

SUSTAINABLE ECONOMIC DEVELOPMENT OF THE RURAL AREA OF ROMANIA THROUGH THE MEANS OF ICT

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Abstract:

This paper aims to analyze the positive impact that ICT (Information and Communication Technologies) could have on the rural area of Romania from the perspective of sustainable economic development. I will focus on 2 main factors: ICT infrastructure and economic activities from rural area impacted by ICT in Romania. The findings will be put in balance with the other countries' experience.

Key words: ICT, sustainable economic development, rural, agriculture.

JEL classification codes: O3 Q1 R2

Introduction

The role of ICT (information and communication technologies) in promoting a sustainable economic development has been already recognized by the most important institutions at global level such as UN in the "Sustainable Development Goals" and by regional level actors such as European Union in the "Europe 2020 Agenda". The impact of ICT on the 17 sustainable development goals is being analyzed by various contributors; I will focus my study in this article on stressing the possible positive effects of ICT on poverty eradication, by "empowering" the people from rural area.

From this paper perspective ICT has the mission to positively impact the small scale farming by helping the sustainable economic development of rural regions and be adopted also by the less-favored people including aged-ones. ICT shouldn't focus on large scale agriculture only, thus leading to the elimination of human being from the agricultural production chain and giving a hand to the depopulation process of rural area. It should help to improve the quality of life in village and make a bridge between rural and urban areas and connect people from rural area with the rest of the world. Otherwise we risk to become a global village without villages.

Description of the problem

In Romania 2.8 million holdings are under 1 ha, which represents 71% from the total of agricultural property. Even if this figure is going to decrease in the future, small farming is not a "phenomena" that should be eliminated. It has long been supposed that large scale agriculture, which is highly automated, is the best choice for local community and economy. In his works, Otiman (2013) advocates for the support of medium sized commercial farms, demonstrating their role in providing economic vitality. He has shown that the four severest poverty pockets in Romania are found precisely in the areas with the highest land cover by very large farms. Actually small is or can be beautiful and ICT can make a contribution to this.

From our point of view, the correct strategy wouldn't aim to decrease the number of people living and working in rural area, but allowing them to diversify the money-earning activities. Governmental strategies should help people to make the agricultural production more profitable, but also encourage other economic activities in rural areas such as: organic farming, tourism, beekeeping, hand-crafting (manufacturing) and why not services outsourcing. The aim of this article is to make suggestions on how ICT can help on this, based also on international experience.

ICT uses in rural area - international experience

In this study we are not analyzing the use of ICT for improving the healthcare, education or administration services in rural area, however it is important to mention that people's quality of life in rural area can be significantly improved by ICT means and this has of course an impact on economic results as well.

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At global level, there are already consistent examples on how ICT has improved the economic situation in villages. Surprisingly best practices from this area do not come from highly developed European countries, but from Asia (India, South-Korea, Philippines) and Africa (Kenya, Ghana, Tanzania) where small farming is still alive and authorities are putting a lot of effort in revitalizing it.

The broad categories of information required by farmers, irrespective of their location and crops can be categorized as know-how, which helps a farmer with fundamental information such as what to plant and which seed varieties to use; contextual information such as weather, best practices for cultivation in the locality; and market information such as process, demand indicators and logistical information” (Mittal et al., 2010).

Having in mind the fact that farmers are working outside and their computer literacy is not always at a high level, PC applications wouldn't be very helpful for them. Therefore developers have focused on providing accessible and user-friendly mobile applications for agriculture and rural development – M-ARDs.

Accessible mobile devices and applications have started to spread in the most remote and poor areas of Africa or Asia. In the World Bank Report for 2011 (Zhenwei, 2011) on Mobile Applications' use for Agriculture and Rural Development we can find many examples of applications covering a full range usages. Based on the above mentioned report and also on Miller's (2013) report for Food and Agriculture Organization of UN, in Table 1 we have classified these applications and explained their possible usage.

Table 1

Applications and their possible usage

Mobile Applications for Rural Development (M-ARDs)	Characteristics
M-ARDs for contextual information	Provide information regarding the weather prognosis, the spread of pests, diseases, appropriate fertilizer use, best practices, etc.
M-ARDs for marketing	Provide information regarding the selling prices and acquisition prices
M-ARDs for trade	Connect sellers with buyers
M-ARDs for logistics	Help farmers to track their own agricultural machinery using GPS technology, but also put them in contact with distributors and other delivery services providers
M-ARDs for financial services	Used for online payments or for receiving money
M-ARDs for Credit and Financing	Inform farmers on credit opportunities or grants, funds and other governmental financial assistance
M-ARDS for Insurance	Provide assistance with online insurances
M-ARDs for accounting and record tracking	Provide book-keeping software adapted to farmer's activities and needs, may have an ERP soft integrated
M-ARDs working as calculators	For appropriate use of fertilizers, pesticides, water, seeds, crops, medicines, etc.
M-ARDs for employment	Put in contact season job-seekers with farmers
M-ARDs for disaster managements	Early warning systems to inform farmers about impending natural disasters (floods, drought or cyclone)
M-ARDs for resource management	Track the usage of water, soil, air and other consumables

Source: FAO. 2013. ICT uses for inclusive agricultural value chains. Rome

As an intermediate conclusion made also by the World Bank in the above mentioned report we can say that mobile applications for agricultural and rural development (m-ARD apps):” offer innovative, dynamic, interdisciplinary services. These new services could raise incomes and create more opportunities for people in rural and underserved communities in developing countries as well as stakeholders throughout the ecosystem for m-ARD apps”.

As per an article from The Economist from Jan. 2011, in some African countries the market of mobile applications is already oversaturated. Many applications have been launched with funding from government and donors, they have been used while being free, but when it came to the next stage and farmers had to pay for them, very few IT companies could make profits on selling them. The lesson to be learned from this is that the offer of ICT applications, for small farming especially,

should be better correlated with the real needs, as the major challenge is to make the small farmers to use the software applications and improve their efficiency.

One important aspect, touched above was the implication from government in financing the applications development at first stages, in providing trainings and disseminating the information on ICT benefits. A very good example on government involvement which has already a long period of implementation is the project Information Network Village in Korea (INVIL), a platform launched in 2001. It has been designed to reduce the digital divide between rural and urban regions and to increase the income level of local residents. An interesting aspect of this project is that the initiatives do not come from central administration, being very far from the reality and thus inefficient, as usually happens, but vice-versa. Villages submit applications which must be approved to gain entry to the INVIL platform. All INVILs appear on central portal with descriptions of their agricultural specialities and tourist attractions. Orders can be made online and products can be sent anywhere in country within 3 days. Villages are supported by government in identifying potentially best selling products and branding them. In 2013 INVIL platform facilitated about 39 million in online sales and 17 million visitors. (Source: UNCTAD IER 2015)

Another example of successful development of rural area through the means of ICT comes from China. In 2009 China's main e-commerce platform Taobao registered 20 000 small businesses offering local food specialities (as per UNCTAD report from 2010). This platform has been created by the owner of Ali Baba platform and was dedicated right from the beginning to the small businesses. In 2016 this platform has already registered a number of 500 million users. Today, Taobao has two major platforms – the TMall, where established brand owners sell directly to customers, and the Taobao Market place, where smaller companies and budding entrepreneurs set up their shops.

ICT Infrastructure readiness of Romania

When starting the analysis on how can ICT contribute to rural development we need ensure that the necessary infrastructure is present. The good news is that even if compared to other EU member states, the situation is rather satisfying in Romania. As per Euractive site The European Commission estimates that in 2008 41.7 % of people living in areas of the EU with low population density (rural) had never used the internet. The Digital Agenda for Europe (DAE) included in Europe 2020 strategy aims to speed up the penetration of high-speed internet while the households and firms should take advantage of the digital single market. These targets are represented by the following indicators:

1. *internet infrastructure* which deals with internet coverage. The rural area of Romania has a good internet infrastructure coverage – house-holds with DSL (digital subscriber line) coverage represented 57%, standard - cable 96% and NGA (new generation access connection with high speed) - 25% in rural area as per 2012 data.
2. *accessibility and internet take-ups*, which indicates the actual subscribers for the different broadband technologies. The number of subscribers to broadband connections is still very low – only 35% of house-holds from rural area have a subscription.

According to Europe 2020 Digital Agenda the migration to high-speed broadband has just started but at a very slow pace; 11% of homes subscribed to at least 30 Mbps, despite the fact that high-speed broadband is available to 54% of homes, which shows that currently only a minority of EU citizens choose subscriptions to high-speed broadband. European Commission has set some Common EU broadband targets for 2025 among which one is providing access to networks offering a download speed of at least 100 Mbps to all urban and rural households.

ICT is usually perceived as an appanage of young and urban people and in some countries this is the reality. As per BRAT (Romanian National Bureau for Transmedia) in Romania the usage of internet in the rural area is 59% (comparing to 75% in urban area) and is approximately the same for various categories of age: 14-24 years = 22%, 45-54 = 16%, 55-64=17%. Other good news stressed by the same report by BRAT is that internet is not used only for entertainment reasons, as some may expect. If split by topic of interested, this report shows that 38% of people from urban

and rural area use internet for educational and personal development reasons. Having that in mind, we can conclude that from the infrastructure point of view Romania meets the necessary pre-requisites for developing rural activities based on ICT tools.

The use of ICT in agricultural and non-agricultural activities in rural area of Romania

The role of ICT in the development of rural area of Romania has been assessed as highly important by the Ministry of Agriculture and Rural Development (MARD) and included in the National Rural Development Programme for the 2014-2020 period.

A brief description of Romanian agricultural sector is required as a background:

In the Factsheet on 2014-2020 Rural Development Programme for Romania we see that approximately one third of all farms in the EU are found in Romania, with some 3.9 million farm holdings. Farming structures are highly polarized: large and medium sized farms, account for around 7% of holdings, but manage some 70% of agricultural area, and have a clear competitive potential. On the other hand 93% of the holdings are less than 5 ha, these are typically subsistence and semi-subsistence holdings, which manage the other 30% of the agricultural area.

In our opinion the poverty eradication in Romania should focus on those 93% holdings that have to be supported to find the way to a sustainable economic development. From this paper point of view, one solution could be a better usage of ICT means. For small holdings the organic or bio agriculture could be the best choice.

Marco Schulter, Director of Federation of Organic Agricultural Movements has declared for Euractiv that approximately 95% of European Agriculture is conventional, but the demand for organic products is increasing continuously. Some studies (Buizer 2015) or (De Ponti 2012) and (Seufert 2012), cited by the French newspaper Le Monde, have already proven that the organic agriculture can be more productive as it was used to believe. The difference in productivity between organic and conventional agriculture is not greater than 20%. The European statistics show that more and more farms are applying for organic certification. Between 2010 and 2015 the number of organic holdings in the EU rose by 23.4 %. As per Eurostat, the highest increases were recorded in Bulgaria, Romania and Croatia (over 100 %).

Romanian Ministry of Agriculture puts a lot of hope in developing the organic agriculture in Romania. In the National Rural development Plan 2014-2020 there is a strategy dedicated to certify organic meadows and pastures. According to latest figures 95% of the 1700 certified organic producers are animal farmers, and the majority of them hold 2-5 cows and an average of 5 hectares of meadows and pastures (Szocs 2015). In the vision of Bio Romania, an Association that stands for the sustainable economic development of agriculture and rural area, "the country could take a leading rank among the highest acreage of certified organic fields from the EU". The first challenge for the development of organic farming in Romania is the certification according to European regulations, but the next one will be undoubtedly selling the organic products on domestic and the European market. Here ICT will have a role to play in ensuring the necessary networking between the producers and clients.

Another aspect that should be stressed out when talking about the modern agriculture is the concept of **Digital Agriculture** (a term for the use of computational and information technologies to improve the profitability and sustainability of agriculture and food systems). In an article published by the Cornell University, Harold van Es, professor in the School of Integrative Plant Science (SIPS), and Joshua Woodard of the Charles H. Dyson School of Applied Economics and Management investigated how farmers from USA are incorporating digital technologies and advanced analytics into farming operations. Their conclusion was that "agriculture, like other industry sectors, stands to see tangible benefits in the form of increased production efficiencies once digital agriculture technologies are effectively employed". Mr. Joshua Woodard added that "the surge in digital agriculture technologies has led to the accumulation of large amounts of data. High-resolution soil data, site-specific weather maps, aerial imagery, nutrient applications, and milking and animal health records are being continuously generated by farms across the country", but farmers are not ready yet to benefit from these huge data because of lack of analysis capacity. So the next step, planned by the University of Cornell is to provide analytics and research capabilities to farms.

In Romania, according to Ziarul Financiar, 5% from 1,5 million farmers use ICT applications for agriculture. But the majority of applications for agriculture are dedicated to large scale producers. Some examples are briefly described below:

- Geomatic applications developed by Siveco (SIVGIS), GPS-carto provided by SC Trans Serv Agro.
- ERP (Entreprise Resource Planning) application Charisma developed by TotalSoft that is already used by large scale producers as TCE 3 Brazi, Doripesco, Agrana sau Agricola Bacău.
- There are 2 applications AQUAmax and Agro-Assist which are developed by DuPont Pioneer. AQUAmax is an online catalog for cross-breed corn which provides the user with a wide range of information regarding the products, including the information on the crops from different areas of Romania. Agro-Aist is a digital agenda that can use the location and direct this information to the nearest metrological station which can provide back information on weather conditions, soil temperature, etc. Based on this information the farmer can set his working calendar. The farmer can also interact through these applications in real time with a specialist from Dupont. But these applications are set to work only with Pioneer products.

As an intermediate conclusion on the Romanian ICT market dedicated to agriculture we can say that this market is very poor developed. The major part of IT solutions providers focus on large-scale producers. Applications for small farming are almost inexistent. Of course interested farmers can buy software from international IT companies, but in agriculture it is very important to have applications adapted to local conditions and realities. As ICT companies are looking for profit, they might wait to have real requests coming from small farmers and develop applications on demand. But as the worldwide experience has shown, in this area, the initiative should come from governmental agencies which can put in contact farmers with ICT providers and in the beginning government or external donors have to cover the expenses with product development, testing and first stage implementation. Only after some good examples of best practice we may expect a grown interest from more and more users from rural area.

Globally, according to an AgFunder (<https://agfunder.com/research/agtech-investing-report-2015>) report in 2015, technological start-ups received investments of 4,6 billion dollars for developing projects in agriculture, which was double comparing to 2014 showing an evident interest of investors in this sector. This figure should ring a bell for Romanian start-ups as well.

An important objective is the **diversification of money-earning activities** in rural area. As stipulated in RDP (Rural Development Programme), one of the 3 priorities is the social inclusion and local development in rural areas. This plan aims to create almost 27 000 jobs in rural areas, to set up and develop 3 000 non-agricultural businesses with support from government. Nearly 27% of the rural population should benefit from investments to improve rural infrastructure

People from rural area can receive between 50.000 and 200.000 Euros from European Union Funds for non-agricultural small businesses. These businesses could also benefit from ICT tools that brake the distance and time barriers. I will describe above the impact of ICT on some non-agricultural activities in rural area of Romania.

One of traditional businesses in rural area is **bee-keeping**. Even if bee-keeping is rather developed in Romania there is still a lot of place for improvement from the efficiency and profitability point of view. This can be achieved through a better use of ICT: applications for beekeeping and marketing ICT tools. The Ministry of Agriculture is coordinating the activity of Romanian bee-keepers through the National Beekeeping Programme. This Programme covers bee-keepers expenses with the IT system for hives' identification and many other expenses. There is also a platform <http://anunturi-apibio.ro/> where bee-keepers can find any product and information related to their activity, starting with medicines and ending with available transport for hives relocation. Honey and other bee-products are also successfully sold through social network sites and e-commerce tools.

From the software point of view dedicated to this activity, Romanian IT market doesn't have yet an adequate offer. On the international market, there are many ERP software products that provide basic functions of a diary but also full statistics of the development and the produce for each bee-garden and beehive by year, a map showing where fly bees etc. Romanian beekeepers need localized software products.

Hand-crafting, in organized form has almost disappeared in rural area in last decades (Otiman, 2013), but some successful examples of small businesses from rural area selling their products

via ICT tools are starting to emerge. We can find now in social media many profiles of small businesses from rural area selling traditional clothes, natural cosmetics, ceramics, wood crafts, furniture, glass crafts etc. Internet offers the possibility to reach clients from anywhere at no cost if social networks as Facebook, Twitter or Instagram are used, or at relatively low cost for e-commerce tools described later on in this article.

Tourism in rural area or **agro-tourism** is a source of earning that can be improved via ICT tools. As per Eurostat, November 2013 data, rural area of Romania offers 285 488 bed places, which is a very low number if compared to top countries as France and Italy who have around 5 mil bed places each, and it is lower than in Central European countries top performers: Poland and Czech republic which have more than 600 thousands beds each. So, there is a lot of room for improving this figure and that can be achieved through a better use of communication means (including online advertising, booking). For example on booking.com, one of the most popular searching engine in tourism, one can find about 5000 properties in rural areas in Romania.

At European level, DANTE, a project co-financed through European Regional Development Fund has also identified areas where ICT can play the role of catalyst in promoting rural tourism. This project has already promoted some successful ideas that can be implemented also in Romania, such as web portals for riding holidays for people who love horses, a project that was launched in Germany. Also, this project contributed to the development of smartphone applications for promoting the rural communities offering accommodations and other touristic services. Romanian agro-touristic destinations could be added to this European platform.

Such platforms have been already developed also in Romania, for example www.ruraltourism.ro or the portal created through a project co-financed by European Union www.cazarelapensiune.ro. Through this project an e-learning platform for tourism providers from rural area – www.intreprinatorturism.ro, has been launched.

E-commerce for rural small businesses

In Romania, even if the e-commerce is booming, the online market places for agro products are almost inexistent. In 2016 the first online Platform, called Trust, was launched. It allows small farmers to communicate via smart phones with agricultural cooperatives in order to sell their bio-products in hypermarkets. There is also an online platform where organic food providers from Romania present their offers, Bio Romania Market. The shopping is not online yet, the client just gets the coordinates of the producer and can get in touch with him later on and usually the client is the one who has to reach to the farmer. Another online shop where local producers sell their grocery products, natural cosmetics, textiles, pharmaceutical organic products and handcrafted products is Deprinromania.ro.

E-commerce could be a tremendous solution for small and niche producers from rural area, but there are some challenges to overcome, such as logistical issues related to bad road network in Romania, the payment method and maybe insufficient internet literacy. These pitfalls could be overpassed only with an implication from government.

Outsourcing – another opportunity to be analyzed is the outsourcing, especially for IT services. Romania has already followed the development model of India for IT outsourcing in urban area.

UNCTAD report from 2010 has stressed the growing interest in developing countries to undertake domestic outsourcing. For the expansion of the ICT sector to have a significant impact on the rural poor, linkages between the urban and rural areas are important (Tiwari, 2006). According to Ernst & Young (2011), there are more than 50 successful Rural Centers in India providing BPO Services to both domestic and global clients. Rural BPOs have come up as an alternative for low -end, low-skilled data entry work in IT, or payroll processing, billing and insurance-claims review (Thoppil, 2012). For the expansion of the ICT sector to have a significant impact on the rural poor, linkages between the urban and rural areas are important (Tiwari, 2006). There are also freelance IT jobs that can be performed also from rural area. An example in this direction is Bangladesh. As per statistics provided by 2014 A.T. Kearney report, there were more than 650,000 freelancers in Bangladesh registered on Upwork (*Upwork is a California-based website, previously known as Elance-ODesk when two companies merged*) alone, though their skills and track records vary. In 2013, Bangladeshi freelancers on Upwork earned \$21 million.

Conclusions and future directions to be approached

The contribution of modern ICT is felt in all rural activities, whether it can be economically quantified or not, if we refer to the social impact through the use of e-learning and e-healthcare systems.

The role of information dissemination being almost achieved, the next challenge of ICT would be to improve the use of IT applications which can directly influence the economic indicators of small farming and small business in general in rural area. It is important to mention also that the know-how transfer has to be bilateral, which means that farmers need to collaborate with ICT developers when creating new applications. ICT applications should address the real needs of farmers. Organic or Bio farming for example has a history of thousands of years and each local community has transferred best practices between generations. Fortunately that information hasn't yet been lost in Romania and what ICT can do is to digitalize it and make it available for the next generations in a more attractive and effective manner.

Bibliography:

- Alecu B, Agricultura a atras atenția industriei de IT. „5% din cei 1,5 milioane de fermieri utilizează aplicații când cultivă terenul“, Ziarul Financiar, 28th of November 2015
- Buizer B, Organic farming has the best credentials for an adequate sustainable food supply <http://www.sustainablefoodsupply.org/en/organic-farming-has-the-best-credentials-for-an-adequate-sustainable-food-supply/>
- Hall M., ICT seen as a key to rural development small-scale farming, accessed from <https://www.euractiv.com/section/agriculture-food/news/ict-seen-as-a-key-to-rural-development-small-scale-farming/>, last accessed on 19th December 2016
- Hayes M, Digital agriculture report looks to data-driven future, Cornell Chronicle, 16th of November 2016, accessed from <http://www.news.cornell.edu/stories/2016/11/digital-agriculture-report-looks-data-driven-future>
- Le Hir P , L'agriculture biologique, plus productive qu'on ne le pense, Le Monde, 10.12.2014
- Miller C., V.N. Saroja and Chris Linder, ICT uses for inclusive agricultural value chains, Food and Agriculture Organization of the United Nations, Rome, 2013, last accessed from <http://www.fao.org/docrep/017/aq078e/aq078e.pdf> in December 2016
- Mittal S. and Mehat M., How Mobile Phones Contribute to Growth of Small Farmers? Evidence from India. From Quarterly Journal of Agriculture 51 (2012), No. 3: 227-244, http://ageconsearch.umn.edu/bitstream/155478/2/2_Mittal.pdf, (last accessed in December 2016)
- Oțimă P., Romania's Present Agrarian Structure: a great (and unsolved) social and economic problem of our country, Institute of Agricultural Economics, Romanian Academy, Bucharest, 2013, last accessed from www.fao.org/docrep/017/aq078e/aq078e.pdf in December 2016
- Szocs Attila, Will organic farming save “unbalanced” Romanian agriculture?, 6 April 2015, accessed from www.arc2020.eu
- Tiwari M (2006). An overview of growth in the ICT sector in India: can this growth be pro-poor. World Review of Science, Technology and Sustainable Development, Vol. 3, No. 4: 298-31
- Thoppil D., Indian Outsourcing Companies Go Rural Villages Are Home to an Untapped Work Force, but Internet Infrastructure Needs to Catch Up, The Wall Street Journal, Sept. 2012, accessed from <http://www.wsj.com/articles/SB10000872396390443618604577623451428599944> in December 2016
- Ureche A., Internetul in mediul rural mai accesibil decat apa curenta, BRAT report last accessed on 19th of December from http://www.brat.ro/assets/events/2015/03/06/16/01._arina_ureche___prezentare_zcm_2015_internet_rural_1.pdf
- Yee A., IT Freelancing Grows in Bangladesh, April 1st, 2016, accessed from <http://www.voanews.com/a/it-freelancing-grows-in-bangladesh/3264214.html>

- Zhenwei Qiang C., Siou Chew Kuek, Andrew Dymond and Steve Esselaar,
- ***, Mobile applications for Agriculture and Rural Development, ICT Sector Unit, World Bank, December 2011
- ***, The Economist, 27 Jan. 2011 “Clever services on cheap mobile phones make a powerful combination - especially in poor countries, accessed from <http://www.economist.com/node/18008202> in December 2016
- ***, UNCTAD sees new opportunities in the ICT sector for the poor, 13 October 2010, last accessed in December 2016 on <http://unctad.org/en/pages/PressReleaseArchive.aspx?ReferenceDocId=13953>
- ***, UNCTAD, Information Technology Report 2015, Unlocking the Potential of E-commerce for the Developing Countries, last accessed from
- ***, http://unctad.org/en/PublicationsLibrary/ier2015_en.pdf in December 2016
- ***, UNCTAD, Information Technology Report 2010, ICT, Entreprises and Poverty alleviation, accessed from http://unctad.org/en/docs/ier2010_embargo2010_en.pdf
- ***, Europe 2020 Digital Agenda Strategy accessed from <https://ec.europa.eu/digital-single-market/en/europe-2020-strategy> in December 2016
- ***, National Rural Development Programme for the 2014 –2020 period Official version 1 –1st of July, 2014, http://www.madr.ro/docs/dezvoltare-rurala/programare-2014-2020/PNDR_2014_EN_-_2020_01.07.2014.pdf last accessed on December, 13th, 2016
- ***, Eurostat statistics on tourism last accessed in December 2016 from http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics/ro
- ***, Rural Shoring: upcoming avenues for ITes, an Ernst&Young report accessed from <http://www.ey.com/in/en/industries/technology/techbytes---rural-shoring--upcoming-avenues-for-ites---1>
- ***, Programul National Apicol 2014-2016, <http://www.madr.ro/docs/agricultura/programul-national-apicol/prezentare-detaliata-pna-2014-2016.pdf>
- ***, ATech Investment Report, Year in Review 2015, accessed from <https://agfunder.com/research/agtech-investing-report-2015>
- ***, Factsheet on 2014-2020 Rural Development Programme for Romania https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/ro/factsheet_en.pdf#page=1&zoom=auto,-121,298, last accessed in December 2016
- ***, Eurostat http://ec.europa.eu/eurostat/statistics-explained/index.php/Organic_farming_statistics#Total_organic_area
- ***, https://www.mae.ro/sites/default/files/file/Europa2021/Strategia_Europa_2020.pdf
- ***, <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>
- ***, <http://www.arc2020.eu/> and <http://www.bio-romania.org/>