

**SERVICES OF GENERAL INTEREST IN RURAL AND INTERMEDIATE REGIONS.
THE CASE OF INTERNET SERVICES IN THE NORTH-EAST REGION OF ROMANIA**

**Daniela-Luminița Constantin, Tudorel Andrei, Raluca Mariana Grosu*,
Bogdan Vasile Ileanu**

Bucharest University of Economic Studies

Piata Romana 6, sector 1

RO-010314 Bucharest, Romania

E-mail: raluca.petrescu@com.ase.ro

*Corresponding author

Biographical Notes

Daniela-Luminita Constantin is a Professor of Regional and Urban Economics and Policy at the Bucharest University of Economic Studies and the Director of the Research Centre for Macroeconomic and Regional Forecasting of this university. She is also the President of the Romanian Regional Science Association and member of the Council of the European Regional Science Association. Her main scientific interest concentrates on strategic assessment methods, regional policy analysis, urban policy, EU structural assistance, and so on. Her list of publications includes a large number of books and articles published in Romania and abroad by prestigious publishers (Edward Elgar, Springer, Elsevier, Ashgate, Sage, etc.).

Tudorel Andrei is Professor of Statistics and Econometrics at the Bucharest University of Economic Studies and led the Council for PhD Studies of this university. He has been the President of the National Institute of Statistics in Romania since 2013. Currently, he also acts as Vice-Chair of the United Nations Statistical Commission. His scientific research interest focuses on income distribution, education and innovation resulting in several books and scientific articles in major international journals.

Raluca Mariana Grosu is Lecturer at the Bucharest University of Economic Studies in Romania. She was visiting researcher at the University of Seville, Spain and the University of Bari Aldo Moro, Italy. She is part of the Romanian Regional Science Association Board and member of European Regional Science Association, Regional Science Association International, Association for Innovation and Quality in Sustainable Business, and Internationale Gesellschaft für Warenwissenschaft und Technologie. She was actively involved in national and international research projects and she authored or co-authored various scientific papers on topics covering her main research interests from the broad areas of entrepreneurship, regional science and demography.

Bogdan Vasile Ileanu is Assistant Profesor at The Department of Statistics and Econometrics, the Bucharest University of Economic Studies. The Ph.D studies, completed in 2012, were focused on developing a method for intellectual capital measure. He is author or co-author of more than 20 articles published in prestigious international journals. His current research interest is interdisciplinary and connects applied quantitative methods with burden of disease, econophysics and applied economics.

Abstract

The services of general interest represent an important component of the cohesion policy of the European Union, particularly in relation to its territorial dimension, which envisages, inter alia, the fair and affordable access to this type of services. Nevertheless, considering the large variety of the European Union territories it is almost impossible to establish basic quantitative levels for all. These levels encounter variations depending on geographical and demographic aspects, traditions, life style, etc., being subject to national policies. However, the availability, accessibility, affordability, and quality principles in the provision of services of general interest must be met. This paper proposes a case study which examines the accessibility of internet services in a rural-intermediate region, the North-East region of Romania. The research is based on both the interpretation of available statistical data and the analysis of a survey results which was undertaken under the auspices of an ESPON project.

Keywords: territorial cohesion, services of general interest, rural and intermediate regions, Romania

JEL Classification: L86, O18, O21, R11

1. Introduction. Focus on theoretical and contextual frameworks

An important instrument for meeting the growth goals outlined in the Europe 2020 Strategy, the Cohesion Policy represents the European Union's (EU) main investment policy aiming to provide new jobs, business competitiveness, economic growth, sustainable development, and improved quality of life amid its citizens. In this sense, five concrete objectives are targeted, in the area of employment, innovation, education, social inclusion, and climate/energy (European Commission, 2014).

Starting from 2007-2013 programme period, the Cohesion Policy has incorporated an explicit territorial dimension, closely related to the economic and social ones. Böhme and Gløersen (2011) cited in Gløersen et al. (2016, pp. 94-95) emphasize a series of storylines of territorial cohesion referring to different aspects of European territorial development, such as: “inclusive, balanced development and fair access to services; better use of the territorial diversity and development of endogenous potentials; smart growth in a competitive and polycentric Europe; support of regions with geographical specificities; environmental dimension with sustainable development; developing and applying new participative forms of governance for the coordination of policies and territorial impacts.”

2014-2020 is the second EU programme period in which the territorial cohesion is in action. Different from the previous period, this puts a stronger focus on results, it is simplified, requires specific preconditions for channelling funds, strengthens the urban dimension and highlights the importance of social inclusion, and links its implementation to economic reform (European Commission, 2014).

Inclusive, balanced development and fair access to services represent an important understanding of ‘territorial cohesion’ and access to services of general interest (SGI) is clearly incorporated in the 2014-2020 Cohesion Policy, particular aspects being amid the 11 thematic objectives set for supporting growth. Some may refer to the following (European Commission, 2014, p. 5): “enhancing access to, and use and quality of, information and communication technologies; promoting sustainable transport and improving network infrastructures; investing in education, training and lifelong learning.”

Territorial cohesion has been closely linked to the concept of SGI, ever since the first debates; SGI are considered essential for “ensuring social and territorial cohesion and for the competitiveness of the European economy” (European Commission, 2004, p. 4)

According to the European Commission (2011, p. 3) SGI represent “services that public authorities of the Member States classify as being of general interest and, therefore, subject to specific public service obligations (PSO)”. The same document emphasizes two main types of SGI,

respectively Services of general economic interest (SGEI) and Social services of general interest (SSGI). “SGEI are economic activities which deliver outcomes in the overall public good that would not be supplied (or would be supplied under different conditions in terms of quality, safety, affordability, equal treatment or universal access) by the market without public intervention. The PSO (i.e. public service obligation) is imposed on the provider by way of an entrustment and on the basis of a general interest criterion which ensures that the service is provided under conditions allowing it to fulfil its mission” (European Commission, 2011, p. 3).

Electricity, gas, transport, telecommunication, postal services, and other services such as water supply, waste management, or public service broadcasting are usually included in the SGEI category. On the other hand, SSGI “include social security schemes covering the main risks of life and a range of other essential services provided directly to the person that play a preventive and socially cohesive/inclusive role” (European Commission, 2011, pp. 3-4) and they usually refer to education, health care, child care, social housing, labour markets, etc. “In general, SGI is a broader concept that includes services provided by governmental or public administration bodies (e.g., education systems, social protection, healthcare) and services that are partially provided by the private sector and are profitable, that is, SGEI (e.g., cultural facilities, postal services, waste management, telecommunications or transport infrastructure)”. (Maly, 2018, p. 4)

SGI should be approached as a proper lever to ensuring smart specialisation, all framed in a context where developing Research and Innovation Smart Specialisation Strategies (RIS3) represents an essential pre-condition to accessing EU funds during the 2014-2020 programme period of the Cohesion Policy. The 2014-2020 Cohesion Policy strongly promotes the idea of smart specialisation - defined as “the national or regional innovation strategies which set priorities in order to build competitive advantage by developing and matching research and innovation own strengths to business needs in order to address emerging opportunities and market developments in a coherent manner, while avoiding duplication and fragmentation of efforts; a smart specialisation strategy may take the form of, or be included in, a national or regional research and innovation (R&I) strategic policy framework” (European Parliament and Council, 2013, p. 95).

Nevertheless, there is a slight difference between the concepts of ‘Smart Specialisation’ and ‘RIS3’. Smart Specialisation represents a proper tool for any region in a framework characterized by innovation, while the RIS3 has to link research, development, and innovation to the sectoral economic structure, worldwide applicable (Foray, 2011 cited in Rotaru, 2015). In such a context, Smart Specialisation is approached as “a virtuous process of diversification through local concentration of resources and competences in a certain number of new domains that represent possible paths for

transformation of productive structures”, while the RIS3 refer to “putting in place a political process aimed at facilitating this dynamic when it cannot develop spontaneously” (Foray, 2014, p. 493).

Smart Specialisation is extremely important for both developed and less developed regions. It is obvious that developed regions provide an auspicious environment for properly approaching, exploiting and implementing Smart Specialisation. On the other hand, regions in the second category are quite disadvantaged as they have less developed research and innovation infrastructure and are less economically developed. In such a context, through the idea of Smart Specialisation, less developed regions are encouraged and supported to properly develop and exploit their regional strengths and to make a great impact in the long-run.

Smart Specialisation and RIS3 may represent two of the most powerful and appropriate instruments that can help regions to boost their growth potential. However, the results of a research developed by Rotaru (2015), revealed that less developed regions raise various issues. Some of these may refer to “the weak cooperation between Research & Development institutions and firms, as well as with the universities. On the other hand, the financing of the strategy from both public and private resources, represents a problem which extends to even a more general aspect as the financing of the research-development field. Other key-challenges are the lack of competences in technology and international marketing and the governance of the strategy without any formal mechanisms to ensure its application”. (Rotaru, 2015)

Different types of SGI, through their importance and through the functions they fulfil, influence regional development and support smart specialisation. For example, the regional competitiveness index combines indicators from 11 pillars, out of which pillars three, four, five, and six are directly related to SGI – Infrastructure, Health, Quality of Primary and Secondary Education, and Higher Education and Lifelong Learning. The connection between SGI and regional development reflects an interdependence relationship. On one hand, the level of regional development affects the provision of SGI. On the other hand, SGI have an explicit role to regional development, directly linked to growth targets and cohesion objectives, as emphasized by official policy documents (Gløersen et al., 2016).

SGI may represent a key contributor to regional development and an important lever for ensuring a smart specialisation, reaching the 2014-2020 Cohesion Policy targets, all in a framework in compliance with the Europe 2020 Strategy. According to the Territorial Agenda 2020 (European Union, 2011, p. 7), “the fair and affordable access to SGI, information, knowledge and mobility are believed to be essential for territorial cohesion”.

However, the extent to which SGI can fulfil all the above-mentioned aims, mainly depends on four key aspects: availability, accessibility, affordability, and quality (European Commission,

2004; European Commission, 2011; Bjørnsen et al., 2013; Social Protection Committee, 2010 cited in Gløersen et al., 2016, p. 97):

- “Availability assesses whether a service exists in adequate supply at the location of potential users of the service (people, businesses/firms, local communities/regions). There are SGI for which the location of service provision is crucial, but also SGI that are less location dependent which can be provided through networks and thus be made available over larger distances.
- Accessibility describes how easy and convenient it is for potential users to actually use the service, taking into consideration all types of barriers – spatial, temporal, monetary, cultural etc. – that need to be overcome.
- Affordability focuses explicitly on the monetary dimension of accessibility. On the demand side, affordability may refer to expenses a potential user has to cover, the availability of compensations and expenses covered by third parties. On the supply side, affordability deals with the adequacy of funding of the SGI provision by public authorities.
- Quality reflects some principles that need to be taken into consideration when referring to SGI, such as quality principles for the relationships between service providers and users, between service providers, public authorities, social partners and other stakeholders as well as for human and physical capital, besides principles related to the already mentioned three dimensions. Quality assurance systems for SGI are very important and high-quality service provision is considered as one central element of SGI provision in the EU.”

These dimensions of SGI are emphasized in the ‘Consolidated Version of the Treaty on the Functioning of the European Union’ (European Union, 2008, p. 308). It highlights the requirements for “a high level of quality, safety and affordability, equal treatment and the promotion of universal access and of user rights” in relation to SGI.

During the 2014-2020 programming period, the European Structural and Investment Funds, among other aspects, support infrastructure development for SGI provision focusing on their four dimensions. Public authorities should ensure the provision of SGI at certain standards in terms of quality, availability, accessibility and affordability. The minimum or basic level of SGI for individuals and enterprises – which encompasses terms like thresholds, critical mass, vulnerability applied to local community and regional level – plays a key role in this context (Constantin et al., 2013, p. 281). “The concept of a basic level of SGI may refer to the types of service provided as well as to what should be regarded as a minimum acceptable level of supply and accessibility within each type of service, in order to satisfy the specified requirements of universal access” (Bjørnsen et al., 2012, p. 25). “The approaches to the minimum level of SGI issue suggest a combination between the socio-economic dimension, which envisages the provision of SGI to everyone, and the territorial

dimension that emphasizes the provision of SGI everywhere” (Constantin et al., 2015, p. 211). Considering the heterogeneity of the EU territories, establishing basic quantitative levels of SGI at EU level is almost impossible. However, such levels are established through national policies in relation to ideologies, institutions, macroeconomic performance, also reflecting moral values, demographic structures, traditions, life style aspects, etc. (Rauhut and Littke, 2013; ESPON, 2013).

Furthermore, the territorial dimension, which focuses on the SGI provision everywhere, takes into consideration the variety of European territories, grouped into several types, significant for SGI provision. Thus, according to the ESPON classification, the following types are employed: densely populated regions (metropolitan, urban), sparsely populated regions (sparsely populated, outermost, island, mountainous, rural) and swing regions (border, costal, industrial, transition) (ESPON, 2012). The urban-rural typology of the Eurostat is also very relevant in this respect: based on the share of population in rural areas, the NUTS 3 regions are classified in ‘predominantly rural’ (more than 50% of population living in rural areas), ‘intermediate’ (the share of rural population is between 20% and 50%) and ‘predominantly urban’ (the share of rural population is less than 20%) (Eurostat, 2018a). The characteristics of these specific areas have, undoubtedly, an important influence on the terms in which the SGI are provided.

This paper aims to reveal the features of SGI provision in rural-intermediate regions, focusing on the internet services. These services represent one of the most visible and prominent SGI for the general public and are a key promoter of innovative capacity and an important contributor to competitiveness in regional development. Internet services are of a great importance, especially when considering the relevance of the Digital Agenda for the accomplishment of the strategic objective of the Europe 2020 strategy, smart-sustainable-inclusive growth. Furthermore, information and communications technology (ICT) developments impact the society as a whole and also influence economic growth and social well-being at regional level. For example, the study developed by Pellegrin et al. (2013, p. 8) emphasizes a large number of outcomes and impacts of ICT on the two dimensions of regional development – economic growth and social well-being – such as: “increased digital literacy, improved human capital, efficiency, inclusion, productivity and competitiveness, more innovative public services and goods, improved territorial cohesion, improved living conditions, reduction in social costs, empowerment and participation”.

As previously stated, the present paper focuses on internet services provision in rural-intermediate regions, proposing as case study the North-East region of Romania. This is a NUTS 2 region comprising six NUTS 3 regions (judete), each of them being included in either rural or intermediate regions according to the urban-rural typology of the Eurostat. This is the most populated

region in Romania with more than 50% of its total population living in rural areas. From an economic perspective, this is a lagging behind region.

The paper is based on updated results of the North-East region case study developed under the auspices of the ESPON project entitled ‘Indicators and Perspectives for Services of General Interest in Territorial Cohesion and Development (SeGI)’ (ESPON, 2013) by the Bucharest University of Economic Studies’ team, one of the 12 project partners. The project outlines nine case studies that explore the issues of quality, accessibility, availability and affordability in the provision of SGI, aiming to support the formulation of adequate policies for the government levels involved in the effective delivery of SGI in accordance with the various types of EU territories. Besides the North-East region in Romania, the following regions were investigated: South Gloucester, England, the United Kingdom; Mazowsze, Poland; Finnmark, Norway; Eastern Austria, Austria; Ruhr region, Germany; Dél-Alföld - Southern Great Plain region, Hungary; North-East Region, Iceland; Navarre, Spain. Their characteristics in terms of the ESPON typology are presented in Table 1.

Table 1. Regions included in the ESPON-SEGI project’s case studies, according to their relevance for the types of the EU territories

Country	Region	Region’s territorial characteristics
Austria	Eastern Austria	Border, Mountainous, Urban/Rural
Germany	Ruhrgebiet	Urban, Metropolitan
Hungary	Dél-Alföld	Rural, Border
Iceland	Northeast	Island, Coastal, Remote, Rural, Sparsely
Norway	Finnmark	Remote, Border, Sparsely, Mountainous, Coastal
Poland	Mazowsze	Urban/Rural, Metropolitan, Intermediate
Romania	North-East	Border, Rural, Intermediate
Spain	Navarre	Mountainous, Metropolitan, Border, Coastal, Intermediate
The United Kingdom	South Gloucestershire	Coastal, Intermediate

Source: ESPON, 2012, p. 127

The paper is organized into two main sections, besides the introductory part and conclusions. After introduction, the first section describes the data used in the study and the quantitative methods applied. In the second section the main obtained results are discussed. The paper ends up with a section which concentrates on concluding remarks and recommendations.

2. Methodology

With the main aim to provide a complex, comprehensive and accurate image of the internet services provision phenomenon in rural-intermediate regions, focusing on the particular case of the North-East region of Romania, the study involved both desk and field pieces of research, implying various methods of data collection and analysis. In such a framework, the study is based on various types of data: data obtained from official statistics, provided by the National Institute of Statistics and Eurostat, the most representative institutions in the field, in case of our study; data obtained from private companies such as OOKLA (OOKLA SpeedTest, 2018); data collected from the field research which consisted of carrying out a questionnaire-based survey organized within the ESPON-SeGI project; data collected by the authors from different available sources such as locality homepages, Google Maps, etc.

The desk research was mainly related to all the steps involved by the statistical analysis of data provided by official institutions.

On the other hand, the field research was carried out under the auspices of the ESPON project 'Indicators and perspectives for services of general interest in territorial cohesion and development – SeGI' (PS 1-16, No.094/2011), in which the Bucharest University of Economic Studies was one of the partners involved. The research was grounded on a questionnaire-based survey carried-out amid a sample of 108 representatives of the public administration acting in different local administrative units pertaining to all the counties in the North-East region. The questionnaire was developed by the Institute of Geography and Spatial Organization – Polish Academy of Sciences, Warsaw, one of the ESPON project's partners, under the coordination of the project's Lead Partner, the Royal Institute of Technology in Stockholm. The questionnaire consisted of ten questions containing scale variants. The questionnaire was applied at the beginning of 2012 to respondents from localities belonging to all six counties of the North-East region, namely Botosani, Iasi, Neamt, Suceava, Vaslui, and Bacau. The sample was created by means of selection criteria so as to provide an overall image on the internet services provision, as part of the broad area of the SGI, in various areas characteristic to this region. These criteria envisaged the urban-rural environment, locality area, population density, the rate of ageing population and locality landform. The total number of collected questionnaire was 108, of which 11.11% from Botosani, 20.37% from Iasi, 12.04% from Neamt, 14.81% from Suceava, 37.04% from Vaslui and 4.63% from Bacau. Taking into consideration that more than half of the region's total population lives in rural areas, in order to offer a clearer and more realistic image from the urban-rural ratio viewpoint in the North-East region, 91 out of the total 108 questionnaires were collected from the region's rural areas.

Based on data obtained from the questionnaires, descriptive statistics was employed to show the status of the internet connection in North-East region and to compare the counties within the region.

In addition, multiple binary logit models were also developed, mainly with the aim to link the quality of access on internet and some characteristics of the investigated localities. The components and form of the developed logit models are further on detailed. The dependent variable is represented by ‘access to internet’, with 1 denoting a good quality access on the internet of individuals or companies, while the zero value denotes a poor quality of internet access. This variable was computed by the authors from the ESPON sample questionnaires data. Initially it was measured on a Likert scale but since there were not enough answers on each of the five categories, it was transformed in a binary variable. In order to create more discrepancy between groups – bad quality vs. good quality, the answers placed in the middle (code 3, out of a Likert scale with five codes) were ignored.

The impact of the following covariates has been tested:

- Distance (codification: DIST), expressed in kilometres, from a certain locality to the county residence town/city. The values of this variable were collected by the authors from Google Maps.
- Locality area (codification: AREA), expressed in square kilometres. The values of this variable were collected by the authors from Google Maps or from the localities’ homepage, depending on each case.
- IDSL, which stands for the Index of Localities’ Social Development, is a variable similar to the Human Development Index, developed and estimated for the Romanian localities by Sandu (2011). Higher values of the index show a higher level of local development.
- Locality population (codification: POP) is the population registered in 2011, during the development of the latest Population and Housing Census and it was collected from public sources specific to the National Institute of Statistics (Institutul National de Statistica, 2011).
- Merging data – the density (codification: DENSIT) of population at locality level (expressed in inhabitants/square km) was computed.

Considering all the previously highlighted variables, the model was developed based on the following equation:

$$\ln \frac{p}{1-p} = \alpha_0 + \alpha_1 DIST + \alpha_2 AREA + \alpha_3 IDSL + \alpha_4 POP$$

where p denotes the probability to have a high access on the internet. The parameters were estimated for both individuals and companies subgroups.

The model suffered multiple changes in order to avoid problems of specification and hypothesis compliance. Various tests were applied (Chisquare Test, Hosmer-Lemeshow) in order to ensure the validity. Based on the achieved estimation, the odd ratios computed as exponential of the α_i are provided.

The main results of the econometrical modelling, along with the descriptive statistics of both publicly available statistical data and data resulted from the carried-out questionnaire-based survey, are thoroughly outlined in the next section.

3. Results and discussions

3.1. General contextual framework

The territorial aspects of the NUTS 2 regions have been defined based on the compilation of the ESPON typology at NUTS 3 level. In order to examine whether changes in the characteristics of the North-East region of Romania occurred compared to the initial year of the case study, Table 2 presents the distribution of population by county (NUTS 3) and residence in 2016 as against 2012.

Table 2. Distribution of population by county and residence in the North-East region

County	2012					2016				
	Total population	Urban		Rural		Total population	Urban		Rural	
		Abs.	%	Abs.	%		Abs.	%	Abs.	%
Bacau	612186	265173	43.3	347013	56.7	598141	257464	43.0	340677	57.0
Botosani	408567	166042	40.6	242525	59.4	392734	159916	40.7	232818	59.3
Iasi	774124	356552	46.1	417572	53.9	789372	363705	46.1	425667	53.9
Neamt	466644	167829	36.0	298815	64.0	453660	160718	35.4	292942	64.4
Suceava	632985	260958	41.2	372027	58.8	628813	256391	40.8	372422	59.2
Vaslui	392306	152063	38.8	240243	61.2	385844	155542	40.3	230302	59.7
Total	3286812	1368617	41.6	1918195	58.4	3248564	1353736	41.7	1894828	58.3

Source: own processing based on data provided by the National Institute of Statistics, 2018

Analysing the data highlighted in Table 2, it can be noticed that out of the six counties, three recorded an increase in the share of rural population, in one the share is the same and only two counties recorded a decrease in 2016, compared to 2012. However, as a general fact, it can be observed that in all the six counties, the share of rural population was above 50% in 2016, situation similar to the one registered in 2012. As a result, the North-East region maintained its ‘predominantly rural’ profile over the analysed period. However, according to the urban-rural typology of Eurostat, the Iasi county can be seen as an intermediate territorial unit, considering that it meets the following definition’s characteristics (which describe an exception from the general rule of ‘more than 50%’): “a predominantly rural region which contains an urban centre of more than 200 000 inhabitants representing at least 25% of the regional population it becomes intermediate” (Eurostat, 2018, p. 1).

In this particular case, Iasi city, the capital of the Iasi county, counted for 364,381 inhabitants, representing 47% of the county's population and being the second largest city in Romania, after the capital-city Bucharest.

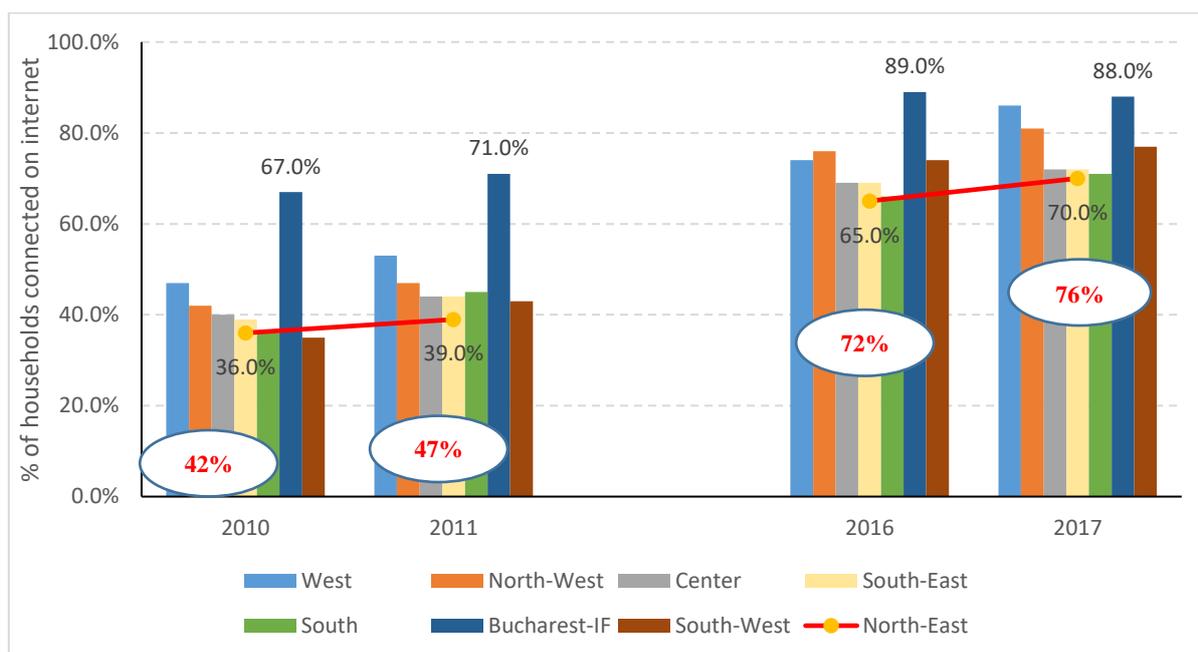
Considering the previously outlined statements, the North-East region continues to be a relevant case study for the analysis of the accessibility to internet in a rural-intermediate region. Consequently, the paper first addresses the situation of the internet services in Romania with reference to the regional inequalities in this respect. Further on, this is followed by the analysis of the research results obtained from the questionnaire-based survey regarding the households, individuals and businesses perception on the accessibility of internet services in the North-East region, undertaken under the auspices of the afore-mentioned ESPON-SeGI project.

3.2. The internet services in Romania – general facts

According to a study carried out by the American company Akamai Technologies in 209 countries and regions around the world in 2010, Romania had no rival with regard to the speed of connection to internet, being surpassed at global level only by 3 Asian countries, respectively South Korea, Hong-Kong and Japan. But, even if the speed of connection to the internet was very high, a study of the European Commission performed in 2010 as well indicated that the penetration rate of the wired internet in Romania was only of 13.7%, placing it on the last place in the European Union (ITC Media, 2011). More recent data (OAAKLA Speed Test, 2018) still show Romania in top five countries in the world and second in Europe regarding the speed of downloading in fixed broadband. In the same source Romania is also ranked 38th in terms of download speed in the mobile networks.

Latest available statistics at Eurostat indicate that 76% of the Romanian households were connected to internet in 2017 (Eurostat, 2018b). When regional data are examined, it can be noticed that the capital-city region, respectively Bucharest-Ilfov, remains on the top, with 88% of the households connected to internet in 2017. On the opposite hand, the lowest connection rate is found in the North-East region, the poorest region in Romania, from an economic point of view. In the North-East region, the internet connection rate of the households reached only 70% in the same year, as illustrated in Figure 1. However, even if the North-East region is on the last place regarding the internet connection of households, the access almost doubled since 2010. Moreover, the gap between this region and the Bucharest-Ilfov region decreased substantially.

Figure 1. Dynamics of household connection rate to the internet in Romania, by region

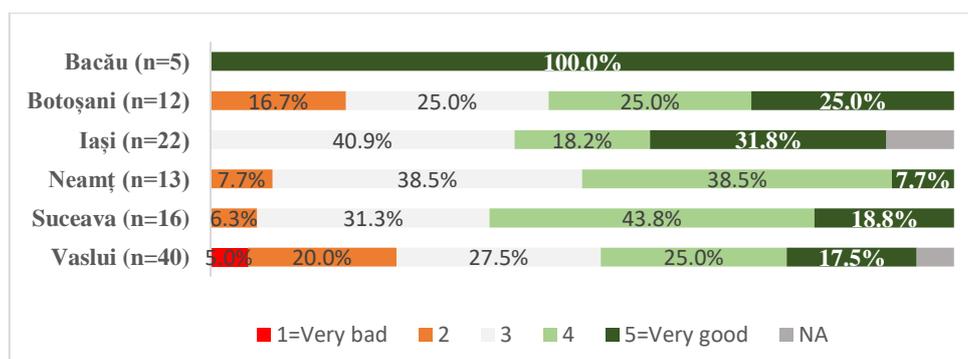


Note: National averages are shown in ellipses.
Source: own processing based on data from Eurostat, 2018b.

3.3. Accessibility to internet in the North-East region – main findings from the questionnaire-based survey

In what concerns the accessibility to broadband/internet for households and individuals in the North-East region, in general, the participants to the research manifested a positive attitude. The shares of respondents that assessed the accessibility to broadband/internet for households and individuals with four and five on a five levels Likert scale (from one - very bad to five - very good) are high. The same situation is also encountered at county level, except Bacău county, where all the respondents consider the accessibility to broadband/internet for households and individuals very good (Fig. 2).

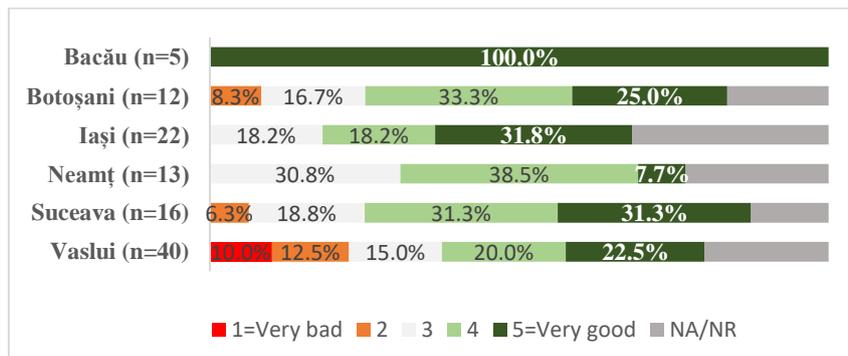
Figure 2. Accessibility to broad-band/Internet for households and individuals in the North-East region



Source: own computing based on data obtained from the questionnaires

An even more favourable situation is encountered in case of respondents' perception regarding the accessibility to broadband/internet for businesses. Both at the North-East region level, as a whole, and at county level, the majority of respondents assessed it with good and very good, as outlined in Figure 3.

Figure 3. Accessibility to broadband/internet for businesses in the North-East region



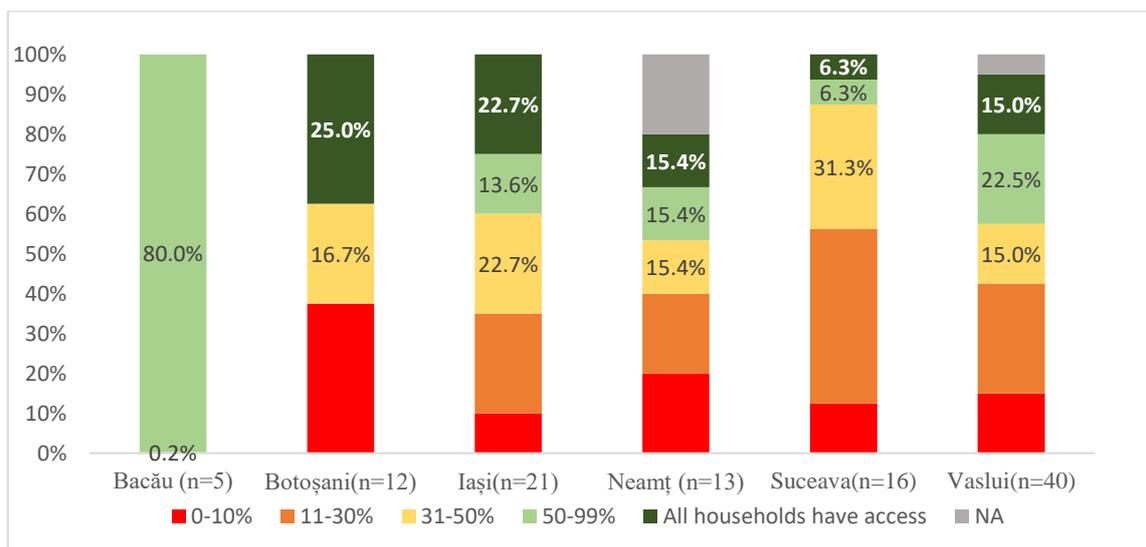
Source: own computing based on data obtained from the questionnaires

Analysing the accessibility to broadband/internet in the North-East Region, by different social groups, the majority of respondents consider that households with low income (48.6%) and elderly (22.5%) encounter a series of difficulties in accessing this service. This may be the result of several factors, which might be looked at either individually, or jointly. For example, low income households cannot afford to pay monthly internet subscription, or they prefer to prioritize their costs considering first various constraints related to the satisfaction of their basic needs. On the other hand, elderly have a small share of high education group and the interest of the old people in accessing the internet is not significant. Furthermore, elderly have a lower level of digital literacy, mainly rooted in their educational background which is strongly connected to the communist period. According to the National Institute of Statistics (2017), in the second quarter of 2017 the monthly average pension of state social insurance in the North-East region was of approx. 194 EUR, registering the lowest level amid the eight regions in Romania, in a context where the region has the highest share of retirees in Romania.

In terms of inaccessibility to broadband/internet for households and individuals, there is a strong divide between counties in the North-East region, as highlighted in Figure 4. Most of the participants to the research (22.3%) consider that only between 10% and 30% of the households and individuals in the North-East region do not have access to broadband/internet. This situation is also encountered in Suceava and Vaslui counties. However, there are cases where access to internet is very difficult. For example, in Vaslui county are communes that hardly benefit from basic SGI. In some of them, there is no gas service. Furthermore, villages where citizens have fixed telephony and

internet access, are quite rare cases. Also, in Bacau and Botosani counties the majority of respondents consider that a share between 50 and 100% of the households and individuals do not have access to broadband/internet.

Figure 4. Inaccessibility to broadband/internet – households and individuals in the North-East region



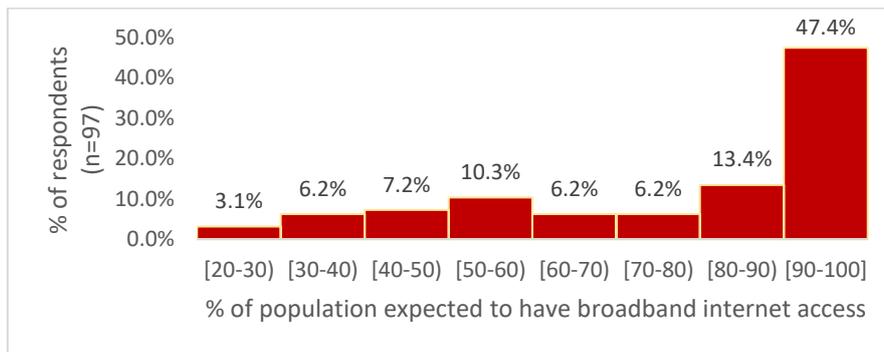
Source: own computing based on data obtained from the questionnaires

In case of businesses, the vast majority of the respondents think that all the businesses in the North-East region have access to broadband/internet, while another important share of respondents (23.3%) did not express their opinion regarding this subject. Considering the counties in the North-East region, the majority of respondents consider that all the businesses, or almost all the businesses have access to broadband/internet in Bacau, Botosani, Neamt, Suceava, and Vaslui counties, while in Iasi the vast majority of the respondents did not express their opinion.

Taking into consideration the slight inaccessibility to broadband/internet, the majority of respondents considered that most of the individuals and businesses in the North-East region should have access to these services, as illustrated in Figure 5. However, there were also situations when the participants to the research considered that access to internet should not be granted to certain individuals. Such particular cases include, among others, the elderly. Some of the respondents considered that, generally, providing internet services to elderly is useless, especially due to their low level of digital literacy. On the opposite side, in case of the ‘business’ category, almost all the participants to the research acknowledged the need for internet services, emphasizing that almost all the companies should have access to these services. The very small amount of respondents who considered that broadband internet may be less necessary to some businesses were, probably, associating their perception with the economic field of the business or the profile of the managers.

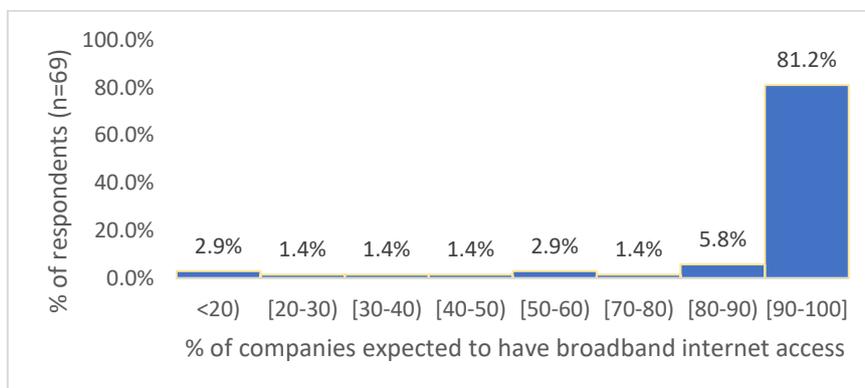
For example, potential non-broadband internet business users might refer to small local producers that act on the local market, mainly characterised by a strong knowledge and expertise in the agricultural field, but by a low or even inexistent educational attainment. (Figure 6)

Figure 5. Target share of population (individuals) that should have access to broadband/internet - respondents' opinion



Source: own computing based on data obtained from the questionnaires

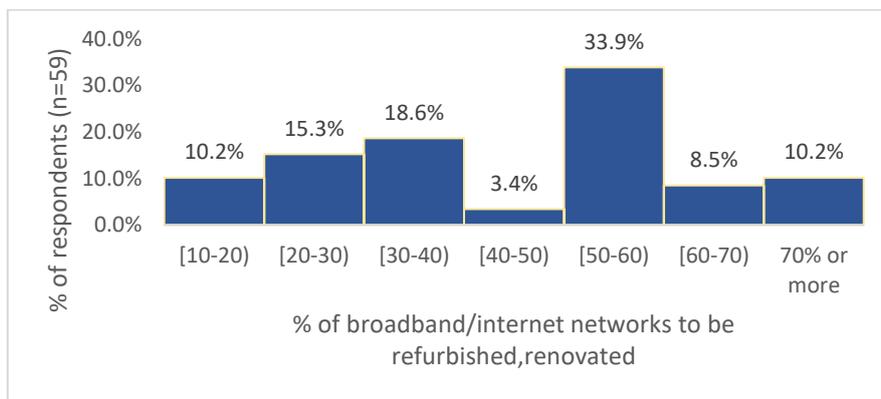
Figure 6. Target share of businesses that should have access to broadband/internet - respondents' opinion



Source: own computing based on data obtained from the questionnaires

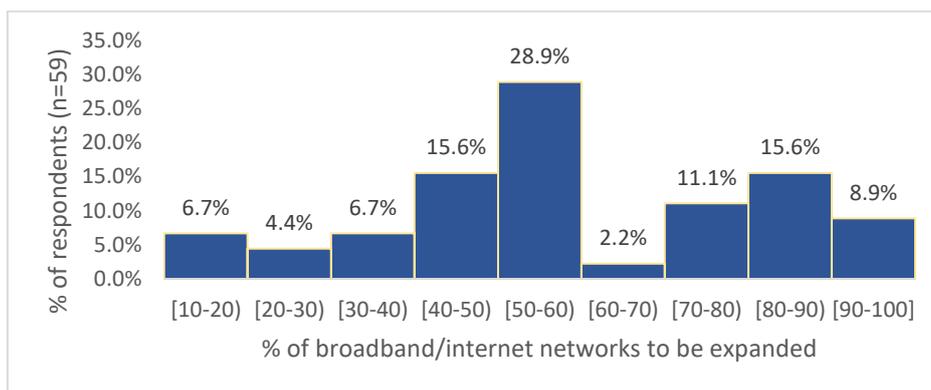
Even if, in general, the overall perception towards the accessibility to broadband/internet services was favourable, an important share of the respondents (33.9%) considered that the broadband/internet network should be renovated/refurbished in large proportion (over 50% of the current network). Furthermore, from another perspective, considering the state of development of broadband/internet in the North-East region, in general, the majority of respondents assessed that more than 50% of the current network must be expanded. (Figure 7 and Figure 8).

Figure 7. Approximate percentage that needs to be refurbished/ renovated considering broadband/internet in the North-East region - respondents' opinion



Source: own computing based on data obtained from the questionnaires

Figure 8. Approximate percentage that needs to be expanded considering broadband/internet in the North-East region - respondents' opinion



Source: own computing based on data obtained from the questionnaires

In what concerns the quality – in terms of durability, reliability and functionality – of broadband/internet in the North-East region, the majority of respondents (30.1%) perceived it as being good; on a five levels Likert scale (from one - very bad to five - very good), it was assessed with four.

3.4. Econometric modelling. Focus on the regression analysis

The regression modelling outlined in this section is mainly based on the usage of the variables described in the ‘data and methods’ part of the paper. However, it is worth mentioning again the fact that the dependent variable is a dummy one and denotes the quality of internet access.

The results of the model are presented below, in Table 3.

Table 3. Results of the regression modelling

model	Models for individuals and households			Models for companies		
	1	2	3	4	5	6
Covariate(s)/Model						
AREA	1.035	-	1.039**	1.003	-	1.027
DIST	1.050**	1.039**	-	1.034	1.037*	-
POP	1.001**	-	-	1.001**	-	-
DENSIT	-	1.025	-	-	1.037*	-
IDSL	1.185*	1.081	1.200***	1.146	1.124*	1.180**
C	*	-4.9**	-8.32**	-8.7**	-6.9**	-6.7**
Nagelkerke R Square	0.58	0.42	0.39	0.51	0.44	0.37
Overall predicted correct (%)	87.5	79.7	76.6	90.2	83.6	82.0
Sample volume (n)	64	64	64	61	61	61

Notes: #estimations were made by the authors in IBM SPSS. The values represent, except for the constant, the odd ratios ($\exp(\alpha)$)

***denotes statistical significance at maximum level of 0.01;

** denotes statistical significance at levels between (0.01 and 0.05);

*denotes statistical significance at levels between (0.05 and 0.1);

- denotes that a variable was not included in the model.

Source: own computation

As a first step, the correlation matrix of the covariates has been analysed. As expected, an average to strong linear correlation between the variables has been observed. In order to provide a detailed view of the impact of covariates on the quality of internet access, results for different type of models are mainly outlined in the above table.

The values highlighted in Table 3 lead to the idea that some factors such as distance from the county capital, the size of the locality in terms of area and population are associated with the quality of internet services in both sub-samples, ‘households/individuals’ and ‘companies’. However, these covariates are strongly related and all of them describe a social development level of a certain community. Thus, the existence of a correlation between the level of social development factors and internet quality is strongly confirmed. A good quality of internet services is achieved when the infrastructure is well developed. Another finding of the econometric modelling is mainly related to the ‘companies’ sub-sample. In this particular case, the impact of factors which characterize the social development of the community are not so visible like in the ‘individuals/households’ sub-sample. Some other drivers which are more connected with the market, economic fields, and size of companies may be studied in order to find a better relationship with internet usage and connection and quality.

4. Concluding remarks

Internet services represent an important component of SGI, contributing to turning into reality the objectives of territorial cohesion in relation to regional innovation strategies and smart specialisation. However, despite the requirements regarding the availability, accessibility, affordability, and quality

established by the European Commission, the heterogeneity of the EU territories makes it difficult to establish basic quantitative levels for all EU regions. Rather, they are subject to national policies, depending on macroeconomic performance, institutions and also reflecting demographic aspects, life style aspects, etc.

The study developed in this paper has demonstrated that the rural and intermediate regions – like the North-East region of Romania – are lagging behind not only in terms of general economic and social development level but also with regard to the access and quality of internet services. The results of the questionnaire-based survey developed under the auspices of the ESPON project indicated a positive attitude of the respondents towards the accessibility to internet in case of both households and individuals. Significant differences were noted when investigating the accessibility to broadband/internet in the North-East Region, by different social groups. Households with low income and elderly were perceived as facing many difficulties in accessing this type of service. Furthermore, even if, in general, the overall perception towards the accessibility to broadband/internet services was favourable, its network should be renovated/refurbished in large proportion (over 50% of the current network) and expanded. Furthermore, the econometrical modelling revealed that the distance from the county capital – Iasi, the size of the locality in terms of area and population are associated with the quality of internet services no matter if referring to households-individuals or to companies. Plus, the level of social development factors is correlated with the quality of the internet services, especially in case of the households/individuals. A good quality of internet services is achieved when the infrastructure is well developed.

However, in the context of the general efforts supported by the ‘Europe 2020’ objectives envisaging the smart, sustainable and inclusive growth and Digital Agenda, the overall gap between the North-East region and the most developed region of Romania, respectively Bucharest-Ilfov, has substantially decreased.

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