100 persons	CNMC (2017) EUSTAT (2017)
1 - Connectivity	1.b - Mobile Broadband	1.b.3 - 5G readiness	The amount of spectrum assigned and ready for 5G use by the end of 2020 within the so-called 5G pioneer bands. These bands are 700 MHz (703-733 MHz and 758-788 MHz), 3.6 GHz (3400-3800 MHz) and 26 GHz (1000 MHz within 24250-27500 MHz). All three spectrum bands have an equal weight	Pioneer 5G Bands	% of harmonised spectrum	EUROSTAT (2018)
1 - Connectivity	1.c - Fast Broadband	1.c.1 - Fast broadband coverage	Percentage of households covered by broadband of at least 30 Mbps download. Considered technologies are FTTH, FTTB, Cable Docsis 3.0 and VDSL	Total number of households	% of households	Ministry of Economy and Business (2018)
1- Connectivity	1.c - Fast Broadband	1.c.2 - Fast broadband take-up	Percentage of households subscribing to broadband of at least 30 Mbps	Total number of households with at least one	% of households	CNMC (2017) INE (2017)

				member aged 16-74		
1 - Connectivity	1.d - Ultrafast Broadband	1.d.1 - Ultrafast broadband coverage	Percentage of households covered by broadband of at least 100 Mbps download. Considered technologies are FTTH, FTTB and Cable Docsis 3.0	Total number of households	% of households	Ministry of Economy and Business (2018)
1 - Connectivity	1.d - Ultrafast Broadband	1.d.2 - Ultrafast broadband take-up	Percentage of households subscribing to broadband of at least 100 Mbps	Total number of households with at least one member aged 16-74	% of households	CNMC (2017) EUSTAT (2017)
1 - Connectivity	1.e – Broadband Price Index	1.e.1 - Broadband price index	The Broadband Price Index measures the prices of twelve representative broadband baskets as the percentage of household income. The baskets include three speed categories (12-30 Mbps, 30-100 Mbps and at least 100 Mbps) and four types of products (standalone internet, internet + TV, internet + fixed telephony and internet + TV + fixed telephony	All individual broadband Internet access offerings	Score (1-100)	EUROSTAT (2018) INE (2018)
2 - Human Capital	2.a - Internet User Skills	2.a.1 - At least basic digital skills	People with "basic" or "above basic" digital skills in each of the following four dimensions: information, communication, problem solving and software for content creation (as measured by the number of activities carried out during the previous 3 months	The entire population aged 16-74 years	% of people	INE (2017)
2 - Human Capital	2.a - Internet User Skills	2.a.2 - Above basic digital skills	People with "above basic" digital skills in each of the following four dimensions: information, communication, problem solving and software for content creation (as measured by the number of activities carried out during the previous 3 months)	The entire population aged 16-74 years	% of people	INE (2017)

2 - Human Capital	2.a - Internet User Skills	2.a.3 - At least basic software skills	People who, in addition to having used basic software features such as word processing, have used advanced spreadsheet functions, created a presentation or document integrating text, pictures and tables or charts, or written code in a programming language	The entire population aged 16-74 years	% of people	INE (2017)
2 - Human Capital	2.b - Specialist Skills and Employment	2.b.1 - ICT specialists	Employed ICT specialists. Broad definition based on the ISCO-08 classification and including jobs like ICT service managers, ICT professionals, ICT technicians, ICT installers and servicers	Employed persons aged 16-74 years	% of 16-74 year olds	EUSTAT (2016)
2 - Human Capital	2.b - Specialist Skills and Employment	2.b.2 - Female ICT specialists	Employed ICT specialists. Broad definition based on the ISCO-08 classification and including jobs like ICT service managers, ICT professionals, ICT technicians, ICT installers and servicers	Employed women aged 16-74	% of women aged 16-74 years	EUSTAT (2016)
2 - Human Capital	2.b - Specialist Skills and Employment	2.b.3 - ICT graduates	People with a degree in ICT	Graduates	% of graduates	EUSTAT (2017)
3 - Use of Internet Services	3.a - Internet Use	3.a.1 - People who never used the Internet	People who never used the Internet	The entire population aged 16-74 years	% of people	EUSTAT (2018)
3 - Use of Internet Services	3.a - Internet Use	3.a.2 - Internet users	People who use the Internet at least once a week	The entire population aged 16-74 years	% of people	EUSTAT (2018)
3 - Use of Internet Services	3.b - Activities Online	3.b.1 - News	People who used the internet to read online news sites, newspapers or news magazines	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	EUSTAT (2018)

3 - Use of Internet Services	3.b - Activities Online	3.b.2 - Music, videos and games	People who used the internet to play or download games, images, films or music	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	EUSTAT (2018)
3 - Use of Internet Services	3.b - Activities Online	3.b.3 - Video on demand	People who used the internet to use Video on Demand services	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	INE (2018)
3 - Use of Internet Services	3.b - Activities Online	3.b.4 - Video calls	People who used the internet to make telephone or video calls (e.g. Skype)	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	EUSTAT (2018)
3 - Use of Internet Services	3.b - Activities Online	3.b.5 - Social networks	People who used the internet to participate in social networks (create user profile, post messages or other contributions)	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	EUSTAT (2018)
3 - Use of Internet Services	3.b - Activities Online	3.b.6 - Professional social networks	People who have used Internet for participating in social or professional networks	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	INE (2017)
3 - Use of Internet Services	3.b - Activities Online	3.b.7 - Online courses	People who have used the Internet for doing an online course (on any subject)	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	EUSTAT (2018)
3 - Use of Internet Services	3.b - Activities Online	3.b.8 - Online consultations or voting	People who took part in on-line consultations or voting to define civic or political issues (e.g. urban planning, signing a petition)	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	INE (2017)

3 - Use of Internet Services	3.c - Transactions	3.c.1 - Online banking	People who used the Internet to use online banking	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	EUSTAT (2018)
3 - Use of Internet Services	3.c - Transactions	3.c.2 - Shopping online	People who ordered goods or services online	The entire population aged 16-74 years	% of people who have used the Internet in the last 12 months	EUSTAT (2018)
3 - Use of Internet Services	3.c - Transactions	3.c.3 - Selling online	People who sold goods or services online	The entire population aged 16-74 years	% of people who have used the Internet in the last 3 months	EUSTAT (2018)
4 - Integration of Digital Technology	4.a - Business Digitisation	4.a.1 - Electronic information sharing	Businesses who have in use an ERP (enterprise resource planning) software package, to share information between different functional areas (e.g. accounting, planning, production, marketing)	All companies (without financial sector, with more than 10 employees)	% of companies	EUSTAT (2018)
4 - Integration of Digital Technology	4.a - Business Digitisation	4.a.2 - Social media	Businesses using two or more of the following social media: social networks, enterprise's blog or microblog, multimedia content sharing websites, wiki based knowledge sharing tools. Using social media means that the enterprise have a user profile, an account or a user license depending on the requirements and the type of the social media	All companies (without financial sector, with more than 10 employees)	% of companies	EUSTAT (2018)

4 - Integration of Digital Technology	4.a - Business Digitisation	4.a.3 - Big data	Enterprises analysing big data from any data source	All companies (without financial sector, with more than 10 employees)	% of companies	EUSTAT (2018)
4 - Integration of Digital Technology	4.a - Business Digitisation	4.a.4 - Cloud	Businesses purchasing at least one of the following cloud computing services: hosting of the enterprise's database, accounting software applications, CRM software, computing power	All companies (without financial sector, with more than 10 employees)	% of companies	EUSTAT (2018)
4 - Integration of Digital Technology	4.b - e-Commerce	4.b.1 - SMEs selling online	SMEs selling online (at least 1% of turnover)	SMEs (without sector between 10-249 employees)	% of SMEs	EUSTAT (2017)
4 - Integration of Digital Technology	4.b - e-Commerce	4.b.2 - e-Commerce turnover	SMEs total turnover from e-commerce	SMEs (without financial sector, between 10-249 employees)	% of turnover	EUSTAT (2017)
4 - Integration of Digital Technology	4.b - e-Commerce	4.b.3 - Selling online cross-border	SMEs that carried out electronic sales to other EU countries	SMEs (without sector between 10-249 employees)	% of SMEs	EUSTAT (2017)
5 - Digital Public Services	5.a - e-Government	5.a.1 - e-Government users	People who sent filled forms to public authorities, over the internet, previous 12 months	The entire population aged 16-74 years	% of people who have used the Internet in the last 12 months and had to send in forms	INE (2018)

5 - Digital Public Services	5.a - e-Government	5.a.2 - Pre-filled forms	Amount of data that is pre-filled in public services' online forms	Services analysed in the e-Government *Benchmark*	Score (1-100)	*e-Government Benchmark* adapted for the Basque Country
5 - Digital Public Services	5.a - e-Government	5.a.3 - Online service completion	The share of administrative steps related to major life events (birth of a child, new residence, etc) that can be done online	Services analysed in the e-Government *Benchmark*	Score (1-100)	*e-Government Benchmark* adapted for the Basque Country
5 - Digital Public Services	5.a - e-Government	5.a.4 - Digital public services for businesses	The indicator broadly reflects the share of public services needed for starting a business and for conducting regular business operations that are available online for domestics as well as for foreign users. Services provided through a portal receive an higher score, services which provide only information (but have to be completed offline) receive a more limited score	Services analysed in the e-Government *Benchmark*	Score (1-100)	*e-Government Benchmark* adapted for the Basque Country
5 - Digital Public Services	5.a - e-Government	5.a.5 - Open data	This composite indicator measures to what extent countries have an Open Data policy in place (including the transposition of the revised PSI Directive), the estimated political, social and economic impact of Open Data and the characteristics (functionalities, data availability and usage) of the national data portal	Aggregate score	% of maximum score	Open Data Euskadi
5 - Digital Public Services	5.b - e-Health	5.b.1 - e-Health services	Percentage of people who used health and care services provided online without having to go to the hospital or doctors surgery (for example, by getting a prescription or a consultation online)	People between 16-74 years old	% of people	Eurobarometer 460 adapted for the Basque Country
5 - Digital Public Services	5.b - e-Health	5.b.2 - Medical data exchange	General practitioners exchanging medical data with hospitals and doctors	All general practitioners	% of general practitioners	*eHealth Benchmark* deployment among general practitioners

						adapted for the Basque Country
5 - Digital Public Services	5.b - e-Health	5.b.3 - e-Prescription	General practitioners using electronic prescriptions	All general practitioners	% of general practitioners	*eHealth Benchmark* deployment among general practitioners adapted for the Basque Country

6.2 WiD indicators and definitions

Dimension	Indicator	Description	Breakdown	Unit	Source and year
1 - Internet Use	1.1 - Internet users	Women who have used the Internet at least once a week	Women aged 16-74	% of women	EUSTAT (2018)
1 - Internet Use	1.2 - People who never used the Internet	Women who have never used the Internet	Women aged 16-74	% of women	EUSTAT (2018)
1 - Internet Use	1.3 - Online banking	Women who have used the Internet for online banking	Women aged 16-74	% of households	EUSTAT (2018)
1 - Internet Use	1.4 - Professional social networks	Women who have used the Internet to participate in professional social networks	Women aged 16-74	% of women who have used the Internet in the last 3 months	INE (2017)
1 - Internet Use	1.5 - Online courses	Women who have used the Internet to make an online course	Women aged 16-74	% of women who have used the Internet in the last 3 months	EUSTAT (2018)

1 - Internet Use	1.6 - Online consultations or voting	Women who have taken part in online consultations or have voted on civic or political issues	Women aged 16-74	% of women who have used the Internet in the last 3 months	INE (2017)
1 - Internet Use	1.7 - e-government users	Women who have sent completed forms to the public authorities via the Internet	Women aged 16-74	% of women who have used the Internet in the last 12 months and had to send in forms	INE (2018)
2 - Internet User Skills	2.1 - At least basic digital skills	Women with "basic" or "above basic" digital competencies in each of the following dimensions: information, communication, problem solving and content creation software. Measures based on the number of activities carried out in the previous 3 months	Women aged 16-74	% of women	INE (2017)
2 - Internet User Skills	2.2 - Above basic digital skills	Women with digital skills "above basic" in each of the following dimensions: information, communication, problem solving and content creation software. Measures based on the number of activities carried out in the previous 3 months	Women aged 16-74	% of women	INE (2017)
2 - Internet User Skills	2.3 - At least basic software skills	Women who, in addition to using basic software tools such as word processors, have used spreadsheets, created a presentation or document that integrates different files, or have performed programming. Measures based on the number of activities carried out in the previous 3 months	Women aged 16-74	% of women	INE (2017)
3 - Specialist Skills and Employment	3.1 - STEM graduates	Women with a degree in science, technology, engineering, or mathematics	Women aged 20-29	Graduates in STEM for every 1000 women between 20 and 29 years old	EUSTAT (2017)

3 - Specialist Skills and Employment	3.2 - ICT specialists	Women employed as ICT specialists	Employed women aged 16-74	% of women aged 16-74 years	EUSTAT (2016)
3 - Specialist Skills and Employment	3.3 - Unadjusted gender pay gap	Difference between the average gross salary of male and female employees and the average gross salary of male and female employees	Employed people	% of average gross salary of employees	INE (2017)

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