

ROMANIA WEST REGION COMPETITIVENESS ENHANCEMENT AND SMART SPECIALIZATION

Smart Specialization Case Studies Report

Intermediate Report

May 2013

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1. Introduction

The previous five reports under this assignment have provided a complete mapping of the key competitiveness factors in the West Region of Romania. Drawing on complementary methodological approaches the reports were intended to: i) assess the recent trade performance of the West Region; ii) evaluate the overall competitiveness of West Romania firms; iii) assess the linkages between economic activity, trade and location in order to identify the challenges of further developing and industrializing the region iv) carry out a qualitative analysis of factors that shape the economic development of the region; v) assess the logistics and transport infrastructure of the country and the region in particular.

In order to complement the desk-work research conducted so far, the current report evaluates the economic specialization of the West Region of Romania, following a sector approach in order to enable a richer understanding of sector-specific contexts. Six clusters of sectors were selected for in-depth analysis, not because they are seen as “winning” activities per se, but because of their representativeness and potential in the West Region’s economy. These clusters are:

- **Automotive**
- **Textiles**
- **Agri-food**
- **ICT**
- **Construction**
- **Tourism**

The current report has three main complementary objectives. Specifically, it seeks to:

1. provide a critical overview of the strengths and weaknesses of the sector’s productive system, detailing demand and supply characteristics;
2. investigate the capacity of firms to adopt new technologies, taking into account the available skills composition, sector-specific regulatory restrictions, access to finance, etc. and considering the specific determinants of technological upgrading in the sector;
3. identify smart specialization niches within the target sectors, as well as the opportunities arising at the level of business and research and technological development infrastructure (RTDI) co-operation, as a way to detect the growth opportunities that lie ahead in these industries prior to the 2014-2020 programming period.

This report is structured as follows: Section 2 presents a brief overview of the *smart specialization* concept and introduces the analytical framework that will be applied to evaluate the economic specialization of the West Region of Romania; Section 3 presents an assessment of the local research and technological development infrastructure (RTDI) services, and discusses how the West Region RTDI ecosystem can be utilized and improved in order to sustain economic growth and unleash the regional potential in research, technological development, innovation, and entrepreneurship; Section 4 provides a detailed analysis at the sector-level which identifies the comparative advantages and the main bottlenecks to growth in the six target industries. Section 5 outlines areas for policy action.

2. Analytical Framework

The Europe 2020 strategy has set out three main reinforcing growth strategies to confront the structural weaknesses of the continent under a crisis scenario: i) smart growth, based on knowledge and innovation; ii) sustainable growth, promoting a more resource efficient, greener and competitive

economy; and iii) inclusive growth, fostering a high employment economy delivering economic, social and territorial cohesion. Investment in research, innovation, and entrepreneurship represents the core of this approach. In 2011 the European Commission (EC) launched the 'Innovation Union'¹ flagship initiative, which introduces the concept of a 'smart specialization strategy' which aims to increase the impact of the research and innovation policies of Member States on economic growth. This framework builds on the concepts developed by Foray and van Ark (2007) and David², Foray and Hall (2009)³, and should be understood as a knowledge-driven approach to growth that will build on existing comparative advantages, will help develop new activities in places where a strong comparative advantage might arise, and will promote a larger contribution of the knowledge factor to economic growth. Thus, the role of 'smart specialization strategy' is to act as a flexible system that endorses iterative learning by emphasizing the role of monitoring and evaluation mechanisms in the development of the strategy but does not target certain economic activities. This allows for policy experimentation which is crucial for structured learning and a systematic adjustment of programs and policies towards the pre-defined objectives.éééé

Following this approach, Member States have been encouraged to define research and innovation policies for their smart specialization strategies (RIS3) and, more formally, the Commission has made the submission of a RIS3 an ex ante conditionality for access of Structural Funds in the 2014-2020 period.⁴

Against this backdrop, the current report follows a sector level approach in order to assess the economic specialization of the West Region of Romania and to identify smart specialization niches within the target sectors. The methodology used for this sectorial analysis draws on a recent study by Correa and Guceri (2013)⁵ which provides a framework to investigate the economic specialization of a region (or country) and then to identify targeted innovation and research policies that can nurture the growth potential of the economy.

Based on the idea that information is asymmetric and incomplete, the authors argue that a public sector governance structure that discourages efficient risk management and the collective decision making processes that are inevitably biased towards incumbents' interests may hinder the government's capacity to properly select sectors or products that may induce an economic transformation. As a result, ***the effectiveness of targeted innovation and research policies depends heavily on the information available in the market on whether the region (country) of interest has any sectors with observable comparative advantages.***

Building on this concept, Correa and Guceri propose three cases in which different degrees of information about economic specialization imply different chances of success with sector targeting:

¹ http://ec.europa.eu/research/innovation-union/index_en.cfm

² Foray, D. Van Ark, B. (2007): Smart specialisation in a truly integrated research area is the key to attracting more R&D to Europe. Knowledge Economists Policy Brief n° 1 October 2007

³ Foray D., P.A. David and B. Hall (2009) Smart Specialisation – The Concept. Policy briefs by the "Knowledge for Growth" Expert Group.

⁴ See Commission's Cohesion Policy proposal -- COM(2011)615 for 2014-2020 . More recently, as an effort to inform this process the EC has issued the Research and Innovation Strategies for Smart Specialization (RIS3) Guide which outlines six steps to establish a national or regional strategy, starting with an analysis of the economic specialization of the country or the region; continuing with the establishment of priority areas and of the consultative process through which these priorities should be determined; concluding with the set of monitoring and evaluation mechanisms necessary for implementation.

⁵ Correa, Paulo and Irem Guceri (2013), "Research and Innovation for Smart Specialization Strategy, Concept, Implementation Challenges and Implications," Working Paper, World Bank, DC, USA.

- **Regions with apparent comparative advantage**
- **Regions with latent comparative advantage**
- **Regions with unknown comparative advantage**

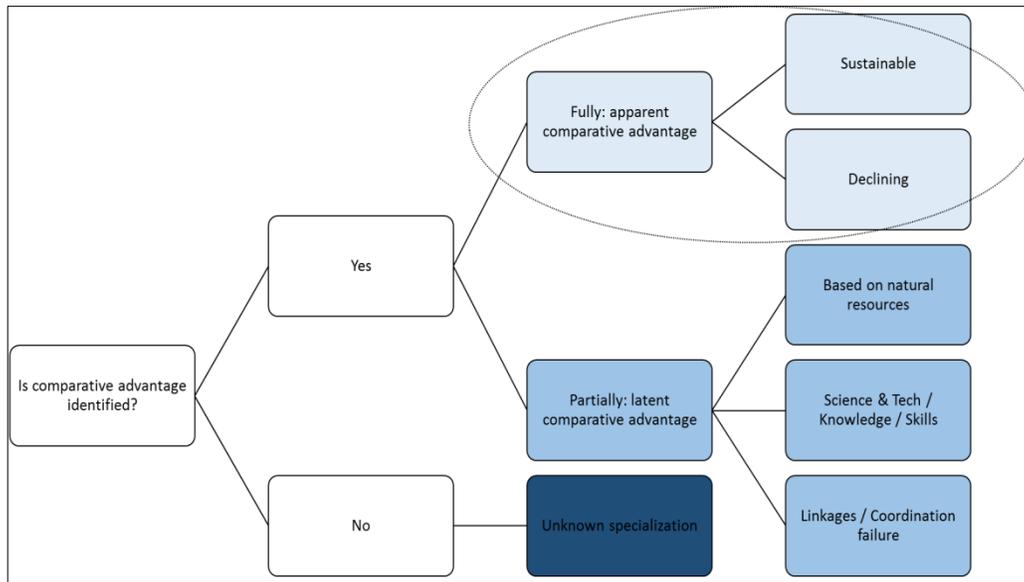
Regions with apparent comparative advantage. These are regions where a number of industries are already well-developed and have attained a level of competitiveness that allows the local firms in these sectors to export on the global market. In such cases, the key indicators and consultations with stakeholders should agree on the region's comparative advantage. However, regions of this type might be experiencing growth or decline, therefore the pattern of specialization adopted so far might not be sustainable in the long term. In this case, targeted R&D and innovation policies might be useful to "complement existing productive assets", helping firms to maintain a competitive edge in the sector by investing in R&D or regain competitive advantage lost to new players in the global market.

Regions with latent comparative advantage. These are regions where there is no significant industrial activity in the economic sector where the specialization potential is envisioned. However, the region may have the required knowledge due to (i) availability of a non-tradable, location-specific input, such as a natural resource, or an immovable asset (land and climate for example); or (ii) local common knowledge about the economic activity, a tradition prevalent in the region that indicate potential for specialization. In this context, R&D and innovation policies (and also investments in skills-formation and other business development services) may be useful to 'unleash' existing comparative advantages.

Regions with unclear specializations. When the available information does not indicate any observable asset in a particular area of specialization sector targeting becomes less recommendable. In this context, policy-makers should focus on creating an enabling environment for efficient market selection allowing such specialization to emerge as a result of entry, exit and experimentation. This means combining measures that promote firm entry and startups – possibly high growth potential firms – and allowing firm exit. In this case, research and innovation policies play a central role in promoting entry but other policies are also relevant such as facilitating access to credit, skills and information; and improving the business environment (such as adopting pro-competition regulation in the service sectors).

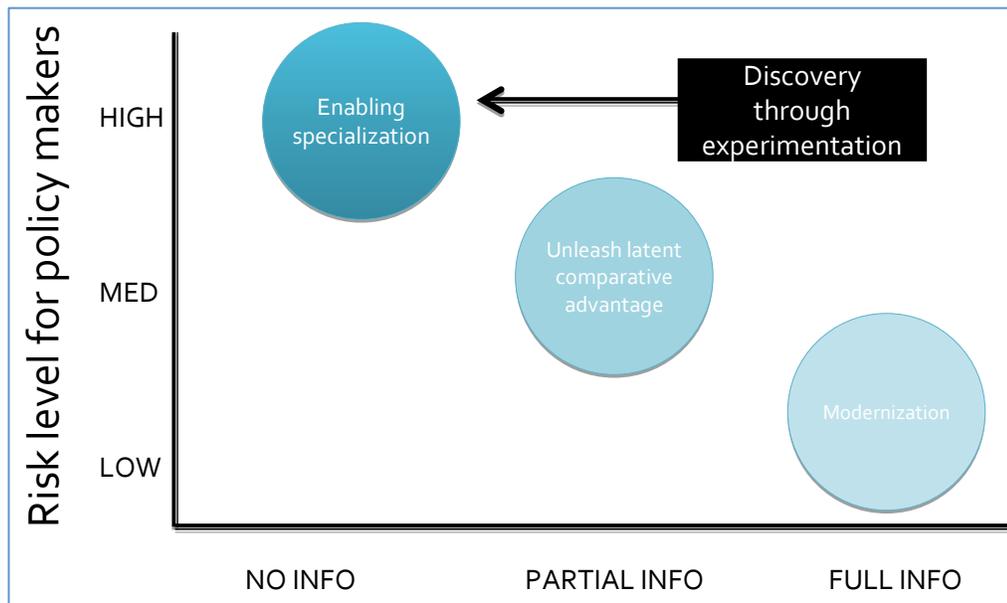
This approach is summarized in Figure 1 and Figure 2 below; the first one present the guidelines to analyze economic specialization while Figure 2 summarizes the argument that different degrees of information about economic specialization imply different chances of success with policy/sector targeting.

Figure 1-Understanding Economic Specialization



Source: Correa and Guceri (2013)

Figure 2 - Access to information, risk level and policy making



Source: Correa and Guceri (2013)

Therefore, in order to design a successful RIS3, it is critical to understand whether knowledge is a binding constraint against structural transformation of the region, as this also determines the nature of policy recommendations. If binding constraints relate to more structural bottlenecks on business environment, the region need to prioritize addressing these constraints, while taking into consideration the next steps in research and innovation in its medium or long term agenda. On the other hand, targeted research and innovation policies can help sound companies in regions with *apparent* comparative advantage to keep a competitive edge in international markets or to cope with growing international competition, or support potentially high growth companies to unleash *latent* comparative

advantage through, for example, R&D and innovation policies, investments in skills formation, or other business development services.

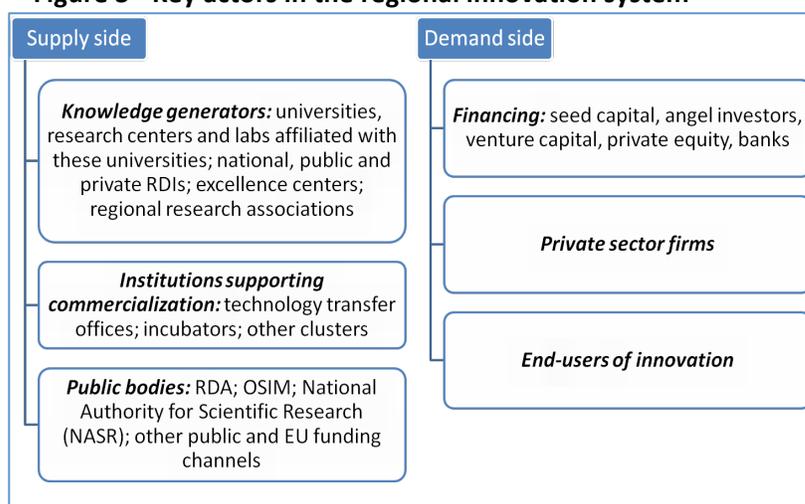
The results to be presented in the current report draw primarily on the discussions of the World Bank team with the main suppliers and users of research and development infrastructure and services in the West Region of Romania. These stakeholders have provided invaluable insights to help identify some of the binding constraints faced by the region and the opportunities that lie ahead prior to the 2014-2020 programming period.

3. An Assessment of the Supply of RTD Services in the Region

The World Bank completed a Functional Review of the Romanian RTDI Sector in 2011.⁶ The Review findings draw attention to some national-level limitations including those with respect to the lack of high enough national level oversight, thinly spread public resources without a focus, poorly monitored public institutes and gaps in the legal framework for the protection of intellectual property. Most importantly, the Review underlines that R&D and innovation seem to be missing from the political discourse on how to achieve sustainable growth, which is at odds with the high emphasis on this topic in countries that compete with Romania.

While the national-level constraints identified remain relevant at the regional level, some major constraints specific to the West Region have been identified. The following sections present a brief overview of the main actors in the West region's innovation system as described in Figure 3.

Figure 3 - Key actors in the regional innovation system



3.1. Overview

The West Region's total investments in R&D as a share of per capita income⁷ dropped from 0.3 percent in 2008 to 0.18 percent in 2009, which meant a return to the 2004 level of R&D activity. Over the same period, the EU-27 average for this metric has risen steadily to a stable 2 percent. The Regional Innovation Scoreboard⁸ for 2009 ranks all Romanian regions except Bucharest-Ilfov among low innovation performing regions and the West region is no exception to this overall poor performance.

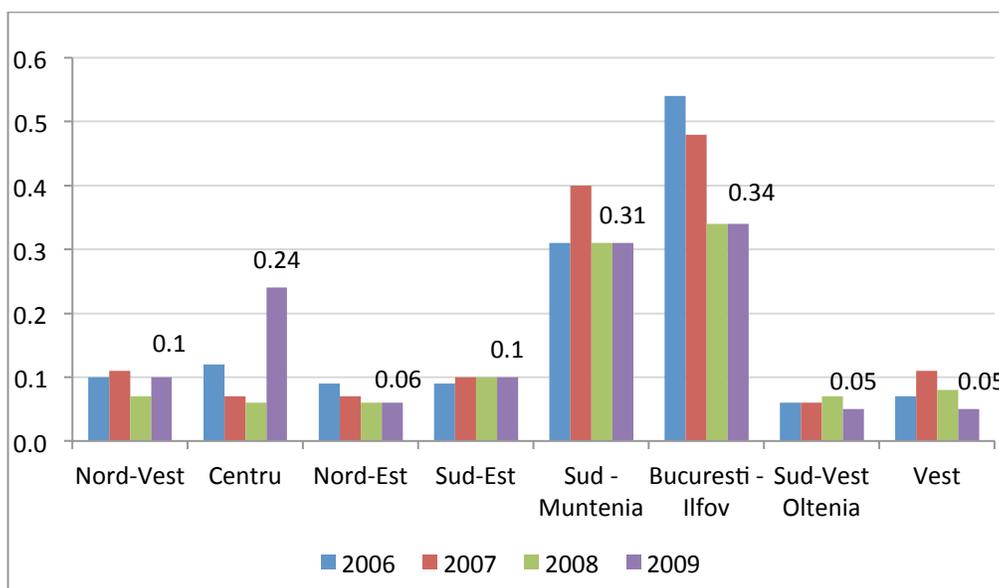
When the R&D spending of the private sector is considered separately, the situation is similar: firms in the West region spent around 0.05 percent of GDP in 2009, which is significantly less than the EU-27 average of 1.25 percent of GDP (**Figure 4**). Within Romania, this proportion places the West region in the lowest rank along with South West-Oltenia in the field of business R&D.

⁶ World Bank 2011. "Research, Development and Innovation Sector", Final Report, Washington, DC.

⁷ Source: Eurostat.

⁸ Regional Innovation Scoreboard, Pro-Inno Europe, 2009 report.

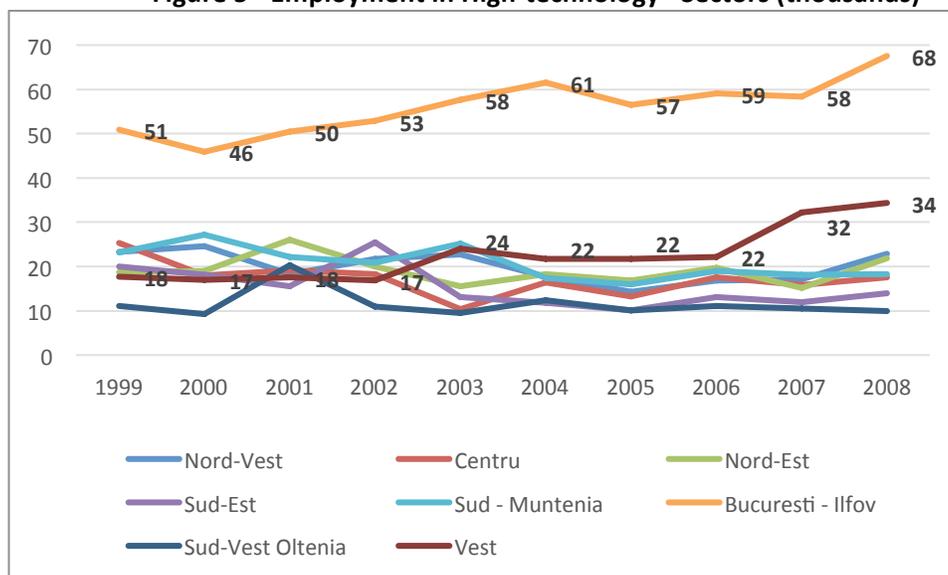
Figure 4 - Business Enterprise R&D Expenditures as % of GDP



Source: Eurostat

The West region is characterized as the second region in Romania after Bucharest-Ilfov in terms of employment in high technology manufacturing. The number of people working in high technology sectors in the West region has been steadily increasing since 2006 (Figure 5). In 2008, this number reached 34,000 employees compared to 22,000 in 2006 and only 17,000 in 2002.

Figure 5 - Employment in High-technology* Sectors (thousands)



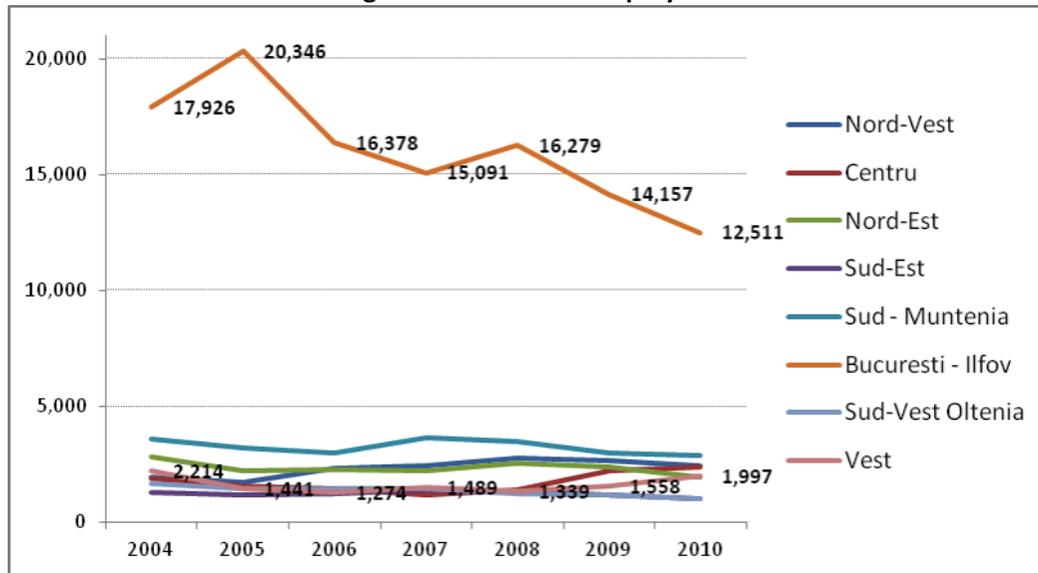
Source: Eurostat.

Note: * high-technology manufacturing and knowledge-intensive high-technology services

However, the number of R&D personnel (full time equivalents) in the West region was about 6 times lower than in the Bucharest-Ilfov region in 2010 and among the lowest when compared to other regions in Romania. This number was 1,997 R&D employees in 2010 still below its 2004 level of 2,214 R&D employees (Figure 6). Despite the low levels, the number of R&D employees in the West region has

been growing since 2008, whereas, in the Bucharest-Ilfov region it has been declining at a fast pace since 2005, dropping from 20,346 in 2005 to 12,511 in 2010.

Figure 6 - R&D total employment



Source: Eurostat

Universities and Research and Development Institutes (RDIs)

There are seven public universities in the West Region, out of which four are based in Timisoara, one in Arad, one in Petrosani, one in Resita, and Politehnica University has a branch in Hunedoara (Annex 5). In addition, there are seven private universities, which are located in Timisoara, Lugoj, Deva and Arad. Specialization areas of these higher education institutions vary, but the region is especially strong in natural sciences, mathematics, computer science, food engineering, agriculture, medical and veterinary sciences.

Requirements for academic advancement differ across universities and faculties. For natural sciences, these include publications, participation in both national and international conferences, and ownership of intellectual property. Previously, commercialization potential of academic research, which can be imperfectly proxied by patents, was not rewarded in the university tenure tracks. Recent changes in the provisions for academic progression allowed a broader range of evaluation criteria with minimum thresholds set by the Ministry of Education.

Important research institutions in the West region are the National RDIs. Some of these are regional branches of large National RDIs headquartered in Bucharest, altogether covering a large spectrum of focus areas. Capacities and sizes of these institutes vary considerably, between less than 10 to more than 100 researchers, depending on whether the lab is a branch of a Bucharest-based RDI or if it is an autonomous institution. Likewise, the number of publications in ISI journals and patents held by West region RDIs range from zero up to levels competitive with the rest of the country.

The majority of Romanian research institutions (National RDIs, RDIs under the Romanian Academy, private not-for-profit RDIs, universities and other public research institutions) have access to public financing from the research budget. The National Authority for Scientific Research (ANCS)⁹ has

⁹ Autoritatea Nationala pentru Cercetare Stiintifica

launched a certification system to evaluate these institutions in order to reassess the status of National Institutes (where applicable) and to determine, in the case of each RDI, whether the institution meets the eligibility criteria for public funding. According to this classification system, the grades, from the highest category to the lowest, are: A+, A, A-, B and C. Institutions which receive A+, A or A- are eligible for public funds, and can be considered National RDIs, whereas those that receive a B or C grade cannot be classified as National RDIs.

For these evaluations, ANCS Advisory Council gathers a committee composed of a minimum of 5 evaluators, half of which are international experts. Out of the five West region National RDIs interviewed, three had finalized the evaluation process¹⁰, as ANCS had been unable to gather a committee of international experts specialized in the areas of focus of the remaining institutes. Given the timeline provided by ANCS that projected to start evaluating National RDIs in the November of 2011, the process seems to be taking extremely long, adding to the financing uncertainty for many of the RDIs.

Major universities in the region have started to invest in technology transfer, but such investments are yet at early stages. A recent example of an initiative to facilitate the transfer of knowledge to industry is the joint e-Austria institute formed with the participation of the Computer Science Departments of the West and Politehnica Universities and the Research Institute for Symbolic Computation at the Johannes Kepler University in Linz. The institute has ongoing projects with private partners in Austria, Germany and Romania. Another example of the recent efforts to foster collaboration between universities and the private sector are the agriculture extension services provided by the Banat University of Agriculture and Veterinary Medicine (this project was initiated with a contribution from the World Bank MAKIS project funding in 2008).

Infrastructure

There are industrial parks in a variety of locations, in Arad, Resita, Hunedoara and Timisoara, but no technology park exists in the region that could provide support services for innovative activities. A section of the Timisoara Industrial and Technological Park (PITT) project was initially designed to serve as a technology park, but financing constraints prevented the development of the technology leg of the project.

The West region has a fluctuating supply of infrastructure and services provided for innovative firms, especially in the ICT sector. Until recently, the region used to host one business incubator focusing on ICT (Timisoara Business Incubator, UBIT), which organized trainings and networking events for its tenants. UBIT was initially funded by the County, the City and Politehnica University and offered its tenants 75% subsidy on rental space in addition to the above-mentioned activities. Currently, the City and the County both have own projects for ICT sector incubating facilities, and Politehnica continues to host the companies on subsidized rent, but the building no longer serves as an incubator..

A private initiative for ICT sector incubation facilities is the Start up Hub located in the City Business Center. Pro bono activities of the community include those that target potential entrepreneurs and ICT enthusiasts from a wide range of age groups; from school age children as young as seven year-olds, to high school and university students. For entrepreneurs, networking events, workshops and trainings are organized with the aim of facilitating new firms in the ICT sector. Financing constraints limit the capacity to institutionalize the activities of Start up Hub.

¹⁰ These institutes were reported to have obtained top grade in the certification.

Innovation finance

Main public funds available for research and innovation are sourced by either European Union (EU) or national funds and are mostly managed by ANCS at the national level. The allocation of these funds into certain activities follows the guidelines set by the National Research, Development and Innovation Strategy. In Timisoara, ANCS has a liaison office which organizes local seminars to disseminate information about available financing, assists with applications at the local level, and reviews application documents from local candidates, but project funding decisions are made at the central level in Bucharest.

Banks are the next available source of financing for the private actors, but large collateral requirements and the high cost of borrowing are among the factors which render bank financing less accessible and desirable for entrepreneurs. The difficulty of obtaining bank credit has some repercussions on access to European funds, as these funds require a bank guarantee equal to the amount made available to the private actors. European funds are released once the applicant achieves a pre-determined performance target in relation to the financed project. This requirement is perceived as a risk by private stakeholders and constitutes a reason to avoid using this type of funding wherever possible.

A few recent investments by local business angels, despite small in number so far, seem to offer a promising source of funding and mentorship for early stage innovative activity to be considered in the future. Another fund that was recently made available at the national level is Catalyst Romania, which was launched in late 2012 as a result of collaboration between the European Commission, the European Investment Fund (through the JEREMIE instrument), 3TS Capital Partners and Banca Transilvania Asset Management. The fund is planned to invest between 200,000 and 2,000,000 Euros in small companies in the ICT, media and services sectors.

Links between regional actors and key economic activities

Tehimpuls, an office established in 2006 within the West Region Development Agency (ADR Vest) to act as an interface between the regional actors in the innovation system, is well-positioned to promote innovation and facilitate interaction between the R&D units and the private sector actors in related industries. The database of research offers and requests published by Tehimpuls enables the dissemination of information on research activity at universities and RDIs for the knowledge and use of the private sector. In addition, the office has a significant role in fostering communication between the parties through fairs and other gatherings.

There are two sector-focused clusters formed to facilitate interaction and cooperation between the actors operating within these sectors. The automotive cluster was established in 2007 and the ICT cluster was inaugurated in 2011. Led by the ADR Vest, these clusters gather a large number of stakeholders including, but not limited to¹¹, private sector firms and associations; universities; RDIs; members from Timisoara, Arad, Deva City Halls; Timis, Arad and Caras-Severin County Councils.

3.2. How Can the Local RTDI Ecosystem Contribute to Increase Competitiveness in Key Economic Activities?

The research and technological development infrastructure of the West Region is essential for the economic development of the area. This role can be fulfilled via two main channels:

¹¹ A full list of participants in each cluster can be obtained from the West RDA. The list provided here is by no means exhaustive.

commercialization of research conducted within universities and research institutes, and public instruments to enhance private sector innovation efforts.

3.2.1. Commercialization of research at universities and RDIs

Incentives for academic research, funding and collaboration with the private sector

The promotion criteria in academia continue to offer very few incentives to conduct research at international standards. In 2007, academics of the West region have produced 45.4 scientific publications per million inhabitants¹², which is about a third of the amount produced in the Bucuresti-Ifov region. By this comparison, the West region ranks fourth in the country, slightly below the North-West region, and 250th out of 268 EU regions at the NUTS2 level. Interviews with university representatives have revealed that this low ranking is due to a great extent to a long-standing tradition according to which many academics still focus solely on their teaching duties and ignore the research component required by their positions. This mentality problem has been reported to be slowly diminishing, as the new standards reward success in research efforts.

A major issue that constrains the national RTDI ecosystem is the lack of political ownership for research and innovation, which leads to policy uncertainty for potential innovators, reducing the probability that they will engage in substantial innovative activities. Regardless of political color, policy makers should agree on an objective set of necessary reforms to achieve the country's R&D, innovation and technology goals. The latest examples of policy reversals have taken place in the areas of human resources funding and the criteria for academic advancement¹³.

Available public funds for both universities and RDIs target mainly basic research, overlooking the importance of the proof of concept, early-stage technology development, product development and commercialization phases of the invention process¹⁴. On the other hand, the real value creation and productivity gains in the economy from the applications of research and development activities only occur in these latter stages.

Even for financing basic research, public funds available to RDIs have been falling, with the prospects of further decline in the future due to the financial crisis. The uncertainty is aggravated by fact that the ANCS evaluation of the institutes is yet to be undertaken in some cases. Cross-border cooperation projects alleviate this problem for some of region's RDIs, but capacity remains low. In order to hire good researchers, the well-performing RDIs in the region rely on funds generated through consultancy, training, testing and certification activities. Such services provided by RDIs are crowding out research activities.

Best practices show that under reliable prospects for commercialization, the research efforts of an RDI or a university could constitute a large proportion of its income, which would ideally be contracted by the private sector. Yet, in the West region private sector demand for the research performed at RDIs and universities is reported to be extremely low, due to the information asymmetry between the RDIs/universities and firms.

National RDIs in the West region have seen their budget for research decline in recent years, while the proportion of income from the private sector has increased to reach 50% on average (see Annex 3 for a detailed breakdown). This is different from the budget composition of all National RDIs,

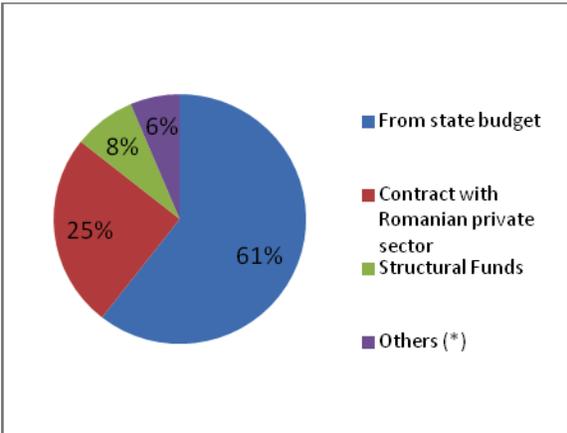
¹² Thomson Reuters Web of Science & CWTS database (Leiden University).

¹³ The details of these policies are beyond the scope of this study.

¹⁴ Based on the Sequential Model of Technology Development and Funding, by Branscomb & Auerswald (2002), cited in the Research, Development and Innovation Sector Functional Review for Romania (World Bank, 2011). Further information on funding through national and EU programs can be found in this Functional Review.

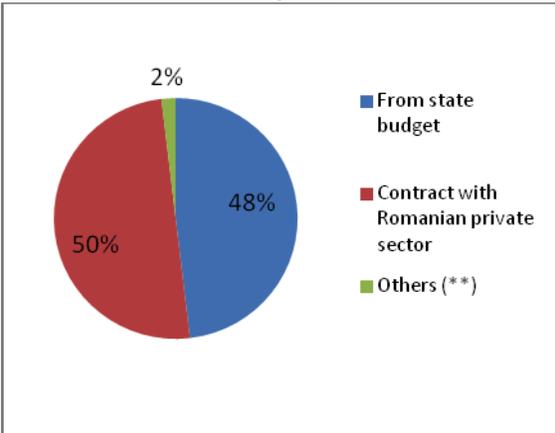
for which the majority of the budget still comes from the state (61%) and includes also a sizable share of structural funds (8%) (Figure 7 and Figure 8). However, based on the interviews carried out as part of this analysis, it appears that in many cases the private sector does not buy research but testing, consulting and accreditation services.

Figure 7- Funding of National RDIs, 2010



Source: ANCS Survey on 47 national RDIs
 Note: include Contract with foreign firms, direct funding from ANCS and MERYS, and FP6-FP7

Figure 8- Funding of National RDIs located at West region, 2010



Source: ANCS Survey on 47 national RDIs
 Note: include Contract with foreign firms, direct funding from ANCS and MERYS, and FP6-FP7 and Structural Funds National RDIs in the West Region: INCD ECOIND, ISIM, INCEMC

Research and innovation of a new or improved product or process is costly, and the universities/RDIs are unable to communicate to firms the extent of the costs on the outset, which suggests the region may benefit from intermediary bodies which could facilitate better communication. Interviews have revealed cases of projects which were withdrawn after long negotiations between the private sector and the university/RDI researchers. In these cases, collaboration was initially proposed by the private sector, but when the university/RDI launched the project, the funding offered by the firm fell far short of the research costs. Another difficulty faced by the universities/RDIs in partnership projects was the inefficiency and red tape involved in procurement procedures which slowed down the ability of research institutions to adapt to the changing demands of the partner firms.

It is difficult for RDIs and universities to retain well-trained young scientists and engineers due to the uncompetitive salaries and lack of funding. The best students in the graduating classes of the Politehnica and West Universities prefer to work for the multinational companies located in the region, to emigrate to pursue further studies abroad or to work in the private sector in other countries. In addition, it is sometimes difficult for young researchers to meet the qualification requirements for national research projects, for which the lead researcher must be a tenured faculty member.

Technology transfer

To create a culture of academic entrepreneurship, researchers at universities and RDIs need to better understand the idea of commercialization through licensing and spin-off companies. Researchers still have extremely limited knowledge on these various mechanisms available to them for commercializing their work. In addition, universities in the West Region have no institutional knowledge that would allow them to assist members in order to promote their ideas in the market.

There are a few examples of successful university spin-offs in the region, which established private sector connections through personal contacts, but did not benefit from any assistance from their respective universities, and did not obtain seed or angel investment in the early stages. In fact, these new enterprises are still facing serious funding problems. Universities do not currently have any establishments such as marketing divisions for university R&D or targeted technology transfer offices. These facilities can help entrepreneurial academics to access funds, apply for intellectual property protection, or approach clients.

In addition to the gaps in the incentive mechanism, an important reason for the limited number of university spin offs is the lack of focus on applied research. Publications by many academics in the West Region are concentrated in theoretical fields and basic research, which have little potential for commercialization without extensions in application. Part of the reason for this is the funding gap for more applied work, while part is attributable to the academic tradition that persists in the region's universities. In order to extract productivity gains from this knowledge stock, an emphasis on applied sub-fields is essential. This, on the other hand, should not mean abandoning the existing work on theoretical fields.

When it comes to collaborative projects with the private sector, the hands of academics are tied not only by the academic tradition of a teaching-focused system, but also by the inflexibility of legislation regarding civil servant salaries and payments. A researcher cannot receive a higher payment from a collaborative project than their own salary from the university, which was reported to be very low for young researchers.

Tehimpuls has a different and broader coverage than a specialized technology transfer office, and therefore, its function to support the full life cycle of an invention is limited by capacity and funding constraints. Given the wide spectrum of industries covered by these activities, it remains a challenge to improve the outreach and provide tailored solutions for specific commercialization projects.

Intellectual property

In 2008, the West region had only about 7 EPO patent applications (per million labor force), according to Eurostat, fewer than in Bucharest-Ilfov (14), but more than other Romanian regions which had 0-2 applications per million labor force. Despite the seemingly better performance in comparison to the Romanian average, the West region is drastically lagging behind comparators in the rest of the EU in terms of intellectual property protection for its inventions. For instance, again in 2008, Del-Alfold and Eszak-Alfold in Hungary made 35 and 14 patent applications per million labor force, respectively. In the regions of highly developed countries in the EU, this metric ranges between 100 and 800.

In the interviews conducted as part of this analysis, the high costs of hiring patent attorneys emerged as the main reason for the low score in international patenting. A secondary reason was the lack of "vision" and the knowhow necessary to approach international bodies in order to apply for patents and then to exploit their commercial value to the fullest extent. Even in cases where an EPO or USPTO patent is granted, there is not much experience with licensing and hence not enough awareness about the potential gains from such activities. In most cases, the overall costs of patenting are believed to exceed the benefits, partly due to the lack of clarity in the rules governing the ownership of intellectual property (See Box 1).

Patent applications, where available, are predominantly for national patents. Romanian patents are perceived mainly as a tool for academic career advancement, while the creation of real commercial value through intellectual property is close to non-existent. Research centers and project budgets allocate a small amount of annual of funding, if any, to obtain local patents in Romania (for example,

US\$ 1,400 allocated in 2011 for 1 patent at the Physics Institute at West University). It is not commonplace to make formal assessments of the commercialization potential of existing patents.

Box 1: Intellectual Property Legislation and Protection in Romania

Romania has a number of regulations on IP including laws no. 64/1991 on patents, 8/1996 on Copyright and Related Rights, ordinance no. 57/2002, Laws no. 350/2007, 129/1992, and 1134/2010, among others. There are several contradictions in these laws regarding invention ownership and its transfer. This creates negative views among business representatives based in Romania as well among potential foreign investors. For instance, according to the Patent law (64/1991) that applies equally to public and private sector, in order to have ownership rights to an invention, a person is required to register the invention in the patent office (the law states 'The right to the patent belongs to the inventor or his successor in title (...) Any person who has submitted, (...) a patent application with OSIM or successor in title, shall have a right of priority, starting from the filing date from any deposit, on the same invention, having a later date'). On the contrary Ordinance 57 and 6/2011 aim to assign the ownership of the research results funded from public resources to the RDIs (law states: 'research results obtained from execution of a contract research and development or innovation partly or wholly financed from public funds belonging to contractors directly performing activities under the grant agreement and / or employees, under funding contracts and legislation effect on industrial property and copyright). Moreover, there are contradictions in 8/1996 law related to software, where some articles protect an author of the invention while others protect the employee's right.

Source: Quoted from the Romania Research, Development and Innovation Sector Functional Review, 2011 (p. 33)

The cost of an application for an EPO patent can be included in the project proposals, as Aurel Vlaicu University, located in Arad, has done on some occasions. Aurel Vlaicu University consults an IP advisor to help file the EPO patents. The services provided by this IP expert cost around EUR 30,000 per application. According to discussions with interviewees at Aurel Vlaicu University, the assessment of novelty of specific research results was made by the principal investigator, who is familiar with the latest developments in the relevant scientific fields.

3.2.2. Public Instruments to Enhance Private Sector Innovation

Public funds

ANCS-administered funds have been reported to have three major drawbacks for innovative firms in the region: (i) amounts and availability have declined severely in the aftermath of the crisis, both because the 2007-2013 programming period has been drawing to a close and also due to adverse economic conditions; (ii) long processing times for the existing funds caused some projects to become outdated; (iii) policy uncertainty regarding some funding sources, as explained in the preceding paragraph.

While most of the key sectors are reluctant to use public funds due to extremely long approval processes, the ICT sector, because of its dynamic nature, suffers the most when using public funds available for research. Even after a funding decision has been made, the amount of time taken by the authorities to monitor the project, and bureaucratic difficulties throughout the project implementation stage are particularly burdensome. All these processes usually occur before reimbursement, adding to the financial uncertainty for the innovators. In the case of the ICT sector, in a year's time the innovative product becomes obsolete and loses its market.

The reimbursement principle has led some beneficiaries of public research funds to bankruptcy during the crisis period. Lack of financing and reimbursements nature of the contracts are major problems for the firms undertaking research and innovation projects. The interviews have revealed that some firms committed to projects which relied on public funds that were allocated for research, but due the lengthy process of project approval, implementation and reimbursement, some of these companies failed to sustain the project and needed to liquidate.

Local training specializations and economic activities

There are ongoing efforts to align higher education curricula and training specializations with local economic activities, based on traditional specializations. A good example of such alignment is the interaction between the University of Petrosani and the National R&D Institute for Mine Safety and Protection to Explosion (INSEMEX), where the University offers a mining program which is in line with the local economic activity and the highly specialized focus areas at INSEMEX. This allows the RDI to employ high skilled researchers upon completion of their degrees and offers students at the University of Petrosani to apply for internships and part time jobs at the institute. Another example is the newly developing practice of agriculture extension services at USAMVBT¹⁵.

The alignment of higher education curricula with emerging local specializations is being established by the participation of private sector representatives in the consultative councils of universities, in exchange for attractive future employment opportunities for their students. Universities have reported that the “private sector is heard” when decisions about curricula are made. From the private sector’s point of view, the Automotive and ICT clusters have been useful in achieving this type of coordination to a certain extent.

Unfortunately, the more common scenario is the lack of alignment, especially between higher education institutions and the private sector. As a result, the availability of suitable skills in the region has been reported as a major challenge posed by the education system, which is slow in adopting a more applied curriculum, and lacks the focus on multidisciplinary approaches and teamwork. In its turn, the private sector is criticized for not being fully involved in the education processes, but merely interested in the recruitment of good students rather than in contributing to the education system.

The universities and public officials also expressed concern that the skills demanded by the large multinational enterprises (MNEs) in the region are too specialized and rigid (for example, development of expertise in a specific design software, or CNC machinery operation). This narrow view of the university level education is at odds with the current educational paradigm, which encourages students to develop a variety of capabilities through reasoning and searching for information on their own.

To achieve productivity gains from local skill formation, it will be important to incentivize the private sector to consider long term investments in the regional university system, promoting the inclusion of multidisciplinary approaches, practical courses and internships, both in the curricula of technical programs and as separate certification courses. When the private sector requires specialized practical knowledge, it should be willing to offer such courses jointly with the university, through open communication and constructive dialogue between the parties. The current practice of acquiring the best students is unlikely to help expand the skill set available in the region.

At the medium skill level, the lack of specialized vocational high schools has been reported as a drawback of the national education system. The issue is one that should be addressed at the national

¹⁵ Banat University of Agricultural Sciences and Veterinary Medicine

level, but at this stage it is worth highlighting the importance of accumulating a pool of specialized medium-skill labor force.

Infrastructure

In general, business incubators are designed to help startups through their initial years of establishment by providing services such as access to utilities (internet connection, electricity, telecommunications, logistics), marketing and sales assistance, capacity building activities including trainings for employees, mentoring, intellectual property advice and management, connections with investors, and more. In return, incubators monitor the progress of their tenant startups, and usually have a firm graduation requirement beyond which point the companies are required to sustain themselves. This ensures that incubators do not turn into hard infrastructure facilities that only offer rent at lower prices than the market.

There are incubation facilities in the region that host a variety of sectors, ranging from labor-intensive activities such as clothing/tailoring, to web design and other ICT-related areas. One of the incubators that started out as an ICT-only facility was UBIT, which no longer offers the value added services listed in above. Currently, UBIT only serves as an office building that offers reduced rent space within Politehnica.

In its early years, UBIT had defined a graduation policy, which required tenants to leave the incubator after two years, but this requirement was never enforced because of a lack of demand. The incubator, during its active years, never achieved full capacity, despite the fact that the services offered by UBIT were the best available in the region.

While it was serving as an incubator, UBIT organized and hosted many activities including mentorship and training, but had no market test for its services, which were offered pro bono. There are still promising efforts to create local tech “communities”, but these are the result of voluntary initiatives by the involved actors and do not create any funding to support the sustainability of such activities. In the incubators that are being inaugurated currently, the implementation of a costing mechanism for such activities and an associated revenue-generation channel, may reduce the reliance of the incubator on funding from public actors.

No structured mentorship programs are available in the region. UBIT offered one mentoring scheme (with an individual mentor), but the incentives for mentors were not clear (mostly voluntary). Best practices in business incubators pair up mentors with firms based on a mutually beneficial relationship: mentors need an incentive to prepare the incubated firms for larger scale activities. Many times these incentives take the form of shareholding, or simply of taking a first look at the technology that the incubated firms are developing and the opportunity to participate in the ownership and management of intellectual property. Mentors also facilitate the access of firms to investors.

In terms of ongoing business incubators projects in the region, the supply of infrastructure (i.e. space and services) is likely to be unbalanced in comparison to local demand. For instance, the Timis County and the Timisoara City Councils are each investing in large business support infrastructure projects for the IT sector, but local stakeholders have expressed concerns over the lack of a proper demand assessment and the potential excess supply of infrastructure in the specific sector. The occupancy rates at former UBIT are also informative of the excess supply of such services.

Industrial parks in the region have been hit by the financial crisis as many tenant firms have either stopped or suspended their operations in the region. In the periphery of the West Region, tenants of industrial parks are companies which operate in medium-low technology sectors such as mining, metal processing, construction, electric components and textiles. Foreign companies which reside in the

industrial parks tend to bring the technologies from their home countries and not develop any technology in the region.

3.3. Considerations for Policy Actions

In order for the research and innovation infrastructure in the West Region to sustain the economic development of the area and help increase the competitiveness of local firms, policy makers must address the weakness of the RTDI ecosystem, and leverage existing strengths. In this context, this section summarizes the region-specific opportunities and challenges discussed so far and outlines a number of policy recommendations which can be implemented at the regional level.

Rather than building new infrastructure to host start up companies, emphasis should be made on developing high value added services in existing infrastructure offers in the region. Institutionalized mentorship schemes, sponsored networking and training programs may be considered among such activities.

The West Region is capable of equipping university students with good technical skills, competitive at the level of world best practices. In order to complement this technical skill with practical experience in modern laboratories abroad, **the region can consider scholarship programs designed to send students for postgraduate study or internships abroad, with the conditionality of returning to a home institution upon completion of their studies.**

Local financiers of innovation expressed interest in **establishing a seed fund to invest in regional innovative activity.** This initiative may be coupled with regional resources to generate a fund-of-funds structure which can be designed to re-invest part of the proceeds from successful projects.

The research undertaken at knowledge generating institutions, predominantly the RDIs do not seem to be marketable, nor do they meet the demands of the private sector. Investments in innovation are by nature risky and academics are not highly knowledgeable about the market's pricing for the risks involved in marketing the products. In most cases, firms do not perceive these institutions as capable of meeting their knowledge needs, and hence offer very low prices for academic research.

Technology transfer may be in form of a licensing agreement with a private firm, or a spinoff company established with participation of the main scientist involved in the project. **Targeted technology transfer offices (TTOs), either in-house within the universities or sector-specific for the key economic activities may be useful in carrying academics' ideas to the market.** The functions of such offices should be carefully designed, with caution to refrain from creating yet another layer in the bureaucracy, additional paperwork and delays for the researchers. The sole function of a targeted TTO should be to facilitate the commercialization of the academic research, carrying applied researchers' ideas to the market and also promoting applied research within the universities and RDIs.

Mentorship and training can achieve the goal of turning ideas into businesses. Innovators, who are potential entrepreneurs, are very good in technical training, but they are not able to apply these ideas in practice. These individuals need to establish a company, consult with legal advisers who will guide them in approaching investors, and pitch their ideas to these investors. **An incubator, in its true sense, can have the objective to turn the ideas into companies, not necessarily provide funding, but at least prepare the company for investment.**

An immediate sectoral application of an incubation facility with institutionalized training, mentoring and networking functions can be in the ICT sector, since there is already an existing community for supporting startups in this field. There are already well established entrepreneurs that grew from the UBIT incubator, whose directors may consider mentoring activities. Local angel investors could also be considered as potential mentors.

In terms of alleviating the burden of acquiring intellectual property protection for inventions, co-financing of patent applications can be a feasible means of support in the light industry, construction and energy efficiency sectors, where relevant RDIs have reported to have made some attempts at protecting the intellectual property generated within the institute, where the RDIs have been unable to cover the full costs of the patent application.

4. Bottlenecks for Development of a Knowledge-Driven Economy: a Sector Level Analysis

The idea behind RIS3 is promoting a larger contribution of knowledge and innovation for economic growth while building on existing or new areas of comparative advantages. Investing in R&D and technology would facilitate increasing the knowledge content in products/services provided and upgrading to higher value added activities. This is the only way to prevent the current comparative advantages being solely driven by low costs of production.

As shown in the previous chapter, there is not enough investment in R&D and innovation activities in the region to help establish a cluster of sophisticated and value added activities. Nevertheless, there is evidence of existing opportunities to unleash the innovative potential in key economic sectors.

In the **automotive sector**, collaboration with research organizations is facilitated through personal connections and the cluster. The most important drawback of the RTDI system for this sector is the supply of qualified engineers with practical knowledge required to work on design and development, as the theoretical focus at universities is once again underlined as a drawback of the system.

In the **textile sector** R&D is mostly conducted by the multinationals, which are clients of local producers, leaving to local companies only the production stage of the process. This exercise has low added value, and recently the local companies operating in the sector have started to introduce new technology in order to produce full products rather than only components.

As a result of the significant human capital supplied by regional universities, the **ICT sector** in the West region emerges as an internationally competitive player, not only in software development activities, but also for the higher value added activities, including design and engineering.

In the **agro-food sector**, the most important concern is the lack of trust on the private sector's side in the quality of research undertaken at universities and RDIs. Part of this problem is caused by an information asymmetry between the private sector and universities/RDIs, and part has to do with the ability of universities to respond to the needs of the private sector.

The **construction sector** has recently begun to engage in collaborative projects with the university and RDIs (apart from certification and consultancy) and companies report that the bilateral relationships with Politehnica University have been producing promising results. Most of the R&D projects in this sector focus on energy efficiency solutions.

In the **tourism sector** competitiveness is strongly linked to the creation of a regional innovation system that can facilitate the absorption of knowledge and its dissemination. In this context, a strong collaboration with the West region ICT cluster, universities and cultural stakeholders is necessary to promote the West region as a tourism destination.

This chapter provides an evaluation at the sector-level which identifies the comparative advantages as well as the main bottlenecks to growth in the six target industries that constitute the focus of the current analysis. In this assessment, **the term "sector" refers to specific industrial clusters** (based on NACE 2 classification) as defined in Annex 1.

4.1. Automotive Sector

4.1.1. Sectoral overview, comparative advantages and challenges

Since mid 2000's automotive sector¹⁶ took over the dominance of economic activity in the West Region from the textile industry. The World Bank report on "Territorial Assessment: Profile, Performance, and Drivers of Growth" have shown that the auto cluster is the most prominent in employment and revenue for the region. It employs close to 15 percent of the employment (around 56,000 employees). This is also the highest employment level of the sector across Romania followed by South-Muntenia region. In output terms, the sector is responsible for 18% of the total turnover in the West Region. Between 2008 and 2010, the cluster alone was the major source of growth in employment and turnover for the region, and it is actually the only cluster among agro-food, ICT, textile, and tourism that had positive employment and turnover growth (Table 1).

Table 1- Performance of selected clusters in the West Region (annual % growth rate, 2008-2010)

Cluster	Employment	Turnover
Agro-Food	-4.3	0.7
Auto	9.2	13.1
ICT	-7.7	-11.5
Rest	-10.1	-5.2
Textiles	-9.9	5.5
Tourism	-13.9	-17.9
Construction	-23.1	-12.2

Source: World Bank staff calculation based on SBS

The automotive sector is in the top five sector in terms of revenue and employment generation in almost each county of the region. In a complementing report of this project a *shift-share growth decomposition* analysis is presented which looks at the relative growth rate of a sector in a particular region with respect to the national economy (see the World Bank report "Economic Geography Assessment: Territorial Development Challenges in the West Region"). According to this assessment the most prominent cluster in the region is automotive sector, which grew strongly at the national level, but even more rapidly in every one of the counties of the West Region most notably in Caras-Severin then in Timis and Arad. This finding is noteworthy that the motor vehicles sector is among the leading areas of specialization in all counties. Thus suggests that investments that catalyzed growth in Timis and Arad are spreading to some extent to other parts of the region.

Between 2005 and 2011, share of auto cluster in exports went up by 10 percentage points and reached to almost 52 percent. Currently about 90% of the output of the sector is accounted by exports. One caveat to this strong export performance is that majority of export products are low or mid-tech outputs (see the World Bank report "Trade Outcomes Assessment".)

The wage rates in the region are more than 10 percent below the national average of auto sector which plays an important role in the region's comparative advantage and its attraction of foreign multinational corporations (MNC). More than half of the firms in the sector have some foreign ownership. These firms account for about 90 percent of value added, employment, and exports.

Development of the auto sector in the region has benefitted the auxiliary industries that serve primarily local markets. However this cooperation is below the desired levels. The core of the auto sector including mainly parts and components manufacturers who are linked to export markets

¹⁶ Annex I presents a detailed definition of sector clusters.

experienced double digit growth in terms of both turnover and employment between 2008 and 2010 (20.5 percent and 10.6 percent in respective order). On the other hand, auxiliary industries recorded a more modest growth of 3.5 percent in output and a decline of 12.2 percent in employment.¹⁷

The region has many productive assets in the sector. Complementing these assets with targeted R&D and innovation policies to increase the local knowledge will help firms to maintain their competitiveness and develop sustainable growth strategies. **West Region has an apparent comparative advantage in focusing on auto sector.** Some of the reasons for this inference can be listed as follows.

- The sector has been gaining market share in the region steadily since the early 2000s. This evidence shows that the relevance of the sector for the region has been tested and there is continuing demand for the output produced in the region. An indication of this demand was the influx of foreign firms to the region. Also the sector's dominance and strong growth performance in each county of the region reflects appropriateness of the sector's production for the region.
- The geographic location of the region gives it a clear advantage over the rest of Romania through its close distance to EU market which provides an advantage over transportation costs. Moreover accession to EU has streamlined trade relationships between Romanian firms and the rest of the EU member countries through establishment of bilateral and multi-lateral trade agreements and larger involvement in global value chains of production.
- Human capital with skill sets that are suitable for the sector's needs has been expanding in the region. Although it is still below the intended levels, there have been significant improvements in this area.
- The region still provides relatively low labor costs for automotive activities which is a major contributor to attract foreign multi-national corporations. Average wages are 13% below the national average in the sector.¹⁸
- West Region is among the most developed regions in Romania (in terms of income per capita). With this development level and high human capital, West Region is in an advantageous position to focus on more knowledge embodied innovation and technological changes. The region has been improving its capacity to produce high value-added activities.
- Due to long years of interaction with the EU countries, business culture is more developed in West Region than many other regions in Romania as well as the neighboring countries who might become potential competitors in medium term.

Although the region has a comparative advantage in this sector, its sustainability is not guaranteed. There are certain challenges which, if not addressed, may cause the loss of existing comparative advantages.

First, low labor costs might become a burden in the medium term for the comparative advantage of the country rather than an opportunity unless relevant policy actions are taken. In two automotive poles of the region, Timisoara and Arad, possibility of increases in wages can easily lead to more competitive pressure from other low-wage regions in Romania or neighboring countries like Serbia, Bulgaria, or Ukraine and cause the dominant foreign firms to move to these alternative destinations.

Second, looking at the revealed comparative advantage of the products exported from the region, medium-tech products come only at the 14th and 15th place of the ranking, with electrical

¹⁷ See the World Bank report "Competitiveness of West Romania Firms: Diagnostics, Challenges, and Opportunities"

¹⁸ See the World Bank report "Economic Geography Assessment: Territorial Development Challenges"

machinery (HS 85) and vehicles (HS 87), where the top positions are filled with low skill, low sophistication products.

Third, the region's increasing participation in European value chain production has resulted in declines in the value added share of output in automotive sector which declined from 30 to 23 percent between 2008 and 2010. Moreover, although exports of auto parts have increased over time, this growth has been on the intensive margin (same firms exporting more of the same products to the same markets). There is low contribution of new export destinations to export growth. Lack of market diversification poses risks on periods of economic uncertainties as was seen in the recent financial crisis.

4.1.2. R&D activity and linkages with global networks: how does it relate to specialization in the sector?

R&D activity in the sector tends to be done outside the region, often in the headquarters of foreign owned companies (OEM and first-tier suppliers) or in collaboration with top universities worldwide. A crucial step forward to increase the R&D investments in the region is establishment of well-equipped independent laboratory infrastructure. These lab facilities enable capacity in the region to produce and test prototypes which is pivotal for local suppliers to become part of global value chains. Furthermore, the labs would help attain high quality standards required by OEM and suppliers which usually a concern and the main reason for which most of the machines and equipment used in production are acquired from foreign suppliers. Labs would help the accumulation of local know-how in the automotive sector in the region and possibly create spillovers to local manufacturers.

Quite often lack of sufficient lab infrastructure inhibits completely or creates huge delays in testing the quality and validity of new products, processes, and designs which are crucial in auto sector. Long wait times increase the opportunity costs for local firms to engage business relationships with large MNCs. Only a few large firms like Continental have access to testing labs in the West region which are not accessible to outside firms. Due to lack of better alternatives some of local firms send their products to Germany or Hungary to be tested. Labs with international standards in the region will attract the attention of OEMs and first-tier suppliers and provide them further incentives to use local supplies. Such research and testing labs cannot be all financed privately as they would be beyond the reach of local SMEs. Public support would be vital in building and operating these expensive infrastructures.

The most important issue that prevents better integration of local suppliers with global production networks in the sector is the low quality level of production. Establishments of relevant research labs as discussed above would alleviate this problem and help to restore the confidence in MNCs to increase the scale of collaborations with local suppliers. Through these linkages, local firms can benefit through transfer of technology and the creation of spillovers.

Local SMEs lack capacity to produce large volumes of output that MNCs need. First/second tier auto suppliers would prefer not to work with too many small suppliers due to coordination problems. Yet small firms cannot respond to large demands. Establishment of auto clusters that are well-connected with the production networks could significantly improve the output capacity of sector in the region especially by allowing many SMEs to cooperate in production and enable them to jointly handle large-scale orders.

All these efforts would support the development of a wider base of local suppliers who would have the capacity to become higher tier suppliers.

4.1.3. An evaluation of the horizontal constraints that affect the sector

Access to external finance

Many local SMEs are extremely cautious and hesitant in scaling up their production or diversifying their product scope. This mainly depends on the uncertainties in auto market and high interest rates charged by local banks to purchase a new machine/adopt a new technology both of which diminish the aptitude for risk. This leads to a bi-modal distribution of firms in the sector where large firms get larger and small ones cannot grow.

Access to external bank financing is rather scarce in the region. West region has one of the lowest use of domestic credit in Romania (1.3% of total investments in 2010). They try to compensate this gap by using foreign credit through their connections with foreign suppliers or clients but it is also difficult to get (0.6% of investments in 2010). Heavy reliance on own resources makes it difficult to make productive investments. Some of the SMEs in the region have used EU funds for their productive investments. Accession to EU funds has been very helpful in alleviating the risks for new productive investments. However, application process needs to be streamlined. Most of the time, the firm needs to hire a consulting firm and the evaluation process last long.

Skills and training

Increasing human capital to work on design and development activities in the region is a major constraint. Timisoara is the only city where such capacity is available, yet it is limited. University graduates should be better trained on how to apply and experiment their theoretical knowledge. Firms usually have difficulties finding graduates to fulfill their needs and the skills obtained from the school do not go beyond theoretical knowledge. Lack of applied and technical skills is more likely to be expressed as a severe constraint by large, globally integrated MNCs or their subsidiaries than by local SMEs in the sector. This might be due to differences in the complexity of operations performed by each group.

In order to develop appropriate skill sets for young graduates, linkages between industry and universities must be improved. This can occur through public-private partnerships aimed at R&D collaborations on joint projects or by adjusting the school curriculum to respond to the industry needs. Currently such collaborations are only available for large companies like Siemens and Continental, which have programs and partnerships with local universities. These efforts must be scaled up and should encompass local firms including small and medium size enterprises.

Vocational training schools also need to be established in order to supply qualified technicians (specialized labor) for the sector. Lack of skilled workers who can operate mid and high-tech machines add additional burdens on firms and increase cost of production. Access to a larger pool of specialized labor force complemented with better guided young university graduates would strengthen the region's comparative advantages in this sector.

Local SMEs should be better prepared to integrate with the global auto production networks. These firms usually lack relevant business management skills, knowledge on quality standards/certificates, knowledge of new technologies and production know-how. Providing mentorship and training to improve their technical and business management skills, attain better efficiency, and understand the processes required to supply for MNCs or to export, and showing how these improvements can help them to become included in the global value chains, would promote their connection with the MNCs.

Infrastructure

Two main aspects of infrastructure stand out as major obstacles for sectoral development. Unstable flow of electricity and the unexpected outages affect businesses’ operations and damage equipment. Considering the heavy reliance on high-tech machines in the sector, this is a serious concern and a major source of productivity loss.

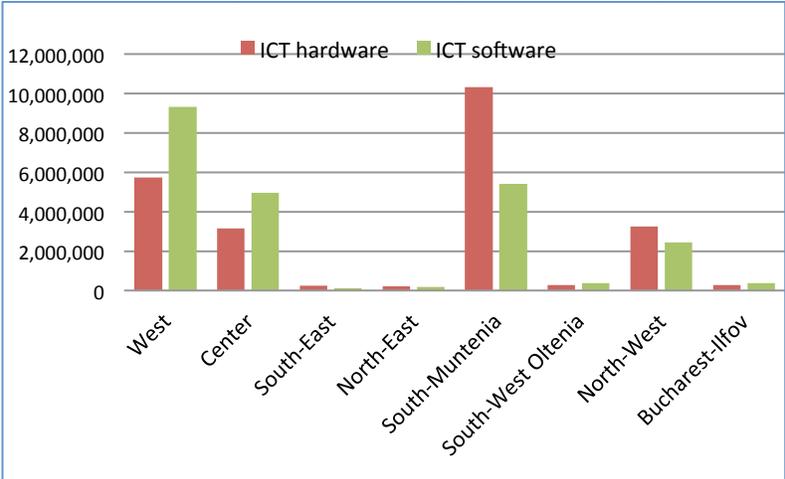
The second aspect of infrastructure that constrains firms is roads. The primary means of transportation in and out of the region are the roads and there are not sufficient high-ways to meet the needs of the economy. With better roads, firms can move their labor-intensive production activities to areas with lower density and keep their knowledge intensive activities such as design and development in centers like Timisoara and Arad.

4.1.4. Prospects for sectoral development and considerations for policy actions

Keeping labor costs low is not a sustainable development strategy for the sector to remain globally competitive. Policies must be developed to increase economic activity in areas where more knowledge and technology is produced. The large number and diverse set of inputs used for production in auto sector enable it to generate cross-sectoral linkages and help development of various activities in the region including engineering, metals, electronics, and textile. Beyond the core motor vehicles subsector, the automotive ‘non-core’ activities contributes close to 14,000 direct manufacturing jobs, making the ‘non-core’ part of the automotive sector still larger than any other manufacturing activity in the region.

In 2010, manufacture of electrical and electronic equipment for motor vehicles has the second highest value added share (33.4%) in auto sector in the region. It also has by far the highest employment level in the region (40.5%). This is encouraging for the future of the sector as production of electrical and electronic equipment involves high collaboration with ICT sector and value added in this sector is higher than other many other sub-sectors of auto production value chain.

Figure 9 – Average ICT investments by: auto sector companies across regions, 2010 (in Romanian Lei)



Source: World Bank staff elaboration based on INS dat

Firms in auto sector in the West Region invest high amounts in ICT (Figure 9). Products like electric conductors, numerical control panels, optical devices, and measuring and checking instruments which are traditionally classified as part of the electronics sector, are largely manufactured by big multinational auto firms in the region. These products form part of modern electrical and computer

systems in cars. They have been among the most dynamic products over the past six years. The rise of exports of these products might spearhead the evolution of the auto sector from labor-intensive products like wire harnesses towards more sophisticated electronic products with higher value added.

After years of involvement in low value-added, high labor-intensive tasks, some large MNC (like Yazaki or Hella) have started to benefit from the local capacity and know-how accumulated over the past years and have begun to engage in design and development activities. These initiatives create great opportunities for knowledge spillovers to region. Timisoara and to some degree Arad have developed the know-how and capacity to be successful in these areas. Efforts to introduce new designs, products, processes and technologies must be scaled up and must be backed by supportive policy reforms. For the majority of the sector's output comparative advantage is generated by low unit costs of production rather than high value generation. Moving the labor-intensive production facilities from hubs like Timisoara and Arad to towns in lagging counties with lower labor costs can contribute to the development of these areas while helping Timisoara and Arad become knowledge hubs. Moreover, higher contribution of lagging counties to the production process can indicate better sufficiency to support large scale investments in auto sector.

With the right policy guidance the region has the potential to develop a strong auto sector that can generate high value added in medium to long term. Based on the discussion provided above there are three main areas of policy recommendations.

First the **value added in production must increase by incorporating more knowledge and technology in production**. Although there are many foreign MNCs in the region, the transfer of technology and knowledge to local firms is insufficient, mostly due to the nature of the tasks undertaken by local firms. **Establishment of research institutes and labs will incentivize local firms to prepare prototypes, test their new designs, products and processes to be included in the global supply chain of MNCs**. Once a firm becomes part of a supply chain the learning and spillovers are likely to be faster. The labs will also give opportunities for more frequent quality tests which will increase reliance of local producers.

A second policy recommendation would be **developing appropriate skill sets of young university graduates that can fulfill the demands of the auto sector**. Training in vocational schools would also help to respond to the increasing need of skilled technicians. In addition to technical skills, **development of entrepreneurial skills on business development, management, and financing would help local SMEs to be better connected with the global networks of the sector** which fortunately have already many active players in the region. Encouraging entrepreneurial initiatives like investing in new machinery or technology, testing new products and processes, diversifying markets, trying new export destinations would all help creating a vibrant and competitive sector. Lastly **expanding and increasing the awareness of the auto clusters initiatives** (like the Automotivest) **would stimulate exchange of ideas, sharing of experiences and would help local producers become better and more connected with the large players**.

4.2. Textile Sector

4.2.1. Sectoral overview, comparative advantages and challenges

Up until mid 2000's textile sector – which encompasses manufacturing of textiles, wearing apparel and leather product - was the dominant activity in the West Region after which they lost the top ranking to auto sector. Since then, the sector has lost significant market share. The World Bank report “Competitiveness of West Romania Firms: Diagnostics, Challenges, and Opportunities” has shown that

employment levels in textile, footwear and apparel sectors declined significantly by 19, 10.7, and 8.8 percent in respective order between 2008 and 2010. Yet, the turnover rates showed positive growth by 12, 3.8, and 6.3 percent respectively. Apparel subsector is the fifth largest sector in the region in terms of employment and together with leather and textile subsectors, they employ more than 31,000 workers accounting 8.5 percent of the employment in the region. Hence despite the drop in market share, the sector is a major contributor to economic activity in the region.

The three textile activities make the second biggest contribution to region's exports (following auto sector) accounting for 13.4 percent of the region's exports in 2010 (see Table 3). Exports of textile products have grown by more than 10 percent between 2008 and 2011. However since the exports of auto sector has been increasing much more rapidly, textile sector's share in total exports has been declining. Between 2005 and 2010, the share almost halved. Foreign firms are quite active in the sector. Share of total exports by fully-foreign owned firms make almost 70 percent of the exports whereas contribution of local firms is less than 20 percent.

In the textile, apparel, and footwear subsectors, the West Region has become closely integrated into regional production networks based in Europe. This has also led to significant investments and job creation in the region. Although the whole textile sector has been experiencing decline in its market share, **there are signs of apparent comparative advantages** with respect to other sectors. Targeted policies for the development of the sector can help the region to participate in higher value-generating activities. Some arguments on why the region still has comparative advantages can be listed as follows.

- The textile sector has been in existence in the region for a long period. It is still one of the biggest employer and contributor to export in the region. A large body of sector knowledge has been accumulated. Through their long term engagements with large production networks, local producers have learnt about how MNCs work, what quality standards they require, what technology they use, how they plan for production, their distribution channels for raw materials and finished products. This know-how which has been accumulated over many years makes them well positioned to respond to demand of their clients and try new activities up or downstream the value chain.
- Similarly, direct connections with many multi-national clients in the sector helped building a business network in the region which can easily generate new business opportunities.
- The geographic location of the region gives it a clear advantage to the rest of Romania as well as to many other global competitors through its closer proximity to European market which provides an advantage over the transportation costs and facilitates communications with clients.

Despite of these opportunities and strengths of the region, there are reasons that can obstruct future development of the overall textile sector. Two reasons can be pointed. First, most of West Romanian firms are sole suppliers of foreign brands. This has limited their contribution to labor-intensive cut, make, trim, and assembly activities. They have not managed to transition to their own designs and own brand manufacturing, according to the World Bank report "Economic Geography Assessment: Territorial Development Challenges". As a result of participating in European value chain, value added share of output declined from 49 to 33 percent between 2008 and 2010 (see Figure 12). Second, current labor force employed in the sector is aging and it is difficult to find young workers interested in the business. This will force firms to increase wages which threatens many firms whose only comparative advantage is low costs.

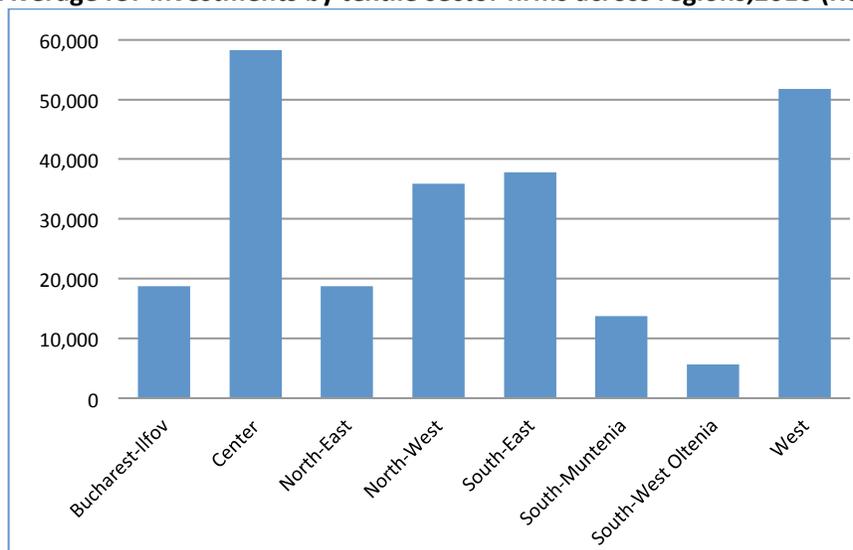
4.2.2. R&D activity and linkages with global networks: how does it relate to specialization in the sector?

Firms in the sector usually purchase all the necessary machinery and equipment from producers located abroad like Germany, Italy or Japan. There is no local R&D capacity to produce new machinery or to adapt the imported machinery and equipment to the needs of local firms. These investments are costly and are beyond the reach of the sector in short to medium term.

Most of the time, the foreign clients conduct the research and undertake design and development of new products. Also the material inputs are either provided or suppliers of such materials are imposed to the textile companies by their clients. The local firms only provide production capacity with limited use of use of technology and little involvement in knowledge intensive. This constrains the sectoral activity to labour intensive production activities that have the least value added. The exceptions are firms who have acted on the risks of losing competitiveness by engaging in vertically integrated activities and offered complete products instead of parts for further assembly process. Through these integrations their design and development skills evolved. These companies provide learning opportunities for the rest of the rest of the sector and their efforts should be advocated.

West Region has the second highest ICT investment amount in Romania after the Center region (Figure 10). The relationship holds both for ICT hardware and software investments. This evidence shows the sector's relatively high collaboration with ICT sector which is usually taken as an indication of capacity to adapt new and better technologies.

Figure 10 - Average ICT investments by textile sector firms across regions,2010 (Romanian Lei)



Source: World Bank staff elaboration based on INS data

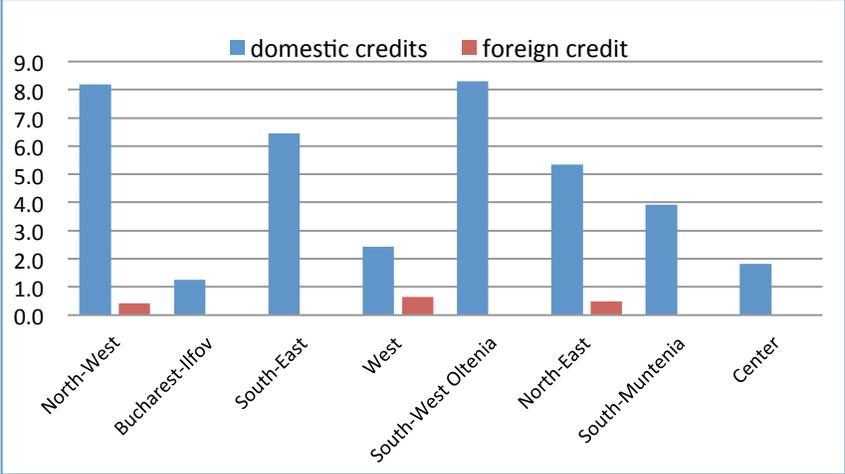
4.2.3. An evaluation of the horizontal constraints that affect the sector

Access to external finance

Many firms in the sector are reluctant to use bank financing for their investments due to unpredictable economic conditions and their low aptitude for risk. Only 2.4 percent of total investments are funded through domestic credit and 0.6 percent through financial credit (Figure 11). As a result,

some textile companies prefer to decline orders for which they do not have the necessary equipment than contemplate the opportunity of investing in machinery and equipment for new but risky products.

Figure 11 Proportion (%) of total investment that is financed externally in textile sector, 2010



Source: World Bank staff elaboration based on INS data

Companies are aware of the availability of the EU funds but generally lack clear information regarding application and eligibility. Those who have applied for the EU funds find the process cumbersome and the evaluation period lengthy.

Skills and training

Insufficient number and poor quality of labour force are the most severe obstacles for business development in this sector. Average worker in textile companies is aging much faster than most other sectors. Firms in the sector are having difficulties to find both skilled and unskilled people to work in plants. There is dwindling interest from young people to work in factories as low-skilled workers to operate sewing machines. Moreover large international automotive manufacturers located in the region are able to pay higher salaries and provide better work opportunities which aggravate the labour supply problem of the textile sector. There is high employee turnover rate for the sector which lowers labour productivity.

A concern shared together with the auto sector is relevance of the curriculum thought at universities for the sectoral needs. University graduates lack minimal practical competencies. There is a disconnection on what is needed by the sector and what is offered at schools to fulfill the demand for skilled workforce. Moreover, number of available mid-level technicians (low-skilled workers) is also shrinking fast due to closing down of the vocational schools. There are certain training programs for the market mostly financed by EU funds. However the administrative barriers are high and the funds from the programs are small.

Infrastructure

As in the auto sector, two main aspects of infrastructure stand out as major obstacles for the sector. First one is electricity. However unlike auto sector, for this sector the bigger concern is the cost of electricity. Liberalization of the energy market is likely to increase prices which is concerning for textile companies. The prices have been constantly increasing since 2007, which translates into higher costs of production. The energy prices are expected to be even higher when the market becomes completely liberalized at 2014. This will cause significant loss of competitiveness for firms in the region.

The second constraint is road infrastructure. The main way of transportation in and out of the region is through roads and there are not sufficient high-ways in the region. However this concern is compensated with the proximity of the region to the border. From the Hungarian border westwards road infrastructure is sufficient to meet their needs. Another reason why road infrastructure is a concern is transportation of workers to work. Lack of good infrastructure inhibits firms to seek employment opportunities in towns further away from their location.

Legal framework

The administrative burden generated by the unpredictable interpretation of legal provisions and the large number of random inspections have negative impact on firms' activities. Obtaining permits and authorizations or filing of taxes are considered time consuming and expensive.

Textile companies lack negotiating power against large multinational clients and tend to strictly observe contractual provisions. If their foreign clients breach contracts local textile producers have to seek contract enforcement abroad where the governing law courts are usually located. This is quite costly and they do not have the capacity to pursue these proceedings.

4.2.4. Prospects for sectoral development and considerations for policy actions

Textile sector as a whole has been a major role contributor to the economic activity in the region. Existence of foreign firms in the region and engagements with global clients create opportunities for knowledge and technology being transferred to local economy. In fact, the typical market positioning of the sector seems to be in niche apparel products and production for large foreign clients. In this context, continuing to specialize in commoditized activities like simple labour assembly or cut-make-trim in apparel makes the basis for regional competitiveness cost driven. Against this background, RIS3 policies can help the sector to develop sustainable comparative advantages over medium to long term by supporting high-value research, designs, sales, and marketing services. **Policy makers should actively support investments seeking to increase the value-added in production, facilitate development of new designs and enable entering new export markets.**

Many local firms in the region conduct labour intensive activities with the lowest contribution to the value chain such as sewing, nesting, cutting, press and packaging. However, in textiles/apparel sectors, major innovations come either through introduction of new machinery and equipment for production or from chemical industry. Development of local capacity to build new machinery and equipment is not feasible in the short to medium term but would be investigated for a long-term strategy if the policy makers want the region to become a global actor. Similarly research capacity on chemical industry in the region is poor and developing this capacity is not a feasible strategy for the time being. Other than these two areas there are many alternative routes that policy makers can support local firms. For example, making patterns and grading using automated systems; dying fabric; developing capacity for embroidering; enhancing quality controls for shrinkage, colors, rubbing fastness through lab facilities; supplying own raw materials for production would be some steps that will generate higher values and broaden the activities performed in a firm.

Expanding into these new activities and especially introducing a new design or a product requires use of new technology and equipment. This is extremely difficult for many local firms in the sector for two reasons: difficulties accessing to external finance and reluctance to take risks. Pursuing a new line of activity requires strong commitment complemented with ambition to succeed and relevant business management skills. Many local producers who focus on the production activities lack these assets. **To close gap on financing, government can provide tax incentives or subsidies on productive**

investments especially on new technology and machinery or provide better financing terms for investments. On the second issue, government can help firms to develop better business management, marketing, and networking skills.

Efforts to support local firms should be complemented with **improvements in education system through adjusting university curriculum to the needs of the sector and providing trainings to develop necessary skills and capacities for fashion design, product development, use of frontier technology in production, and marketing.**

Low-skilled blue collar workers need to be incentivized to work in the sector. In the apparel sector workers get paid by the number of products they produce whereas in other sectors they get fixed salaries. They need to be better compensated and provided better work conditions which are only possible if productivity in production increases. Otherwise, firms cannot keep their current competitiveness. Increasing productivity in turn relies at first on access to better technology and machines such as automated cutting machines and second on providing a wider range of services with higher value generation. With new and better technology firms get flexibility in adapting to client needs. There are firms in the sector who have already shown signs of upgrading potential by developing their own design capabilities.

4.3. ICT sector

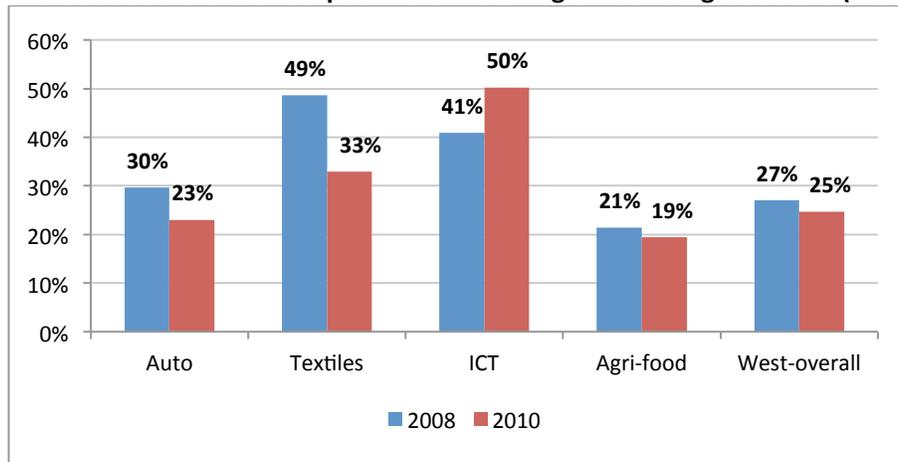
4.3.1. Sectoral overview, comparative advantages and challenges

In a region where basic manufacturing has been the main source of value added, ICT activities emerge as one of the few successful knowledge-intensive service sectors. Taking advantage of the significant human capital supplied by regional universities, the ICT sector in the West Region is generally regarded as an internationally competitive player in the areas of software development activities as well as design and engineering.

The sector has recently suffered setbacks due to the economic crisis. Between 2008 and 2010, turnover declined by 11.5% and employment by 7.7% (see Table 1). This contraction was driven mainly by the negative performance of the telecommunications sector (-18.1% and -5.5% in terms of turnover and employment, respectively). It is worth noting that the only good performer in the sector was the software development cluster, which registered a modest increase in turnover (2%) and a minimal decline in employment (-0.7%).

However, during the same timeframe, the ICT sector as a whole was able to increase the value added share of output (Figure 12). In fact, it was the only cluster in the region which increased its contribution to value added over time, which reflects the potential of the sector to act as a knowledge-driver and enhance the competitiveness level of the West Region (see the World Bank Report "Territorial Assessment: Profile, Performance, and Drivers of Growth").

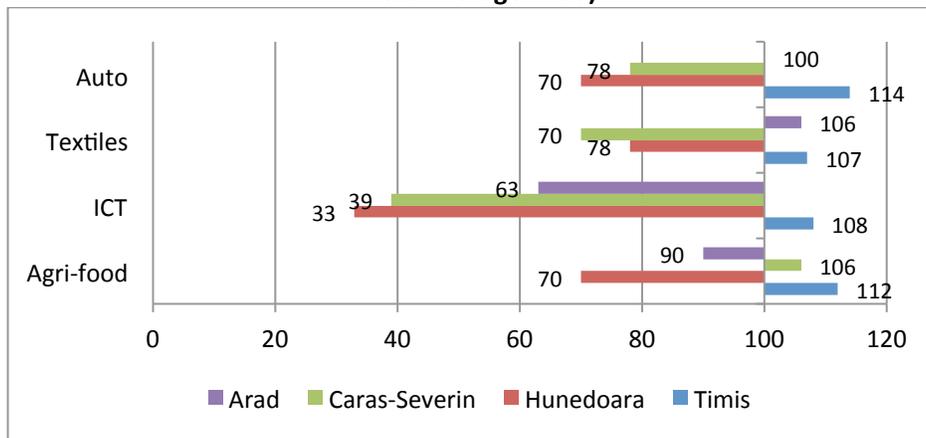
Figure 12 - Value added share of output in the West Region's strategic clusters (2008 and 2010)



Source: World Bank staff elaboration based on INS data

The majority of ICT companies are located in Timis, while only a handful of firms are present in Arad and Hunedoara. This geographical agglomeration is strongly linked with variation in productivity performance across counties (see Figure 13). In this respect, the ICT sector stands out the most when compared to other traditional clusters of the West region.

Figure 13 - Comparison of Value-Added Per Worker (2010) in West Region's Main Clusters (Index: West Average= 100)



Source: World Bank staff elaboration based on INS data

Although the ICT sector has been experiencing a decline in market share, there are signs of **apparent comparative advantages** with respect to other sectors. Low wages and good skills seem to be the main advantages of West Romania in the ICT sector. A number of international firms have chosen Timisoara over other locations in order to capitalize on the local advantages in terms of skill availability, particularly mathematics and computer science which are areas of strength of the local universities, and low wages, while enjoying the benefits of a EU location.

4.3.2. R&D activity and linkages with global networks: how does it relate to specialization in the sector?

Foreign firms dominate the ICT sector, accounting for almost 40 percent of all ICT firms in 2010. As a result, there are reasonable linkages with global networks. The majority of firms interviewed as part of this analysis develop software exclusively for the headquarters of the mother company or for a single foreign firm that outsources this task to the firm in the West Region. In addition, MNEs as well as local SMEs do not have any important clients in the West Region or in Romania and do not seem particularly interested in exploring opportunities to working with other firms in the region (mainly because the work for their sole client is already consuming all their time and resources). However, there is still space for policies to support linkages between ICT firms connecting with global customers and to support ICT companies in the region to cooperate with each other or with other industries in the region.

In terms of links with R&D infrastructure the most important actors are the business incubators, particularly UBIT which initially targeted startups in the ICT sector, primarily software development firms. UBIT activities focus on networking and training in areas such as marketing, legal advice and accounting. The main benefit to the tenants is the heavily subsidized rent (by 75%). While startups initiated by former MNE employees are unusual among UBIT tenants, the most successful tenant is a MNE spin off. MNE employees usually have better technical skills and knowledge of the market, and they have the potential to create high growth startups. However, MNEs tend to recruit the best students by offering competitive salaries and job stability, which can discourage talented engineers to start an uncertain new venture. UBIT has no market test for the recipients of its mentorship and training services, as these are offered by the incubator mostly pro bono. There are promising efforts to create local tech “communities”, but these are the result of voluntary initiatives and have not generated any funds for UBIT. The graduation policy for tenants is not enforced. Tenant firms are typically startups with less than 2 years of activity, but currently there are firms located here that are older than 5 years, and which continue to enjoy the subsidized rent and services offered by UBIT.

Currently UBIT has ceased to exist as an incubator but the tenants continue to pay a subsidized rent and remain on the premises. Meanwhile, there are at least two other business incubator initiatives in Timisoara: a Startup Hub located in Timisoara’s Business Center and the Timisoara City Council incubator, which is still in construction. Two key issues are important regarding incubators. First, the supply of infrastructure (i.e. space and services) is likely to be unbalanced in comparison to local demand. Second, although UBIT has been a catalyst for the local software community, there are significant lessons that should be drawn from this experience.

4.3.3. An evaluation of the horizontal constraints that affect the sector

Human Capital

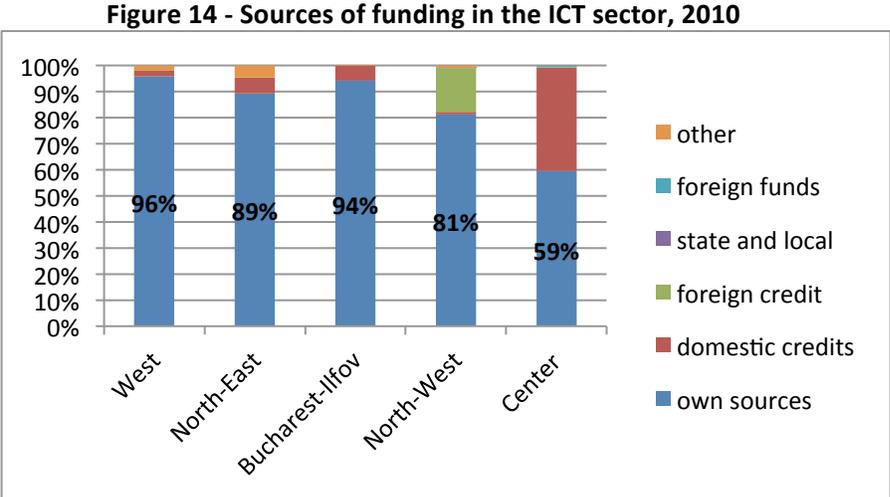
The availability of qualified labor is the most pressing issue faced by ICT firms in the region. The competition for the same pool of qualified labor is intense between MNCs. Such competition can give rise to major hiring difficulties for local software SMEs. In order to remediate the lack of adequate knowledge and skills of new graduates from the local universities, all firms provide extensive training. Most firms consider that some training is necessary in the industry as universities provide basic knowledge and most programming skills are developed on the job.

In this regard it was observed that, while universities and ICT start ups favor a holistic education, MNEs advocate for more specific training in, for example, specific software programming languages. The quality of the average graduate from local universities in ICT related fields, such as computer

science, is perceived to have declined over time, although the five to ten percent of graduates are still considered to be top performers.

Finance

Almost all of the financing for ICT firms comes from internal funds (see Figure 14). This situation is not particular to the West Region, as ICT firms in other regions are in a similar situation. In the case of multinational companies, the source of those internal funds is either from the Romanian subsidiary or funding from headquarters. Other financing channels include the use of bank credits and EU funds. In both cases, stakeholders consider that paperwork is time-consuming and interest rates are high. However, the interest rates have improved compared with a decade ago. EU funds have been accessed mainly by mid-size firms, which complain that reimbursements for pre-financed investments take a long time and even extend past the date specified in the contract.



Source: World Bank staff elaboration based on INS data

Infrastructure

Infrastructure is not perceived as a problem for any of the firms interviewed. No problems were reported with electricity or internet connectivity and speed – the latter was highlighted as one of the comparative advantages of the region. The firm located in Hunedoara complained that it is not easy to reach their clients in the West Region (mainly in the Timisoara and Arad) and that a highway might help in this regard.

4.3.4. Prospects for sectoral development and considerations for policy actions

Policy recommendations for ICT should take into account the different ICT subsectors included in the cluster.

In addition to technical skills, the **teaching and development of entrepreneurial and managerial skills** of technical workers would help both MNEs and local SMEs to increase productivity, create more and better spin offs and startups and be better connected with the global networks in the search of business opportunities. In a fast paced sector such as ICT it may be convenient to have specific targeted workshops (“boot camps”) where workers and entrepreneurs could connect and, practice these skills. This type of trainings could also be included in university curricula.

Specific measures could aim to increase access to finance, thereby helping in particular large firms in the ICT manufacturing subsectors, such as telecommunications and electronics. In general almost all investment is financed with internal resources. In many cases, having access only to this source of investment financing constraints the firm's ability to scale up the business and to engage in innovative activities such as joint research or technology transfer. **Firms in the West Region are eligible for EU funding through the Operational Programs, but these instruments need to be re-designed so as to make them more attractive to firms and entrepreneurs.** Particular issues to be tackled include: a) very long timeframes between application and disbursement, b) amount of paperwork, c) inflexibility to make adjustments once a project has started and d) the amount of the required co-financing which is particularly burdensome for startups. Interviews with focus groups mentioned as a main constraint for the development of the sector the lack of financing for startups and small firms. This is necessary to pay for the costs of the initial investment, and to pay wages, while allowing time to develop a good application and/or software and to generate revenue. For the type of business prevalent in the ICT sector, financing is best obtained through venture capital. The reason for this is that software companies need money upfront to experiment but other forms of financing (e.g. EU funds) may be impose requirements that are too constraining.

In addition, specific policies targeted to software startups are related to the design and implementation of the new and upcoming business incubators. **Mentorship programs should be structured more efficiently, as the incentives for mentors have to be clear.** In the past, UBIT's mentorship program was undertaken by one individual mentor. The program ceased when this person left Timisoara, showing that the initiative was not sustainable. Best practices in business incubators pair up mentors with firms based on a mutually beneficial relationship: mentors need an incentive to prepare the incubated firms for larger scale activities. Many times these incentives take the form of shareholding, or the right to take a first look at the technology that the incubated firms develop, and to subsequently participate in the ownership and management of intellectual property. Mentors also facilitate the firms' access to investors. There are different successful models for this type of activity, some of them (such as Endeavor) which operate in different countries and could be franchised to Timisoara.

In Timisoara there are several potential investors (i.e. angel investors) interested in ICT startups, however only one such investment has materialized so far. These are experienced, skilled and well-connected individuals who could provide hands-on support to entrepreneurs. Potential investors argue that they lack knowledge on investment opportunities. Nevertheless, there is little willingness to spend time and resources researching startups. Therefore, **there is a space for public action in order to scan the market and connect the investors to new creative companies in need of funding.**

Although there is no immediate shortage of skilled labor, SMEs seem to have more difficulties in finding the skilled workforce they need. The main reason is that **programming activities require "customized" training.** While larger firms are connected to universities and are able to fund laboratories where they can train the workforce, this is not possible for smaller firms.

While there is agreement regarding the usefulness of **incubators and business accelerators**, it was highlighted during discussions that in order to be useful these infrastructures **also need to provide other services, such as information about the sector and the clients, assistance in drafting business plans, and advice regarding financing options.**

Finally, regarding the linkages with global customers and with downstream user sectors, **match-making mechanisms and more efforts to market the West Region ICT sector to downstream users and global customers** would also be necessary.

4.4. Agro food sector

4.4.1. Sectoral overview, comparative advantages and challenges

In the West Region, the agro food sector, which includes food processing and the manufacture of beverages, accounts for only 4.3% of the total employment in the region, or a little more than 10,000 people.¹⁹ In 2010 there were 199 firms involved in agro food activities, including 15 producing beverages. As a whole, the sector represents 5% of the total number of firms in the West Region. Most firms in this sector are small and older than 10 years (see Table 2 below).

Table 2- Size and age composition of Agro food firms in the West region, 2010 (N. of firms)

Age	Big	Medium	Small
1-5	1	3	11
6-10	2	11	48
+10	4	33	86

Source: World Bank staff calculation based on SBS data

Although the West Region is one of the most trade-dense regions in Romania, in comparison with other sectors, agro food exports represent only 0.5% of total export in the West region (see Table 3). A reason for this is that production has been outperforming processing in recent years, while as much as 50% of production in the sector stems from low-tech activities such as processing and preserving of meat, production of cereals, legumes and oilseed and manufacture of bread. In terms of export potential, it is worth mentioning the unexploited opportunities with Serbia. As stressed by the World Bank report “Economic Geography Assessment: Territorial Development Challenges”, despite the fact that Belgrade is the closest major city to almost all of the West Region, Serbia ranks only 19th among the region’s export destinations, accounting for just 1% of exports. Taking better advantage of opportunities for trade with Serbia, especially in agricultural products, could be particularly important for parts of Caraş-Severin that are among the most economically lagging in the West Region.

Table 3 - Dominant Sectors by Exports in the West region, 2010 (% shares)

Sector/clusters	%
Textile	13.4
Auto	43.8
ICT	9.2
Construction	0.1
Agro/Food	0.5
Tourism	0
Energy	0
Health	0
Other	33

Source: World Bank staff calculation based on INS customs data

The performance of agro food firms is highly heterogeneous in the West region and firm productivity dispersion is high. As a result, in a sector with a multitude of low productivity firms, about 10 percent of high-growth firms in the region – the so-called “gazelles” (firms with at least a 25% turnover growth for 3 or more years) – belong to food processing activities, the highest percentages of

¹⁹ SBS data – which is used for this analysis – does not provide information for agriculture neither for fishing.

gazelles across sectors in the West region (see the World Bank report “Competitiveness of West Romania Firms: Diagnostics, Challenges, and Opportunities”). The significant presence of gazelle firms in agro food activities might be one of the reasons why the sector has been relatively resilient during the crisis. Over the 2008-2010 period, employment in this sector has declined 4.3% while turnover performance has been positive, though the increase of 0.7% was small (see Table 1).

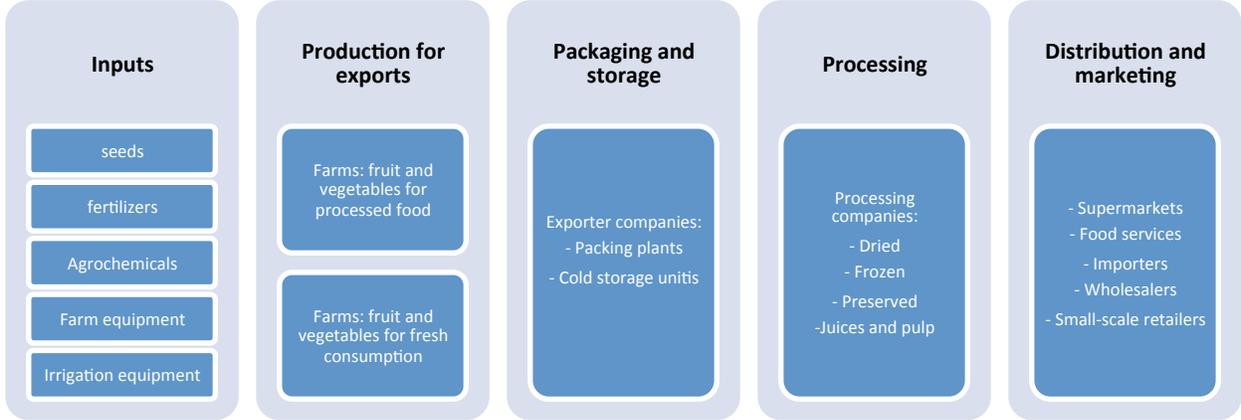
The West region has a latent comparative advantage in the agro food sector. The main reasons for this inference are the low wages and, particularly, the agricultural richness of the region. With regard to the latter advantage, the World Bank report “Territorial Assessment: Profile, Performance, and Drivers of Growth” has shown evidence that the region, - especially the Banat Plain, which makes up the western half of the West Region – encompasses a rich agricultural land that has supported diverse agricultural activities, including cereals, horticulture, and animal production. However, the share of the region’s land area that is utilized for agriculture is the lowest among all regions in Romania.

Although land is plentiful and arable there are certain challenges which, if not addressed, may prevent the region from taking advantage of the existing potential. In this regard, particularly in the food processing and beverages activities, the main challenges in the short term seem to be increasing profitability, improving marketing, and establishing linkages with large distribution.

4.4.2. R&D activity and linkages with global networks: how does it relate to specialization in the sector?

The food industry, a resource based sector, is characterized by low appropriability of resources. As such, it is dominated by those countries that invest in basic and applied research (e.g. Switzerland, France, and the United States). Most innovation and value added is generated by suppliers through the creation of new machinery, new seeds, new chemicals and fertilizers, and more recently by the application of ICT to agriculture. It is also increasingly important to abide by international sanitary and quality standards, as well as intellectual property rights. A typical value chain in agro-food is described in Figure 15. This type of value chain is complex and has taken an increasingly global scale.

Figure 15 - A typical value chain in agro-food



Source: World Bank report “Trade Outcomes Assessment”

In the West region, there is evidence of producer-exporter vertical consolidation. This consolidation happens through (i) backward integration of exporters to production and increased dominance of large farms; (ii) contracted supply from outgrowers whereby the farmer may receive inputs, credit, technical assistance, and guaranteed sales from the exporters; and (iii) non-contracted

supply from independent growers. Large farms are mostly used to produce outputs according to strict quality and traceability requirements, because coordination and control is centralized in management. These large producers typically have greater access to the financial capital necessary to make the investments needed to meet these rigorous requirements. These firms have the potential to undertake other important high-value activities such as product development and innovation.

However, a large proportion of smaller agro food firms do not join the agro-food value chain in optimal conditions. Contracts can be terminated “overnight” and profit margins are too low. In addition, given the fragmented land structure of the region, the local producers of fruits and vegetables, who could supply inputs for food processing activities, are not able to produce and sell in large quantities, which decreases their competitiveness and reduces their ability to join the production chain.

In addition, firm interviews conducted as part of this analysis revealed that R&D is a marginal preoccupation for the majority of firms in the agro food sector in the region. Even those companies that are willing to collaborate with universities show a general distrust in the capacity of these institutions to conduct applied research, and previous collaboration attempts have so far been timid and unsuccessful. However, the collaboration with research institutes is important as these have a role to play in disseminating technologies, testing and adapting seeds to local conditions, preserving local varieties, and seed testing in order to identify higher crop yields. Given that food engineering, agriculture, and veterinary sciences are areas of strength of the West Region universities, public policy should encourage innovation in the agro-food sector.

While the role of universities is also to provide extension services, in the West region these services have been introduced only recently. However, more formal, streamlined practices could be developed since the majority of contracts are between firms and individual professors. Therefore the key questions are: i) how to encourage the development of institutional extension services if professor salaries are capped to university standards; and ii) how to organize the firms operating in the sector in an association that identifies sectoral needs and niches for university-firm collaboration.

4.4.3. An evaluation of the horizontal constraints that affect the sector

Infrastructure

There is a lack of highways and the existing road infrastructure has poor quality. While the connection to EU highways in Romanian western border is important for exporting firms, the local/national distributors face difficulties for delivering to the national retailer networks. Nevertheless, roads used for local distribution (i.e. network Resita-Timisoara-Arad-Oradea-Satu Mare) have drastically improved recently.

Moreover, energy fluctuation is a problem for most firms and this constitutes major risk for the food processing industry where cooling storage facilities are important. Therefore several firms have invested in the purchase of own power generating equipment so as to mitigate such risks. In addition, water utilities are problematic in the country side and mountain areas, reducing water availability. Irrigation is a national issue that affects large scale crop farming and is perceived as a major for the future, considering requirements for higher yields necessity and the effects of climate change.

Labor: Skills and Training

The sector requires technical staff that can enter rapidly into production but most new workers need training for at least 6 months. The workforce needs to be geographically mobile because most businesses are in rural areas that are not particularly attractive. Agronomy engineers trained in

Timisoara are well-regarded and, while the availability of unskilled workers is not an issue in general (as the firms are remote – thus lack of choice towards urban life and no other industries are preponderant), their retention is difficult and seasonal turnover is a given, since most of them can go abroad for seasonal work.

Standards, Quality and Certification

Quality standards are imposed by the major retailers and for EU exports. Exporting firms have the necessary certification requested by EU regulations for internal market and exports. In the case of suppliers, the food processing activity also requires certification of raw materials and it appears that, apart for the companies with integrated value chain, there is mistrust regarding smaller local suppliers in terms of quality certification, especially for meat production where the black market is a serious problem. State controls on the quality are too numerous and from different local agencies. There were no particular complaints about access to state testing labs, apart from the milk testing which is done outside the region and takes too much time.

Financing / Use of EU Funds

Most companies in the sector access funding from their own internal sources (reinvested profits). Bank credit lines and EU funds are minimal on average. The interest rate is generally perceived as high. Those that have accessed EU funds have used it for new production lines, plants, machinery, testing labs. The collateral required by EU funded programs makes them inaccessible for small producers. Moreover, EU funds rules are very bureaucratic, and do not provide for flexible implementation. All the large companies interviewed as part of this study benefited from EU funds.

4.4.4. Prospects for sectoral development and considerations for policy actions

As mentioned previously, the largest share of innovation and value added in the agro food sector is generated by suppliers through the provision of new machinery, new seeds, new chemicals and fertilizers, and more recently by the application of ICT to agriculture. In many cases large buyers, both foreign and local, serve as channels for technology upgrading and standards compliance. In this increasingly “buyer-driven” environment, agro food firms can grow by upgrading processing, packaging, quality, and branding in value chains. Value-adding activities range from sorting, cleaning, and packaging to processing, branding, and retailing. Value can often be captured through relatively simple changes, such as canning, drying fruit, cooling milk, packaging, and even labeling. These windows of opportunity can benefit small and medium enterprises, given a favorable business environment and access to reliable supplies of raw materials of a given quality from the farm sector.

Against this background, the agro food sector in the West Region could benefit from **targeted initiatives for SMEs, e.g. in terms of supporting the development of infrastructure for improving quality, health and safety standards, SMEs financing initiatives, marketing initiatives such as the development of a regional brand, or training in marketing, sales, etc.** According to focus groups discussions carried out as part of this analysis, problems exist in all these areas. One main obstacle faced by local producers who wish to become suppliers for large distribution chains appears to be the need to ensure quality and health standards that, according to focus group interviews, small firms are not always able to meet. Moreover, the costs for complying with food and safety standards are high. There is only one accredited food safety and veterinary agency in Romania which is located in Bucharest. Performing tests takes 10 days. Agro foods SMEs have significant difficulties in accessing financing. For example, financing may help local suppliers to access large retail chains. Some retailers require suppliers of food to co-finance shelf space in supermarkets, a costly activity that small firms may not have the

financial resources to undertake. Finally, public initiatives to offer short courses in marketing, sales, brand management and value added production may help local firms. In particular marketing support for small and medium sized firms as well as training and consulting services to help build capacity in the sector could be very helpful in enhancing the competitiveness of West Region food producers.

In addition, **investment in basic and applied research should be supported**, as this kind of investment will also be necessary to increase competitiveness in the sector. Due to the fact that food engineering, agriculture, and veterinary sciences are areas of strength of the West Region universities, public policy should support innovation in the agro-food sector. Already, an encouraging initiative is the collaboration between the University of Banat and the private sector in the field of agriculture extension services, which was initiated with a contribution from the World Bank MAKIS project funding in 2008. Input systems must be backed by a dynamic research system. To the extent that R&D efforts should involve public financing, because of the public good nature of most R&D products, collective action by industry associations to implement a small levy on production offers a promising method to finance R&D for the commercial agriculture products.

Lastly, a major constraint on competitive commercial agriculture and agribusiness in the region is the lack of skills at all levels, from vocational to postgraduate education, including management and entrepreneurial capacity. With few exceptions, vocational and university programs require a major overhaul in order to meet demand from the private sector for operational, technical, and managerial skills. The private sector could lead the introduction of specialized vocational schools funded by European programs. Curricula should be developed in close cooperation with companies and industry stakeholders so as to best match existing market demand.

4.5. Construction Cluster

4.5.1. Sectoral overview, comparative advantages and challenges

In its communication An Integrated Industrial Policy for the Globalization Era²⁰, the European Commission emphasizes that the “EU industry must speed up its transition to the low-carbon, resource- and energy-efficient economy. Combating climate change and increasing resource efficiency can achieve cost reductions and reduced environmental impact from enhanced resource and energy use. These are increasingly essential both to deliver sustainable growth and jobs and to gain competitive advantage in response to increasing global competition for resource and environmental constraints.”

The communication also notes specifically that:

“the construction sector can [...] make a substantial contribution to responding to climate change and other environmental and societal changes. The revised Directive on energy performance in buildings sets the ambition of the transition to nearly zero energy buildings in Europe as of 2021, whilst the reinforcement of the energy performance requirements will set new standards for buildings. This is an opportunity for the construction and renovation sector.”

Construction is typically classified as a pro-cyclical economic activity. Following a global trend, the industry has been severely impacted by the economic crisis; many construction firms in the West Region of Romania have seen their rates of activity decrease steadily since 2008, beginning with the onset of the economic crisis that swept over Europe and Romania. Analysis of firm-level data from the National Institute of Statistics indicates that, between 2008 and 2010, West Region firms in the

²⁰ Brussels, COM(2010) 614

construction sector experienced a 23% decrease in employment 12% decrease in turnover, on average (see Table 1).

Despite adequate levels of expertise regarding the use of technologically-advanced construction materials (particularly in the Timisoara area), there is not sufficient available information to indicate that the West Region holds significant natural or knowledge assets in construction. For this reason, the West Region can be classified as having **an unclear specialization or an unknown comparative advantage** in the construction sector.

In this context, there are certain opportunities and challenges that need to be considered in order help the sector develop through entrepreneurship and “self-discovery” while promoting the use of resource efficient technologies.

First, due to continuous increases in energy prices, the use of energy-efficient materials will become a requirement for medium and long-term economic sustainability. Nevertheless, the use of this type of materials by construction companies in the West Region is still highly dependent on the client market. Discussions with sector stakeholders indicate that many firms, particularly in the Timisoara area, have access to the necessary skills, know-how and inputs that would allow them to use this type of materials, if the demand existed.

However, as private investment has continued to decline, construction firms have become increasingly reliant on government contracts as their main source of revenue. If the client is the government, which has often been the case in recent years, the use of energy-efficient inputs can be restricted if these materials or installations are more expensive than the average inputs. As a result of shrinking government budgets, procurement contracts have been assigned lately based overwhelmingly on the lowest-price criteria, to the detriment of technical and energy performance requirements. Regarding other types of clients (private sector companies), these can constitute a type of market that is better able to absorb high quality materials. It should be emphasized that such investments, including supermarkets, office buildings, or hotels are also dependent on the general business prospects of the region. Lastly, a third category of users of energy efficient construction materials are private residencies. As the West Region become better-off economically, households will be better able to invest in energy efficient materials.

4.5.2 R&D activity and linkages with global networks: how does it relate to specialization in the sector?

Most of the construction companies in the West Region adapt the existing off-the-shelf technology to the specific needs of their projects or clients, but do not have an organized R&D division. It is expensive to conduct research and the availability of capital for this type of activities constitutes a major obstacle for local firms. However, some companies manage to engage in small research projects. Such projects include: developing a new construction material for thermal rehabilitation, production of photovoltaic cells and panels, design of a prototype for a new steel door. Part of these projects are conducted in collaboration with Politehnica University and the companies which undertake this type of research are located mainly in the Timisoara area, where they have access to higher levels of technical expertise than in other counties in the region, and where they can collaborate more easily with university students and teaching staff. These projects sometimes start from the company’s attempt to better meet the needs of its clients or are prompted by observation of trends at international fairs.

The availability of financing is essential for the development of research activities. Some construction companies in the West Region have lost their investments in innovation projects. For

example one firm mentioned that it has tried to develop and produce a new type of LED light bulbs but the project failed because the Romanian company could not compete with Chinese producers.

The machinery and equipment used by construction companies in the West Region is imported to a large extent primarily from Germany, Spain, Italy, or the Czech Republic. According to interviews with firms in this sector, the technology required to produce this type of equipment is not available in Romania. Some of the materials used are also imported (even though they may be purchased from companies based in Romania).

A local organization which has the potential to catalyze research efforts in the field of energy efficiency is ROSENC - a Romanian NGO organized as a cluster association of firms and industry, research organizations and public institutions, which aims to promote renewable energy sources, energy efficiency, and new sustainable energy sources within the West Region and across Romania.

One of the most important functions that ROSENC fulfills is that it focuses on providing the necessary, and often but missing, incentives for collaboration. For instance, in order to develop a project to produce solar panels the cluster created a new enterprise to overcome firms' reluctance to conduct joint research or invest resources with other firms, fearing some of the companies involved could free ride. The solution implemented by ROSENC was to create a new company in which all involved parties became shareholders. In this manner all stakeholders, including university professors, could have an incentive to bring the project to the commercialization phase.

The leadership of ROSENC approaches each project with a comprehensive look at the value chain in order to identify the missing links that can be provided in the region, how the work can be organized among its members, and the parts of the supply chain that must be strengthened in order to improve a project's chances of success. For example, for a project focused on poles of competitiveness, ROSENC mapped the entire value chain and found that the missing link was the photovoltaic cells, which were not produced in the region. As a result of this analysis ROSENC proposed a project to finance a factory that can manufacture the missing component. In the future, ROSENC could play a key role in the West Region for mobilizing existing know-how and promoting collaboration which can materialize in innovative and marketable solutions for energy efficiency.

4.5.3. An evaluation of the horizontal constraints that affect the sector

Access to external finance

Apart from the use of internal funding, the acquisition of machinery, equipment and supplies by construction companies in the West Region is mainly financed through bank loans. Some firms mention that credit is difficult to obtain due to the large amount of collateral required and high interest rates, compared to requirements in other European countries. In this context, EU Funds are important for construction companies in the West Region via two main channels: i) projects for which the companies can apply (and which are focused on technology development and research, sometimes in collaboration with Politehnica University, and upgrade of in-house technology and equipment); and ii) large scale development projects financed by European Structural Funds in which construction companies can participate via government contracts.

At the individual firm-level, construction companies in the West Region have used European Funds during the 2007-2013 financing phase and plan to also apply for this type of financing in the upcoming programming period (2014-2020). However, some stakeholders mention that the procedures required to access these funds are not transparent. In some cases national or local authorities impose additional requirements which make the process slow and cumbersome. Long delays in project approval

can render a particular technology (the end-use of the funds) obsolete. As a result, these delays can make the company that is waiting for funding to lose competitiveness.

Skills and training

Companies (especially in Timisoara) can usually find qualified labor force, although they complain that many graduates, in fields such as engineering, do not have sufficient practical (and sometimes theoretical) skills. Proximity to Politehnica University is essential for companies that wish to recruit interns, collaborate on research and product development, or provide technical training for staff. Small or medium-sized firms face wage competition from multinational companies and can sometimes invest in training for highly-skilled employees who choose to leave soon after they acquire better qualifications. The economic crisis had alleviated some of the pressure on labor availability. Outside of Timisoara or Arad it is more difficult for companies to attract and retain high-skilled labor who can perform high value added design and research activities, as the less developed counties like Caras Severin and Hunedoara provide fewer opportunities and lower living standards than the more developed areas of the West Region.

The lack of vocational schools has had a significant negative impact on the availability of skilled labor (technicians, masons, electricians, etc). The courses offered by unemployment agencies fail to provide blue collar and unskilled workers with the necessary abilities. Companies train the workers in-house or contract specialized training if they have the financial means or the opportunity to do so (ex: worker training programs sponsored by German funding). Worker turnover is also a problem for unskilled labor (people used to leave to Western Europe) but the trend has been reversed with the onset of the economic crisis.

Infrastructure

The general perception is that the local roads and the quality of the infrastructure have degraded due to lack of investments. Companies have usually managed to adapt to the situation but they are affected by the state of the road infrastructure to various degrees. Firms that use their own trucks for transport complain most stringently, as this leads to vehicle depreciation, delays and loss of competitiveness. The most pressing issues are the general poor quality of the roads in the region and the lack of a ring road for Timisoara.

Legal framework

Changes in legislation occur often and are unpredictable. This concerns both horizontal regulation (tax code or labor code) as well as sector-specific legislation concerning the rules for renewable energy. For example, uncertainty related to the distribution of 'green certificates' can derail a company's business plan.

According to discussions with private sector stakeholders, litigation procedures can be very lengthy, which has a negative impact on business operations. . Consultations with firms suggest that contract enforcement procedures could be streamlined, and some stakeholders have suggested using arbitration procedures in order to resolve legal disputes in a more efficient manner.

4.5.4. Prospects for sectoral development and considerations for policy actions

Construction firms in the West Region are still trying to recover from the global and national economic downturn, which has had a particularly severe impact on this sector. In addition, there is very little information to indicate whether or not the region will succeed to build a significant comparative

advantage in construction in the medium term. As Correa and Gucerri (2013) argue in their study, in this type of situation **the authorities ought to prioritize horizontal policies, which will create a business environment that is conducive to entrepreneurship and “self-discovery”.** This approach can facilitate firm entry and exit, access to finance, and the accumulation of knowledge.

Discussions with construction firms and stakeholders in the West Region, which were interviewed as part of this report, have also highlighted **labor skills, and infrastructure as horizontal policy areas that need to be addressed in order to support business development,** both in construction and on an economy-wide level.

In this regard, **the establishment of vocational schools is essential in raising and maintaining the competitiveness of the construction sector in the West Region.** Currently, the scarcity of qualified technicians including electricians or middle-skilled workers such as masons affects the ability of firms to grow and may increase wage pressures for these professions. The curriculum should be established in close collaboration with the private sector, ensuring that graduates possess a set of skills which is in line with market demands.

All firms interviewed as part of this report mentioned that they have used European Funds, either by applying for a particular project or through a government contract financed by structural funds. However, **in order to improve access to this key type of financing, it is critical that authorities increase the overall level of transparency regarding access to EU Funds and that application and payment disbursement procedures are streamlined and simplified.**

For firms which use their own vehicles for transportation, the quality of the local road infrastructure can affect the ability to send and receive materials in a timely manner and may increase costs in terms of vehicle depreciation. In this turn, **improving the quality of internal roads in the West Region and the connectivity with the highway is essential in order to enhance the competitiveness of firms in the sector.**

Nevertheless, there are additional sector-specific issues that could be tackled to help increase the competitiveness of construction firms; two important issues can be highlighted: i) knowledge exchange and R&D cooperation; and ii) modification of selection criteria used in state auctions for infrastructure projects.

The West Region cluster ROSENC can play a key role in promoting collaboration between state authorities, academia, and the private sector in order to increase the level of local technical expertise regarding the use of resource efficient materials. It can also, in the medium and long term, support commercially sustainable projects in order to expand the production of energy efficient construction materials and appliances in the region, which could help reduce the cost of such inputs and increase their use in local infrastructure. Increasing awareness regarding ROSENC’s initiatives would encourage knowledge exchange and would help local firms to increase competitiveness and to become better connected to the latest technological developments in the field.

Discussions with construction firms in the West Region suggest that over the past few years, government infrastructure contracts have been awarded primarily according to the *lowest price technically acceptable* criteria. This evaluation method can exclude project proposals that rely on the use of high-quality energy efficient materials, as this type of inputs and appliances is more expensive than regular materials. However, studies²¹ have shown that ‘green buildings’, although more costly to

²¹ Kats, Greg, Leon Alevantis, Adam Berman, Evan Mills, Jeff Perlman. *The Cost and Financial Benefits of Green Buildings*, November 3rd, 2008 ; Langdon, Davis. *The Cost of Green Revisited*. Publication. 2007; Fuerst, Franz;

build, provide a good return on investment due to significant savings in energy costs over the life-cycle of the structure. In this context, **the authorities should encourage the use of energy-efficient materials and should support the transition to nearly zero energy buildings. These measures would promote the use of energy efficient materials while helping sustain long term economic development.**

4.6. Tourism Cluster

4.6.1. Sectoral overview, comparative advantages and challenges

The characteristics of the tourism sector make it a key sector for promoting the smart, sustainable and inclusive growth that Europe 2020 aims to foster. This is acknowledged within the strategy itself, which lists the enhancement of the competitiveness of the European tourism sector as one of its priorities within the framework of the flagship initiative “An industrial policy for the globalization era”.

There are three basic characteristics that position the tourism sector at the center of the Europe 2020 strategy:

- Tourism is the third most important socioeconomic activity in the EU after the trade and distribution sector and the construction sector. The sector generates more than 5% of GDP of the European economy and employs 5.2% of the workforce. When those sectors related to tourism are taken into account, these percentages increase to 10% and 12%, respectively.
- Tourism is one of the economic activities with the greatest potential for creating growth and employment in the EU. In recent years it has not only created employment at a higher rate than average within the economy, but it has also generated more employment opportunities for young people, women and unskilled workers. This is illustrated by the fact that the proportion of young people working in the tourism sector is double that of the rest of the economy, for the EU as whole.
- The tourism sector is essential to fostering territorial cohesion within the EU, particularly in terms of encouraging the economic and social integration of rural and mountain areas, coastal regions and islands, peripheral and ultra-peripheral regions and less prosperous regions.

In the case of the West region, the different types of tourism that form the comparative advantage of the tourism sector are detailed below.

Figure 16 - Types of Tourism in the West Region



Ecotourism and active tourism

One of the main assets of the West Region is its important natural heritage resource: mountainous landscapes, gorges, lakes, hot and mineral springs, nature parks and reserves. Approximately 26% of all Romanian protected areas are located in the West Region. These protected areas are part of the Natura 2000 network. The West Region main national and natural parks cover an area of about 4,461 square kilometers, which represents 13.4% of the West Region’s land area. Boxes 2 and 3 present a detailed description of these parks. Besides these parks, the Danube River – which represents the border of Caras-Severin county and the national Romanian border with Serbia – is another important advantage with potential to become a significant touristic asset for the West Region.

Box 2 - National Parks in West region

Cheile Nerei – Beușnița is situated in the southwest part of the region, in the southern part of the Anina Mountains along the Nera River. A very diverse flora has developed here, particularly Balkan, Mediterranean and Sub-Mediterranean species and a very impressive karst landscape with caves, sinkholes, outbursts, and waterfalls.

The National Park Cheile Carasului-Semenic is located in the central part of Caras-Severin county, covering an area of 36,364 ha including 10 declared reserves and 8 proposed reserves. The sculptural aspect of its limestone formations gives a particular beauty to “Cheile Carasului”. Karst landscapes are also predominant, including caves, pitches, sinkholes and lapis.

The National Park Domogled - Valea Cernei is the second largest in the country and the only one that includes an entire river basin and several mountain massifs. Domogled is located near Baile Herculane, and is considered as one of the richest reserves in terms of plant species in Europe. Within its territory, all three types of ecosystems present in Romania can be found: water, land and underground aquatic ecosystem.

The National Park Retezat represents the most complex scientific reserve in Romania and its importance is recognized by international organizations such as UNESCO, which have included the Retezat Park in the Biosphere Nature Reserves list. The park covers 20,000 ha including glacial relief (many basins, valleys and glacial lakes), rare plant (mountain orchid, edelweiss, wild walnut) and valuable specimens of fauna.

The National Park Defileul Jiului hosts many wildlife species, especially birds that “pass through” this “Central European - Bulgarian path”, one of Europe major bird migration corridor.

Box 3 - Natural Parks in West region

The Natural Park Lunca Mureşului is located in the West part of the region, in Arad and Timiş counties. It stretches from Arad to the Hungarian border, along the river Mureş. The park is a typical wetland ecosystem of river and backwaters. It is also an important nesting place for approx. 200 species of birds.

The Natural Park Portile de Fier is located in between the South West and the West Regions, stretching over an area of 115 655 ha. The park contains a total of 18 protected areas with two protected bird areas. It is part of the Natura 2000 network.

The Natural Park Grădiştea Muncelului-Cioclovina is a protected area of national interest (IUCN 5th category) situated in the Southern Carpathians Sureanu Mountains. The main touristic attractions are natural Karst and archaeological sites such as the Prehistoric painted cave of Cioclovina and the UNESCO Heritage Site of the Dacia Fortresses Sarmizegetusa Regia.

The Dendrologic Park Bazoş is a forest reservation situated about 15 kilometres from Timisoara, which benefits from a sub-Mediterranean climate. Eight hundred different species of trees and shrubs from all over the world can be found there, some of them unique in the country.

In terms of historical and architectural heritage, in 2010, 2,104 monuments and historical sites located in the West region were registered on the Romanian national list of Historical Monuments.

In Arad county, the main cultural heritage assets are historical sights and cities, more than 20 castles, monasteries and churches, ethnographic centres and rural heritage sights. The Arad County is well known for medieval fortresses such as Arad Vauban, Siria, Dezna, Soimos:

In Caras-Severin county, the main cultural heritage assets are of archaeological nature: Geto-Dacian sites (Bocşa, Colţan, Ocna de Fier, Oraviţa, Sasca Montană, etc.), Roman military architecture (Varadi, Mehadia, Teregova, Moldova Veche, etc.), medieval fortresses (Caraşova, Mehadia, Coronini, Caransebes, etc.), historical and religious monuments (monasteries, wood churches), historical monuments and groups of buildings (Caransebes Oravita, Baile Herculane Bocsa and Anina), museums and memorial houses (Resita Caransebes Oravita, Varadi, Ocna de Fier, Anina, Moldova Noua). Although the Caras-Severin County hosts an important number of registered monuments, the tourist flows are very low. This is mainly due to poor accessibility and the lack of integrated road infrastructure and accommodations in the rural area.

The rural cultural heritage is also a highly significant asset of Caras-Severin. This includes the Rudaria valley (in the Eftimie Murgu commune) watermills that have not only an utilitarian use, but have inspired legends and folklore connected to the rural wedding rituals and traditions. Their ancient history and architectural characteristics form a highly specific genius locus.

In Hunedoara county, the tourism anthropic resources are various, including Roman cities and fortresses (the complex Ulpia Augusta Dacia Traiana Sarmizegetusa, Sarmizegetusa Regia), medieval fortresses (Corvin Castle, Deva Fortress), historical and religious art and architecture (Deva, Hunedoara, Calugara), museums and art galleries, ethnography and folklore.²²

²² Ulpia Augusta Dacia Traiana Sarmizegetusa- was the capital and the largest city of Roman Dacia. Sarmizegetusa Regia was the capital and the most important military, religious and political centre of the Dacians, while *Corvin Castle* dates from the mid-15th century, and was built mainly in late Gothic style, but has Renaissance architectural elements.

In Timis county, the main cultural heritage assets are: medieval castles and fortresses (Huniade Castle in Timișoara), groups of buildings and monasteries (Baroque Palace of Timișoara, the Castle of Queen Elizabeth from Banloc, Partos Monastery, Saraca Monastery), cultural events and festivals, museums and memorial houses (Lugoj Traian Vuia), ethnography and art craft (Banat Village Museum, Dumbrava).

It is evident that the West Region encompasses a significant number of monuments and historical sites. However, these are not included in a common integrated thematic road and have not been adequately promoted. Many aristocratic 18th century castles in the rural areas of the West Region (mainly Arad and Timis) have degraded because of unclear ownership rights and the lack of funds for rehabilitation works. The intangible cultural heritage is also well represented in this region by folklore and traditions. The best-known intangible heritage element of the West Region is the Călușarii, a very dynamic dance that has seemingly ancient, pre-Christian origins and that was included on the list of UNESCO intangible heritage.

Spa resources and health tourism

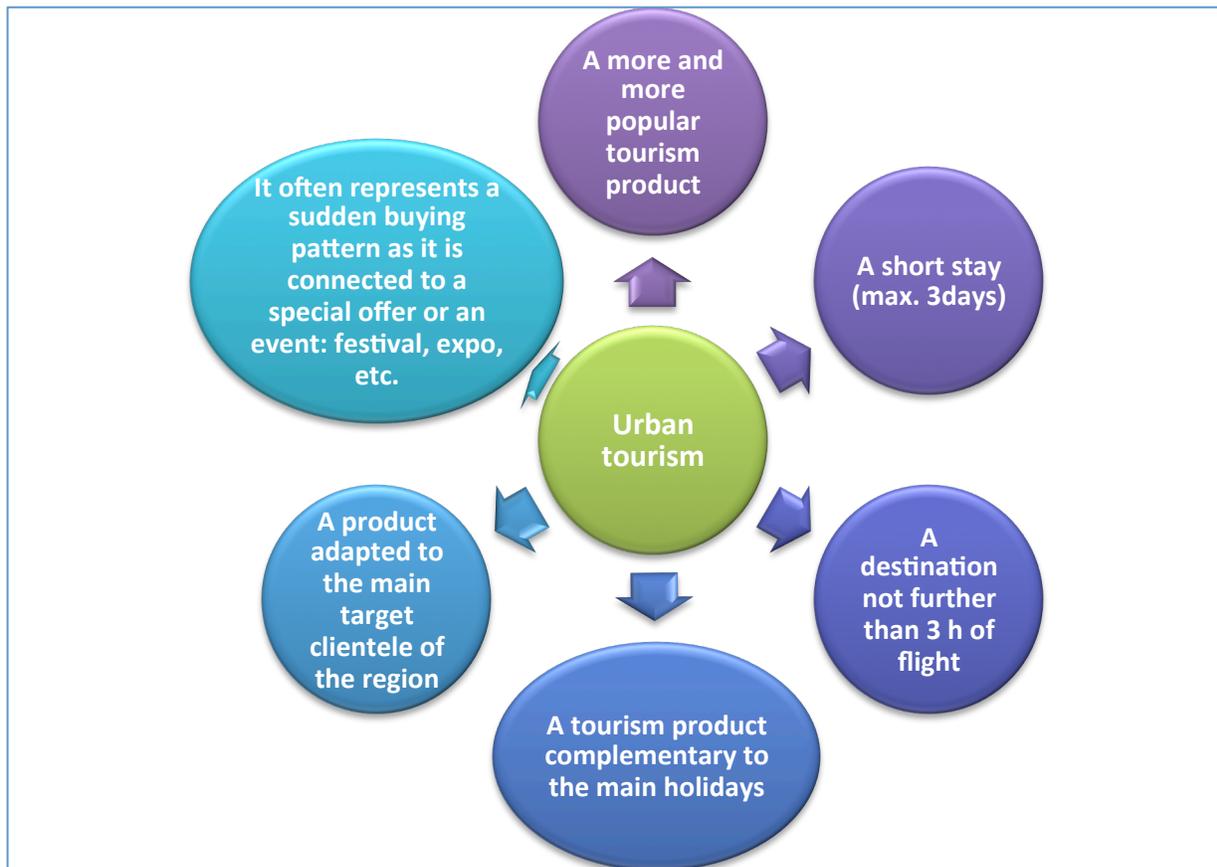
The West Region has several important spa resorts, as: i) Buzias and Baile Calacea in Timis county; ii) Moneasa and Lipova Bai in Arad county; iii) Baile Herculane in Caras-Severin county; and iv) Geoagiu Bai and Baile Calan in Hunedoara County. These resorts are key assets for tourism in the West Region due to the quality of thermal springs, their location, their historical heritage, the national custom of spa holidays and the new international trend in spa and wellness tourism.

Nevertheless, these spa resorts have not been modernized since the fall of communism and have suffered as a result of the inefficient privatization strategy undertaken at the end of the 1990s. Their accommodation facilities are no longer competitive and West region tourists prefer to go to Hungarian spa resorts. Other weaknesses of the spa resorts in the West region can be pointed as follows: i) difficult access to natural resources (ANRM exploitation rights); ii) old accommodation facilities that need renovation works; iii) lack of leisure facilities; iv) high proportion of social tourists: pensioners financed through the state subsidized spa holiday voucher system; v) legal ambiguities regarding land ownership that arise during the process of restitution of properties confiscated during the communist period and the failure of the privatizations carried out by the public authorities; and vi) lack of urban city centre renovation in historical spas.

Urban & MICE tourism

Urban tourism is increasingly perceived as an instrument and facilitator for promotion of the European cities as tourism destinations. It creates connections to other sectors that become increasingly important: it generates new equipment/infrastructure (museums, accommodation facilities, restaurants, etc.) which can have an impact on the quality of life of residents. In addition, tourism development leverages the cities' image and perception: if a town is viewed as a touristic destination, it becomes attractive not only for tourists but also for its inhabitants and the business sector as a whole. In this context, cities increasingly implement territorial branding strategies that are based on tourism arguments « I Amsterdam », « Only Lyon », « Be Berlin », and the famous « I Love NY ».

Figure 17 - Features of Urban Tourism



The main form of tourism in the West Region cities is business tourism. The attractiveness of the area in economic and investments terms is illustrated by the fact that business travelers represent most of the overnight stays in the hotels of the West Region’s major cities.

The geographical proximity of the West Region to Western and Central Europe, the Arad and Timisoara airports, the three main European routes (E68, E70, E79), the three international railway lines, and the economic potential of the region attract investors, thus contributing to the emergence and development of meetings, incentives, conventions and exhibitions (MICE) tourism in the West Region.²³ The two exhibitions and conference centres - Expo Arad International and CRAFT Timisoara - have a cross border regional impact and are strengthening the position of Arad-Timisoara as a Euro regional economic hub.

The West region has a latent comparative advantage in the tourism sector. Indeed, as shown before, the main reasons for this inference lie behind the location-specific assets of the region which can be summarized as follows:

- Natural heritage (including natural parks and thermal springs)
- Historical and architectural heritage

²³ MICE includes visitors participating in the following activities: i) Association/Charity/Institute/Society Events; ii) Governmental meetings & conferences; iii) Corporate Events – dinners, product launches, conferences, awards etc; iv) Incentive travel; v) corporate hospitality; and vi) exhibitions & trade shows

- Better accessibility than most of the Romanian regions and the advantage of emerging as a cross border business center for its neighbors.

Overall, there are certain challenges that need to be addressed in order to capitalize on the important natural and historical endowments **The tourism sector has not been considered by the political stakeholders as a priority** but has continued to develop and a significant level of know-how still exists in this area, especially in the field of spa tourism. Moreover, tourism generates employment opportunities for young people, women and unskilled workers that are the most affected by the current economic crisis.

Tourism is an underdeveloped sector that must be sustained by an integrated territorial development strategy during the 2014-2020 programming period. European funds will be necessary to finance public infrastructure investments that are necessary for the development of the private sector. One potential instrument for consideration would be the development in the West Region of the EuroVeloroute – the highly popular European network of greenways that “theoretically” cross or end in Romania. Until now, no public investment has been made in in this area and the tourists, coming from upstream countries, usually stop their journey in Serbia.

4.6.2. Some key numbers on the tourism cluster in West region

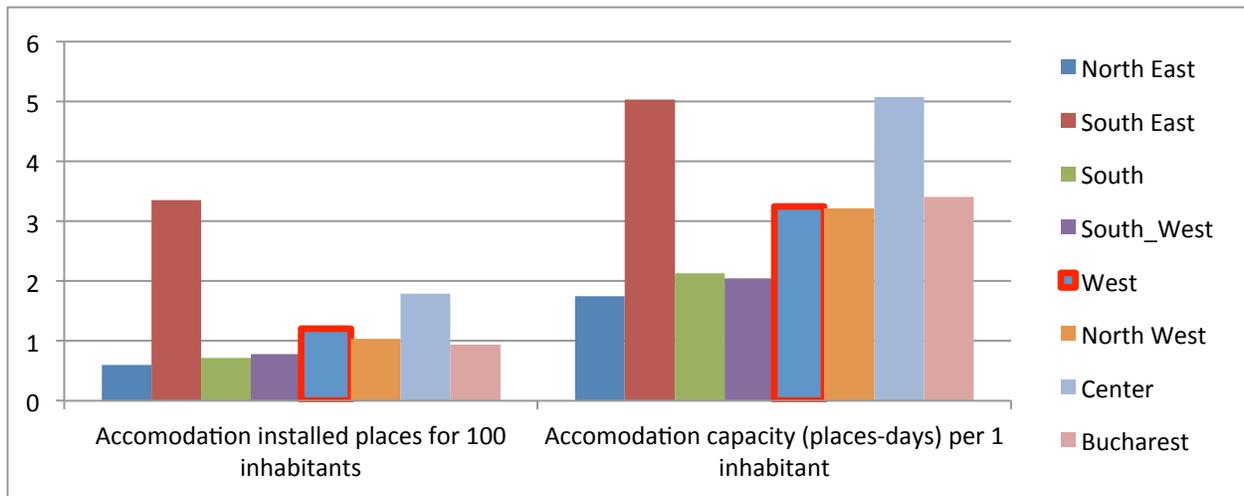
Accommodation capacity

The overall touristic accommodation capacity of the West Region places it amongst the best-developed developed regions in Romania from this standpoint. Being one of the less populated development regions, the Western Region is nevertheless the 3rd in the country in terms of the number of accommodation places per 100 inhabitants. It is surpassed only by the South-East Region (which includes the sea side resorts on the Black Sea) and by the Central Region (with Sibiu city and the Brasov county ski resorts like Poiana Brasov), while Bucharest-Ilfov and the South regions (including the Prahova Valley resort towns: Sinaia, Busteni, Azuga) have less accommodation capacity per 100 inhabitants. The same hierarchy is maintained if we look at the accommodation capacity per inhabitant²⁴, except for Bucharest that had a slightly higher average than the West Region in 2011 (

²⁴ **The installed accommodation capacity** is the accommodation capacity (number of beds) that is legally on the market, (i.e.: that has obtained the public authorities certification). It is calculated at one precise moment of the year (usually the 31st of July or the 31st of December), without taking into account if the beds are really available or not (if the hotel is open or not). This is thus *an administrative variable obtained from administrative records* and not from field research. **The accommodation capacity** data is obtained by adding the number of beds that are effectively available each month. For example, a hotel located on the seaside that has an installed accommodation of 100 beds can be closed between January and April. So the Romanian National Statistics Office will consider that the accommodation capacity is 0 during M1, M2, M3 and M4 even if the installed accommodation capacity is of 100 beds. *This indicator is obtained through monthly survey and data collected on the field from accommodation facilities.* **Accommodation units** represents number of accommodation units (number of hotels + number of hostels + number of camping facilities, etc) according to the Romanian fiscal definition and the certification provided by public authorities.

Figure 18).

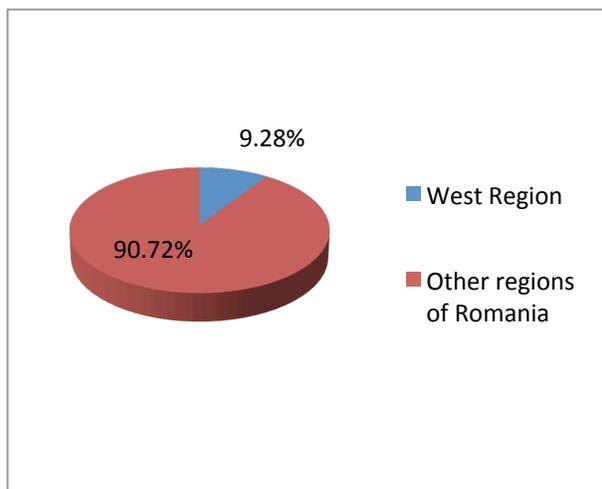
Figure 18 - Accommodation capacity comparison between the Romanian regions (2011)



Source: World Bank staff elaboration based on INS data

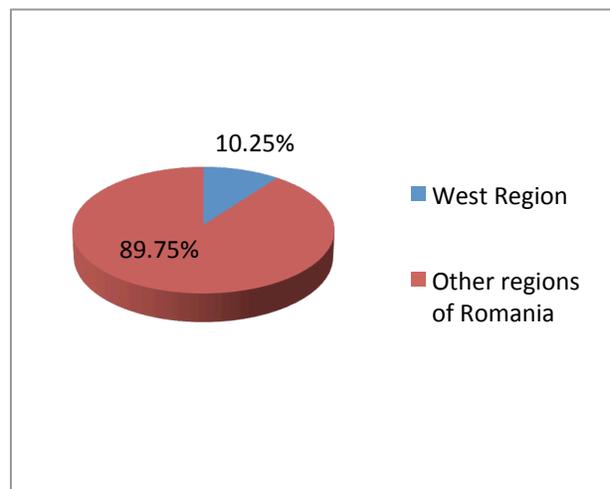
The West Region of Romania represents around 10% of the Romanian tourism accommodation capacity as well as accommodation units (hotels, hostels, etc), as shown below. The West Region represents for almost all the types of accommodation between 8% and 10% of the national installed accommodation capacity.

Figure 19 - Accommodation capacity 2011 - %



Source: World Bank staff elaboration based on INS data

Figure 20 - Accommodation units, 2011 - %²⁵

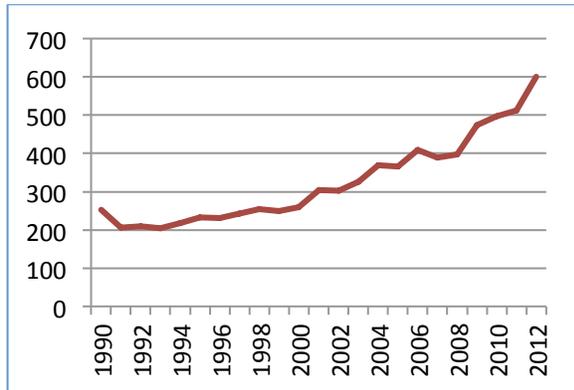


Source: World Bank staff elaboration based on INS data

The following charts illustrate the evolution of the accommodation capacity of the West Region from the beginning of the 1990s to the present. As in the case of other Romanian regions, there was a transition from fewer and larger accommodation facilities owned by the state to many smaller accommodation facilities (more than 2 times more units in 2012 than in 1990). Concerning the installed accommodation capacity, Figure 22 shows that after the initial steep decrease of 1990-1991, it took the West Region until 2012 to register again the same volume of capacity.

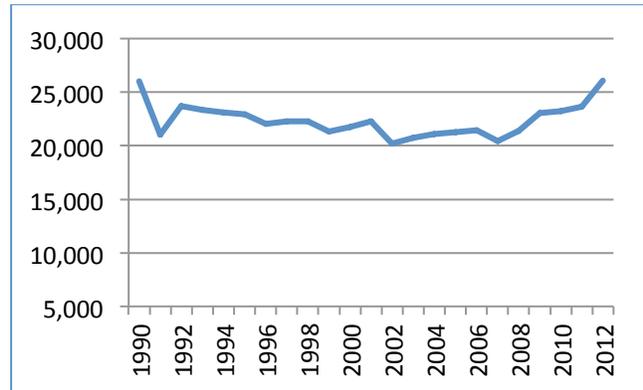
²⁵ The indicator “accommodation units” (in Romanian “unitati de cazare”) represents, broadly, the number of hotels, hostels, etc

Figure 21 - - The evolution of the number of units of accommodation West Region 1990-2012



Source: World Bank staff elaboration based on INS data

Figure 22 - Evolution of West Region's installed accommodation capacity



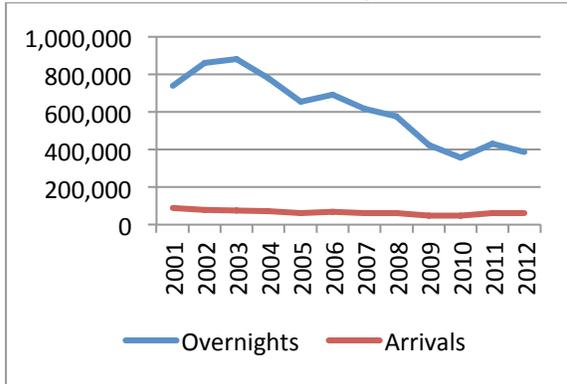
Source: World Bank staff elaboration based on INS data

As in other parts of Romania, the West Region is dominated in terms of accommodation facilities by hotels (more than 50% of the installed accommodation capacity). This is the case particularly in a county like Timis with an important urban touristic destination – the hotels in Timisoara represent more than 50% of the county's accommodation capacity.

Tourist flows

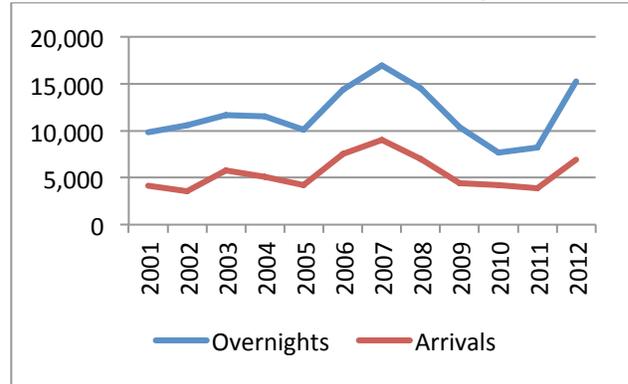
The evolution of tourist flows to the West Region (domestic and foreign) was similar to the national trend. Affected by a severe fall after 1989, tourist flow experienced an increase during the 2000-2008 growth period of the Romanian economy. Nevertheless, during this time frame, significant differences appear between the four counties. If Arad and Timisoara in particular experienced a relatively robust growth during the last half of this interval (almost a 20% increase of overnights between 2005 and 2008 for Timisoara), Caras-Severin and Hunedoara registered lower tourist flows between 2005 and 2008 than between 2000 and 2004. This difference between the more developed counties – Timisoara (and to a lesser extent Arad), and the other counties, may in part be explained by the process of economic transition which took place in Romania during the 2000's. Two main factors can be pointed. First, the closing of the industrial plants resulted in a fall in business tourism flows as well as in a reduction of the domestic (especially intra-regional) touristic flows to the spa resorts located in Caras Severin and Hunedoara. Second, the inefficient privatization of public accommodation facilities that was followed by a lack of investment, particularly in the case of the spa resorts.

Figure 23 - Baile Herculane spa resort: tourist flows and overnights



Source: World Bank staff elaboration based on INS data

Figure 24 - Valiug (Semenic mountain resort): spa resort: tourist flows and overnights

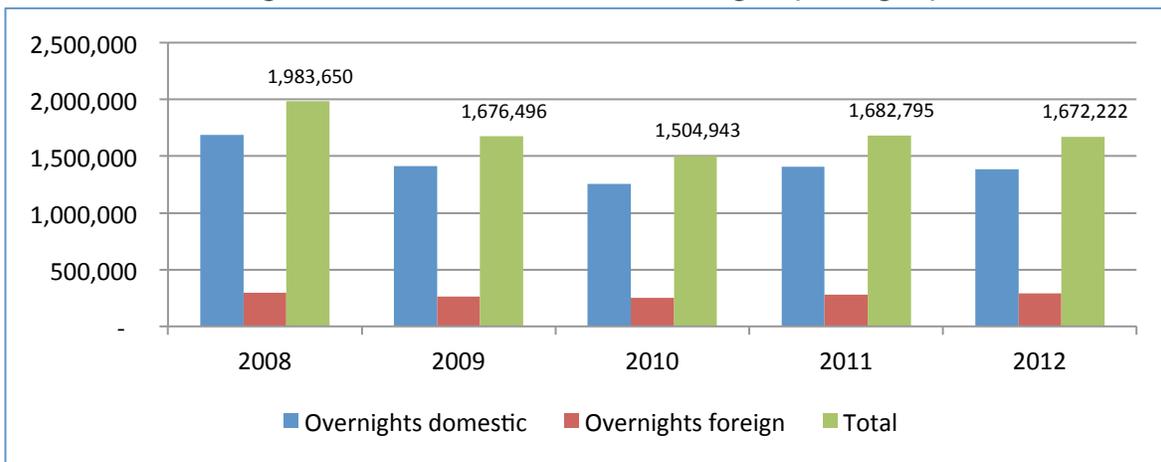


Source: World Bank staff elaboration based on INS data

The predominance of spa tourism in Caras Severin county and the significant decrease of tourist flows and overnights in the Baile Herculane spa resort can hide the development of other touristic products such as nature and active tourism in the area (Figure 23). For example, the Semenic mountain resort, also located in Caras Severin, has seen a significant increase in overnights and in the number of arrivals (Figure 24).

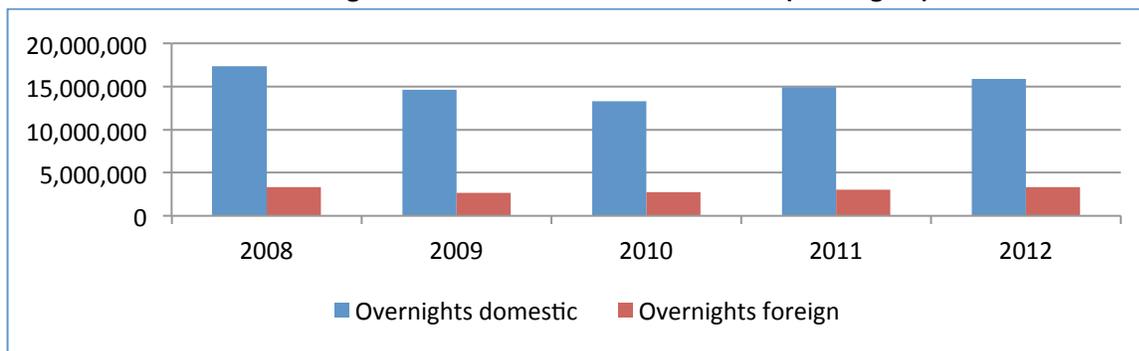
Overall, the economic crisis that struck the Romanian economy after 2008 has affected the tourism sector in the whole country, including the West Region and all its counties. The figures below make a comparison between the situation of the West Region and Romania in terms of tourism flows between 2008 and 2012.

Figure 25 - Tourism flows to the West Region (overnights)



Source: World Bank staff elaboration based on INS data

Figure 26 - Tourism flows to Romania (overnights)



Source: World Bank staff elaboration based on INS data

As it can be observed in the previous figures, after the negative impact of the crisis between 2008 and 2010, the West Region followed the national upward trend in 2011 and registered a growth in the number of overnights spent by both local and foreign tourists. In 2012, the West Region had mixed results, with a decrease in the number of overnights spent by domestic tourists and a slight increase in overnights spent by foreign tourists. Romania as a whole registered an increase in the overnights spent by both types of tourists in 2012, compared to 2011. As in the other Romanian regions, in terms of volume the West Region tourism flows are strongly dominated by domestic touristic flows (Figure 27). Therefore, the slight decrease of domestic tourism in 2012 compared to 2011 has led to an overall decrease in tourist flows. The West Region was the only Romanian region which displayed this trend.

Figure 27 –Total tourism flows to other regions in Romania

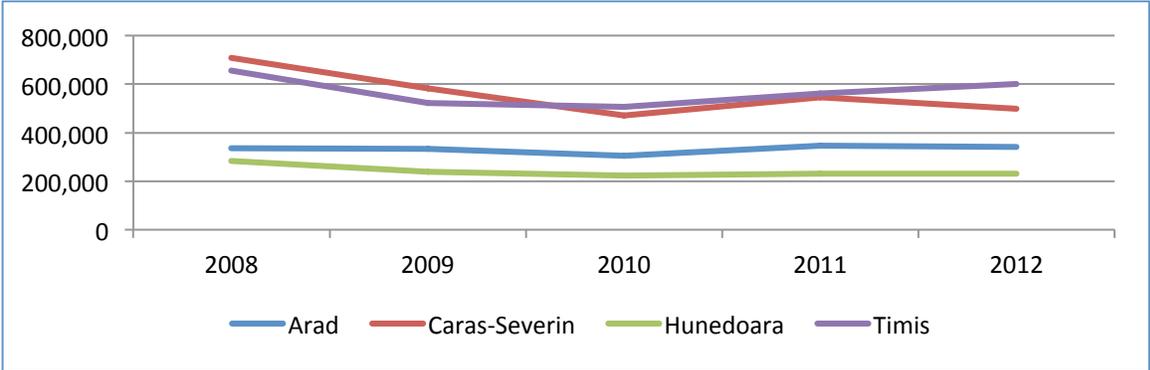


Source: World Bank staff elaboration based on INS data

A comparison between arrivals and overnights is important in order to understand the specificities of the West Region. The West Region saw in 2012 an increase in arrivals but a decrease in overnights. This might be explained by the importance of business tourism in the main cities of the region (Timisoara and Arad) and the tendency of this type of clientele to adapt their behavior to the overall economic situation: business tourists arrived in increasing numbers but their average stay decreased. However, another explanatory factor is the decrease in the number of arrivals to the main spa resorts of the region and of the average length of stay, particularly in the most important one: Baile Herculane (as shown in Figure 23).

Inside the West Region, the 2008-2012 period shows a continuation of the previous trends with certain minor fluctuations due to the general economic situation of both Romania and the main inbound markets (Italy, Germany, Austria, Hungary, Serbia). After a decrease caused by the economic crisis in 2008-2010, the overnights and arrivals have been increasing in the Timis county, which has surpassed Caras-Severin county in terms of overnights spent. In 2012, tourist arrivals increased in all four counties. Nevertheless, the overnights situation is mixed: Caras-Severin continued to decrease (even if it registered a slight reversal of trend in 2011), Hunedoara did not manage to rebound and Arad stagnated in 2012. Hunedoara remained the least visited county, while Arad is a fluctuating destination: in 2011 it saw an increase in terms of overnights while arrivals were decreasing. In 2012, arrivals increased while overnights decreased slightly (Figure 28).

Figure 28 - Overnights spent by county in the West region 2008-2012



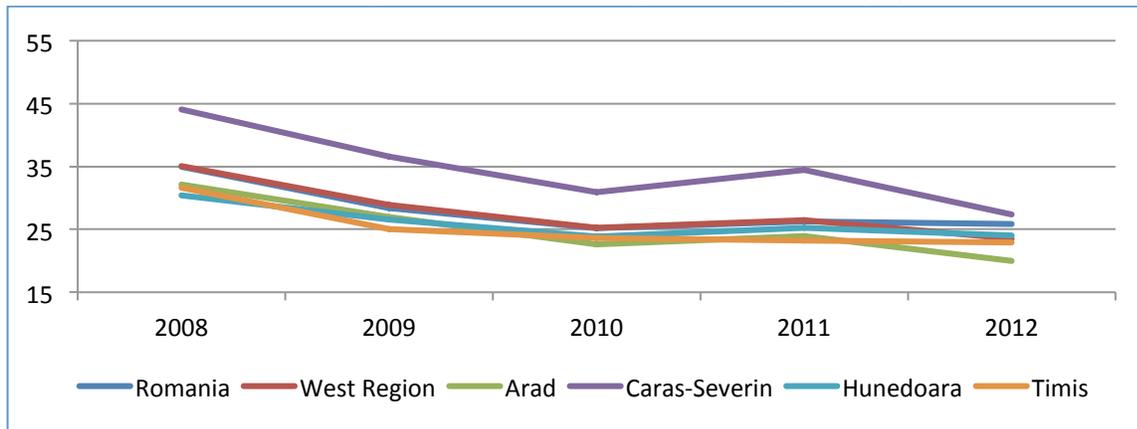
Source: World Bank staff elaboration based on INS data

An important aspect of the tourism sector is seasonality. A well-balanced seasonality ensures a viable tourism economy and strong positive externalities for related sectors such as transport, retail, public services, etc. The seasonality of the West region is similar to the national one, with a high touristic season during the summer and the beginning of the autumn, and a difficult low season during the winter months (overnights spent in January, February and March represent less than 50% of the overnights during July and August). This seasonality pattern represents a highly adverse feature of the tourism economy of the region, as it gives rise to a “vicious circle”: bad seasonality → limited profitability in the tourism industry → low level of investments in developing accommodation and leisure facilities → low tourism attractiveness → bad seasonality.

The occupancy rate is another important indicator of the economic situation of the tourism sector. Its connection to seasonality is important as Romanian tourism providers usually try to mitigate bad seasonality through a higher flexibility in the volume of services/places made available on the market during the low season. The occupancy rate can thus be used to understand the degree of adaptation of tourism operators to the seasonality patterns region’s seasonality.

The West Region has followed a similar trend to the rest of Romania and is an average region in terms of monthly occupancy rates. The chart below indicates the yearly average occupancy rate of the West region counties compared to the regional performance and to the national situation.

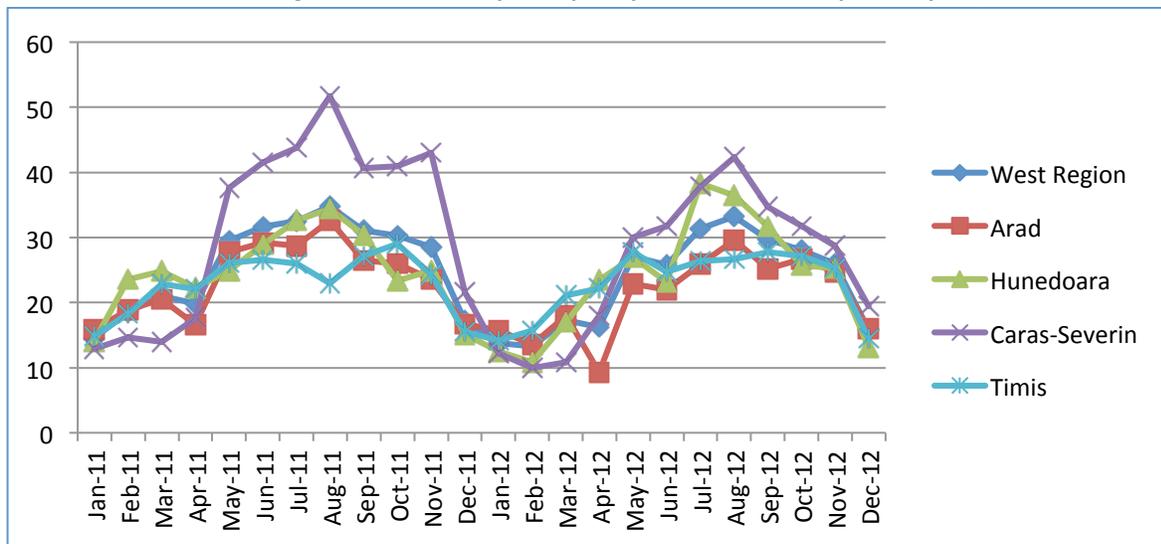
Figure 29 - Yearly average occupancy rate (%)



Source: World Bank staff elaboration based on INS data

Some conclusions can be drawn from these occupancy rates figures. First, the West Region overall occupancy rate is almost identical with the national average, which is a low one. Second, the overall trend in the Western Region mirrors the national one: strong decrease during the crisis years in 2008-2010 and a slight rebound in 2011. Third, in 2012 the occupancy rate in the Western Region was 23.5%, a relatively low figure. Caras-Severin has a slightly higher occupancy rate (that is rapidly decreasing towards the regional and national average) because of the performance of the Baile Herculane spa resort. Finally, Timis county has displayed a more stable occupancy rate and moderate growth due to the opening of new hotels for which construction started before the crisis.

Figure 30 - Monthly occupancy rate variation by county (%)



Source: World Bank staff elaboration based on INS data

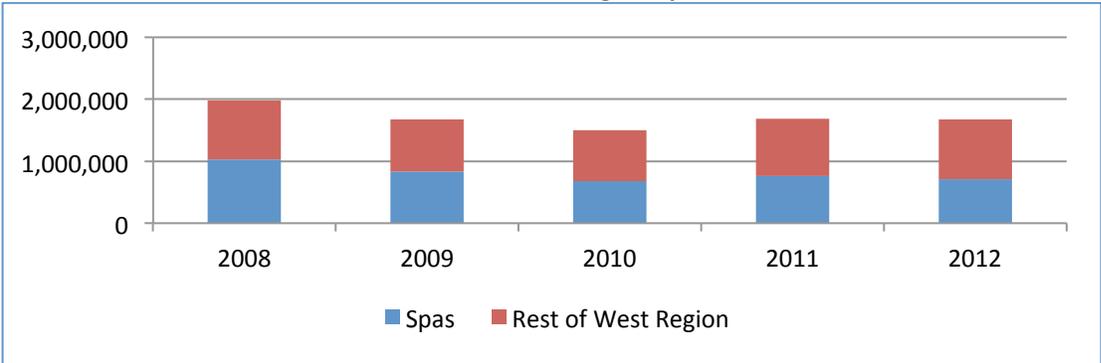
Analysis of monthly data highlights a number of features (Figure 30). First, there are differences in seasonality: during winter, the occupancy rate of Caras-Severin facilities represents 20%-25% of the summer occupancy rate, while in Timis the lowest month (January) represents more than 50% of September occupancy rate. Second, the high season is not similar across counties: The summer months represent the high season in Caras Severin, Hunedoara and Arad (due to Romanian emigrants coming

back home for holidays and passing through Arad), while for Timis the high season takes place in the spring and autumn (primarily in September, October and May).

Key numbers for spa & wellness tourism

An analysis of the spa sector in the West Region can give some indication on the overall tourism flows. This is primarily because spa tourism in the region accounts for a large part of the touristic offer (accommodation capacity, places-days per year), as the spa resorts built during the communist period include large treatment and accommodation facilities for state subsidized clientele (mainly pensioners). The main spa resorts and spa towns in the West Region are: Baile Herculane, Geoagiu, Vata, Buzias, Lipova and Moneasa.

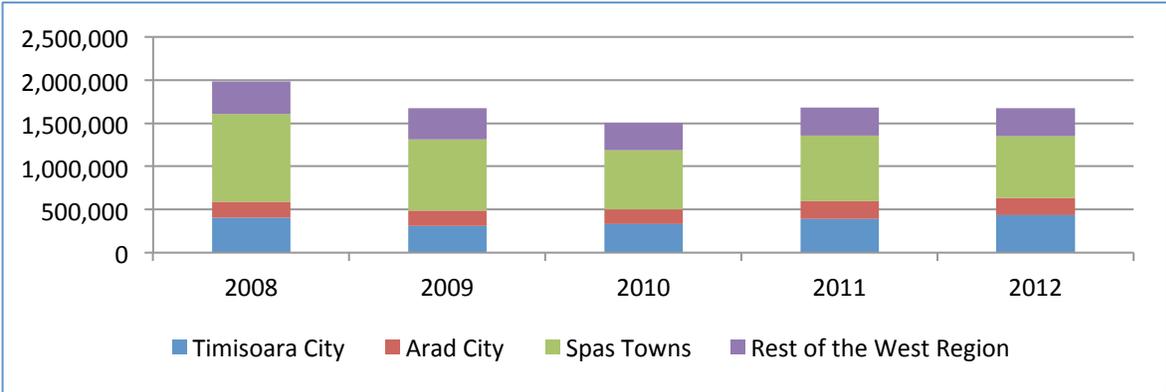
Figure 31 - Share of spa tourism in overall tourism flows (overnights) in the West Region, annual overnights spent



Source: World Bank staff elaboration based on INS data

Tourism flows in the West Region are strongly linked to spa tourism which represents between 40% and 50% of all overnights spent every year in tourist accommodations. The share of spas in the total is however decreasing due to the difficulties affecting the traditional spa resorts (see Figure 32).

Figure 32 - Distribution of the number of overnights spent in the West Region by main tourist destination



Source: World Bank staff elaboration based on INS data

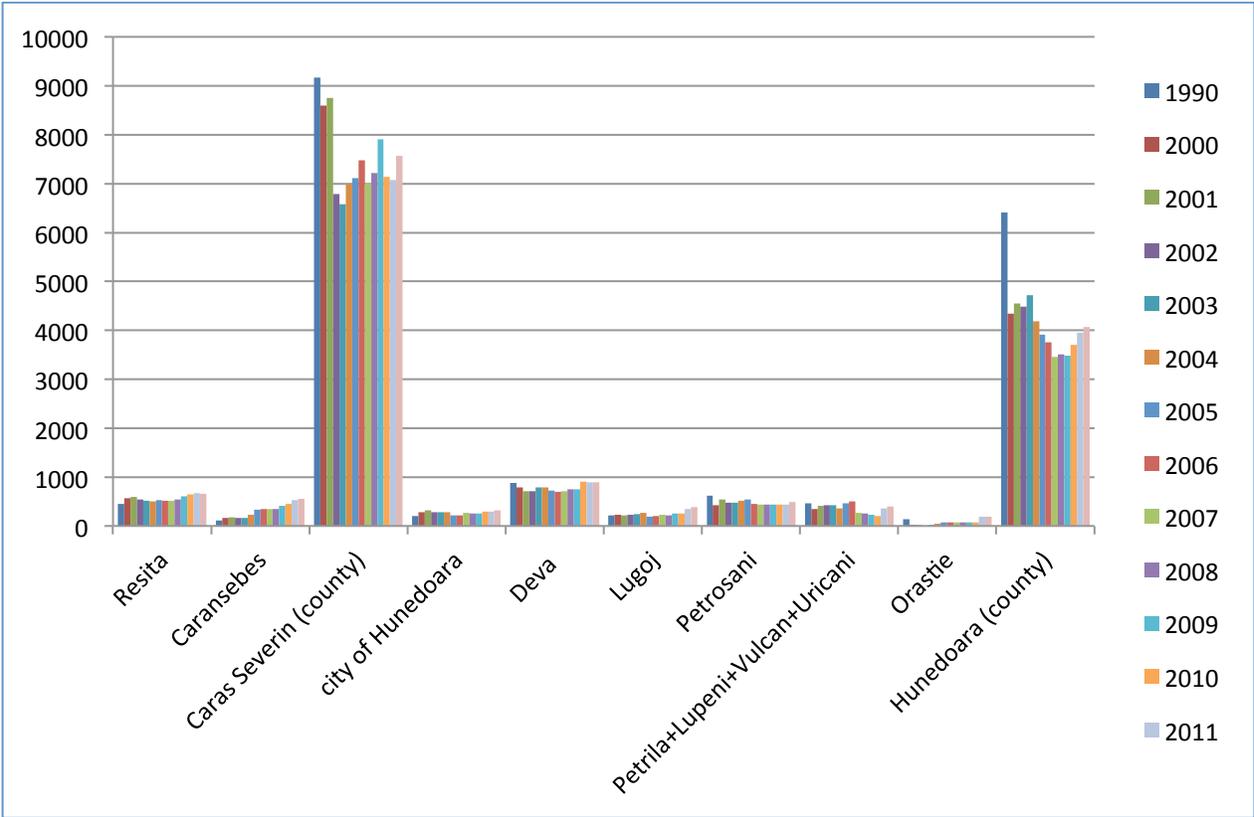
If the analysis considers the overnights in the main urban destinations (Timisoara and Arad) added to the ones in spa resorts, it can be seen that the seasonality of spa tourism in the West region is similar to the national one: high influx of tourists in the summer months and much lower activity during

the winter (an exception is Lipova, a town in Arad county, due to a decrease in the number of arrivals experienced in the last few years). This type of seasonality patterns lead to an annual average occupancy rate below 50%, as spa facilities are open usually all year long, which suggests that the development of MICE tourism is one of the priorities of spa tourism providers in order to mitigate the seasonality problem.

Key numbers for city tourism and business tourism

Urban and business tourism is another other important tourism sub-sector in the West Region, given the importance of Timisoara and Arad as business destinations. The weight of the other cities in the region is low.²⁶ Resita, Deva, Petrosani (including all the other mining satellite towns such as Lupeni, Vulcan, Petrita), Hunedoara, Caransebes, Orastie and Lugoj are the other main cities in the region. They are mainly industrial or mining towns, with very low tourism intensity, even though some of them have cultural-historic assets that could attract visitors²⁷.

Figure 33 - Evolution of the number of installed accommodation places, main towns

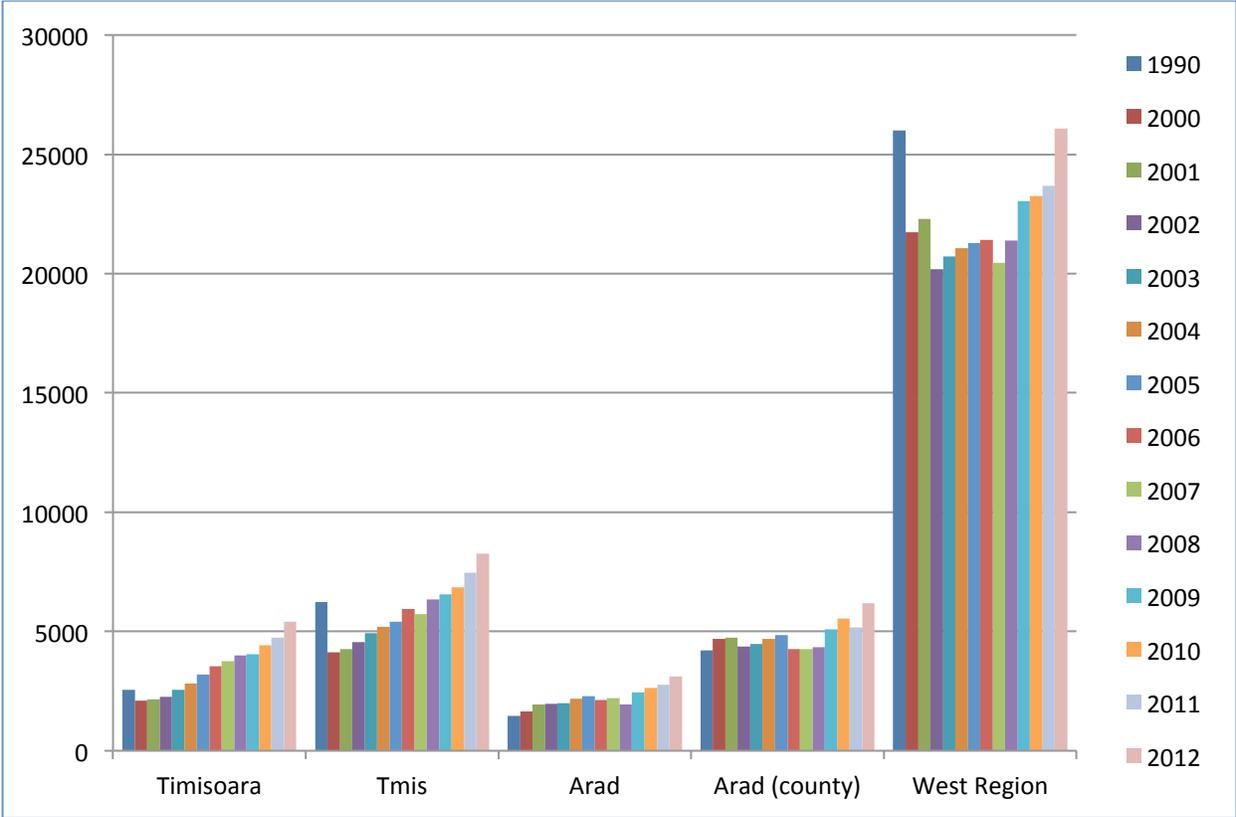


Source: World Bank staff elaboration based on INS data

²⁶ In the West Region almost all the spa resorts are located in towns, many of them owing their urban character to the existence of the spa facilities. These are not included in this section as they are mainly frequented by tourists for spa treatment and not for cultural or urban attractions, even though spa towns such as Baile Herculane have an impressive architectural and historical patrimony, which unfortunately attracts very few people due to its state of decay.

²⁷ Hunedoara castle, Deva citadel, Hunedoara and Resita’s industrial patrimony, Lugoj baroque city center and gothic architecture, medieval citadel in Orastie, etc.

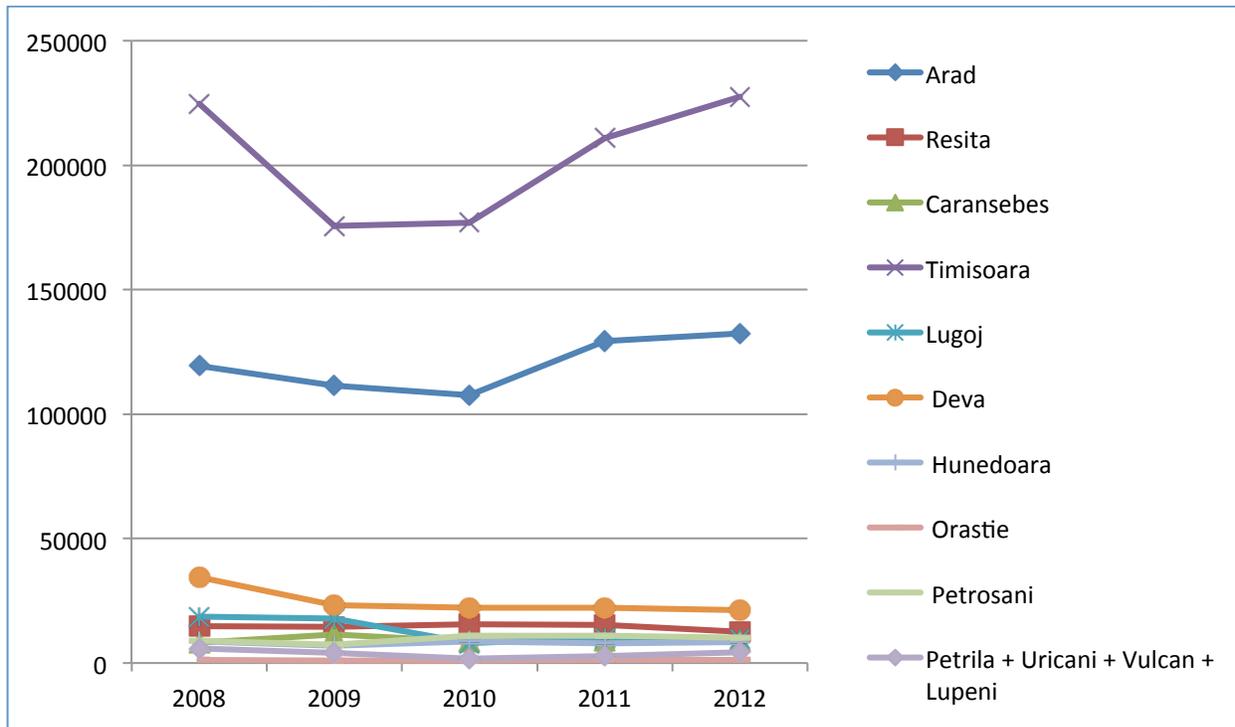
Figure 34 - Evolution of the number of installed accommodation places in the main touristic towns and their counties



Source: World Bank staff elaboration based on INS data

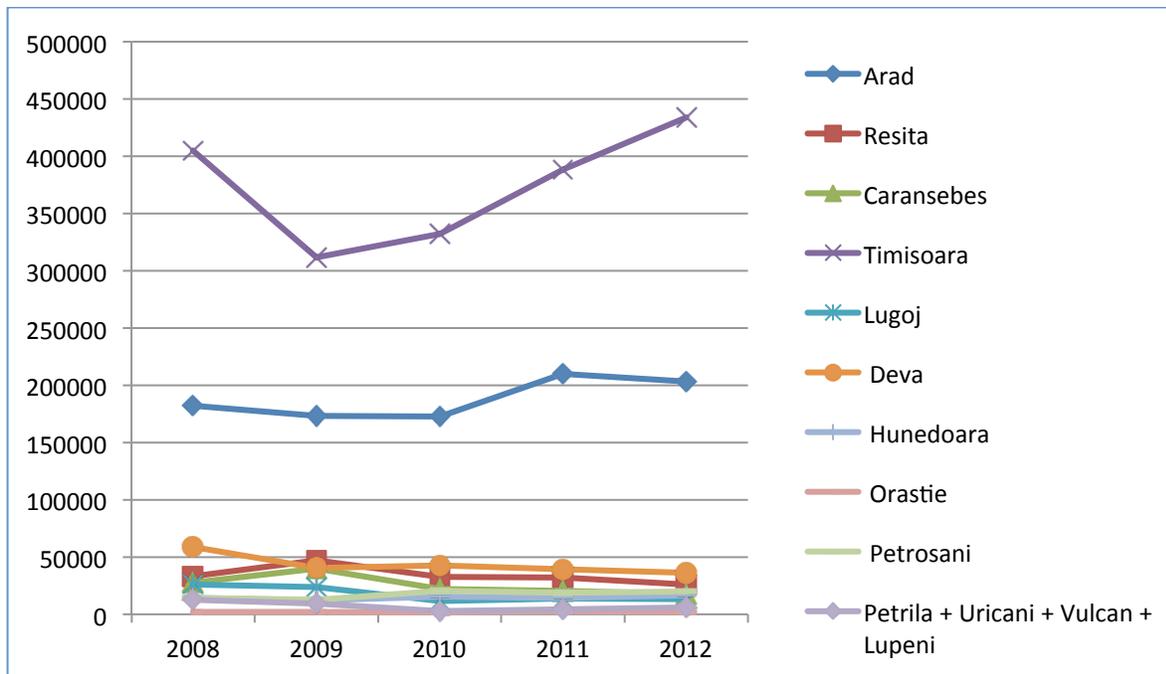
Several facts and conclusions can be drawn from the available data. First, the accommodation capacity in the urban destinations of the West Region has steadily increased between 1990 and 2012. Despite the general economic conditions prevalent since 2008, the number of accommodation units and the overall urban accommodation capacity have followed an upward trend. Some of the less developed urban tourism destinations registered slight decreases in accommodation capacity during the economic crisis but managed to grow again in 2011-2012. Second, Timisoara and Arad represent 32% of the overall accommodation capacity in the West Region (having increased from only 15% in 1990). This dynamic evolution is obviously due to business tourism that has required newer and more modern accommodation facilities in the two economic centers of the West region. Third, Timisoara’s tourism capacity represents 2/3 of the accommodation capacity of the entire Timis county. In terms of accommodation capacity, Timis and Arad are far above the national average. Fourth, the tourism sector in Caras Severin is mainly concentrated in Baile Herculane while Hunedoara has a low accommodation capacity with a clear lack of tourism accommodations outside the main cities.

Figure 35 - Annual arrivals in the main towns 2008-2012



Source: World Bank staff elaboration based on INS data

Figure 36 - Annual number of overnights spent in the main towns in the West Region



Source: World Bank staff elaboration based on INS data

There is an important gap between the volume of arrivals and overnights in Timisoara and Arad and the performance of these indicators in the other major towns of the West Region. Only Timisoara

recovered completely in 2011-2012 from the 2008-2010 period. The other towns saw fluctuations in the flow of tourists and display an overall decreasing trend. Petrosani and its satellite towns that are situated near the ski resorts of Straja and Parang experienced a limited increase in 2012 vs. 2011.

Seasonality is another important aspect of urban tourism. Timisoara and Arad have a similar seasonality with a constant annual pattern (even though Arad has a better occupancy rate during the summer season – due to its position of “country gate” during the summer holidays – while Timisoara performs better during the spring and autumn). The other major towns show important fluctuation from one year to the other. Occupancy figures indicate that apart from the county capitals (Resita and Deva), the other towns in the region are not destinations for urban tourism. The seasonality of tourist flows is influenced by the towns’ proximity to other types of attractions (e.g.: the Straja ski resort near Lupeni), or by one-off events that dramatically alter the usually very low occupancy rate (e.g.: Hunedoara in July 2012²⁸)

The average occupancy rate in the towns of the West Region over the last 2 years was low (around 15%). The average stay in the largest towns of the West Region is similar to the national average for county capitals, including Bucharest (with the exception of Caransebes that registered very high averages in 2008 and 2009). Urban tourism in the West Region displays low occupancy rates and low average length of stay, in absolute terms.

4.6.2. R&D activity and linkages with global networks: how does it relate to specialization in the sector?

Tourism competitiveness and innovation is strongly linked to the creation of a regional innovation system that can facilitate the absorption of knowledge (education and training, advanced services) and its dissemination (technology transfer, ICT, entrepreneurship). As highlighted previously, the West Region appears to have a latent comparative advantage in tourism. Therefore, tourism sector policies must evaluate the regional instruments that focus on strengthening the capacity to access, take up, and disseminate knowledge and technology transfer in the tourism field. These instruments can also support Public/Private infrastructure investments and promote better governance to help unleash the existing comparative advantage.

Unfortunately, no regional or local instrument of this type exists in the West Region and this is mainly because regional political but also economic stakeholders do not appear to consider tourism as one of the main competitive assets of the West region. Moreover, economic and political stakeholders from different local areas and counties see themselves as competitors more than providers of complementary touristic offers.

For example: Timisoara and Arad are competing to become the European Capital of Culture in 2021. In order to succeed, these two cities are drafting cultural and tourism strategies that are in competition and that will propose the creation of similar infrastructures, to be financed during the next programming period in the two cities. It is clear that by taking this approach the two cities are lowering their chances of winning the competition against larger cities such as Cluj and Brasov. By having a common application Timisoara-Arad, these cities would have increased their chance to win and may have been the preferred candidate. This type of competition is important because: it requires the drafting of a clear strategy and its implementation by the public stakeholders; it attracts and stimulates long term investments in the tourism sector; and it helps to launch a new tourist destination on the National and European market.

²⁸ Opera Nights 2012 Festival in the Hunedoara Castle, 13th-15th of July 2012

Therefore, **the West region needs a regional instrument** to support cooperation between (i) tourist actors and (ii) between the tourism sector and different innovation actors. In this context, **the creation of a tourism cluster is mandatory** to implement the smart specialization strategy in the tourism sector because clusters are powerful instruments for fostering sectorial competitiveness, innovation, and regional growth.

The tourism sector in the West region and more generally in Romania is not linked to global networks and the national and regional tourism offer is not commercialized outside the country or even on the local market. Indeed, an estimated 95% of the turnover of Romanian tour operators is realized through outgoing trips. Very few Romanian tour operators have developed incoming offers. Romanian regional public stakeholders and tour operators are often invited abroad to present local tourism products but they do not usually participate to these events or do not have any concrete tourism products to sell. Once again, the lack of affinity of tourism private and public stakeholders is clear. Promotion and marketing campaigns exist but usually there is no tourism product to offer and not even an up-to-date tourism website managed by public or private stakeholders (NGOs, Tour Operators, etc).

In addition, tourism stakeholders in neighboring countries are trying to find Romanian public and private partners in order to develop common cross border tourism products. The Serbian Tourism Management Organization has been attempting for two years to encourage Romanian public authorities to develop a greenway network because the extension of the EuroVeloroute will also have benefits on the Serbian side. Moreover, they encourage the setting up of a regional or national Convention Bureau that will join their initiative of creating a regional association for the promotion of MICE tourism. Overall, there is real potential for the West Region to become connected to a global tourism network if regional tourism stakeholders organize themselves to take advantage of the current opportunities.

4.6.3. An evaluation of the horizontal constraints that affect the sector

Ease of entry-exit

The tourism sector specific hindrances concern mainly entrepreneurs in rural accommodation facilities. The administrative procedure is long, complicated and expensive. Investors need to obtain various authorizations (i.e. fire protection, environmental, etc.), a process that often discourages potential entrepreneurs. Administrative procedures are too complex to manage for small investors, without financial possibility to subcontract these tasks .

Access to external finance

Firms in the tourism sector face significant difficulties in accessing external finance and the lending bank rates are perceived as being too high. This appears to be a structural problem for the tourism sector in Romania. Indeed, in many other countries, the tourism industry has managed to develop based on state subsidized loans, because the ROI on tourism investments is usually lower than in other sectors and due to the fact that public authorities considered that tourism development creates more external direct and indirect benefits than other sectors. In Romania, no support policy has been available for this sector and it is a complex task for tourism investors to access loans that would allow them to co-finance European funded projects.

Infrastructure

Accessibility is a common problem in Romania and is usually used to explain the slow development of the tourism sector. As mentioned previously, the West region does not suffer from major accessibility problems except in rural areas. For the ecotourism subsector, the provision of basic infrastructures (roads as well as water and sewage system, waste treatment, etc.) is necessary for the development of ecotourism destinations. Without this basic infrastructure, the destination carrying capacity remains very low and tourism development can damage the environment and rapidly become unsustainable.

Legal framework

The main legal constraints are related to the accessibility of European funds and a lack of architectural and landscape planning rules that results in a chaotic and unsustainable development of tourism areas. Consultations with stakeholders have highlighted a number of regulatory hindrances, including:

- The lack of a concession contract model for the renovation of historical buildings' facade in cities centers is preventing urban renewal projects
- It is not possible to finance projects through European funds if the direct owner of the location (buildings, historical sight, etc.) is not the funds' beneficiary. In natural parks such as the Retezat Park, alpine refuges or shelters are often private properties that are granted in concession to mountains rescue associations that developed projects that were considered ineligible for European funds by the management authorities
- Some potential investors and current hotel owners, through subsidiaries companies, are venture capital firms such as SIF Transilvania SA (with corporate assets of 335 million Euros). These companies are also ineligible for European funds
- There is a need for the development of common landscape and architecture planning regulation especially for the mountain and spa resorts in the West Region.

4.6.4. Prospects for sectoral development and policy recommendations

Infrastructure and budgets that support the creation of a regional innovation system will facilitate the absorption of knowledge (education and training, advanced services) and knowledge dissemination (technology transfer, ICT, entrepreneurship). The basis of this regional innovation system can be a tourism cluster that will support cooperation between tourist actors and between the tourism sector and different innovation actors. Through its capacity to stimulate public and private infrastructure development according to integrated and multi-sectorial area-based local development strategies, this cluster may become a driving force for the development of related innovative clusters and companies.

During the 2014-2020 programming period, the tourism cluster can act as a platform and implement the smart specialization objectives **by using policy tools such as the Integrated Territorial Instrument (ITI) to guide the European funds towards tourism integrated and sustainable projects with major externalities.**

The three sub-sectorial area-based development priorities can be defined as:

- Spa & wellness tourism
- Urban & MICE tourism
- Ecotourism and active tourism

Spa & Wellness Tourism

The development of spa and wellness tourism in the West region is strongly linked to tourism product development issues. For this purpose, two main initiatives could be pursued.

The first initiative focuses on the creation an *anti-ageing pilot region* in the Western part of Romania. The country is still well known for its expertise in anti-ageing treatments. Meanwhile, the ageing process has become a concern for all EU states. Life expectancy has increased to over 70 years and 2012 was the European year of Active Ageing Intergenerational Solidarity. The European Commission aims to design and adopt special policies in areas like employment, medical care, social services, life-long learning, volunteering, housing, IT and transport services adaptation, in order to support the active role that seniors increasingly play in society and the need to live healthier lives. The evolution of spa tourism towards anti-ageing and prevention treatments transforms it in a key sector for European policies in the field of active ageing.

The West Region can take advantage of this trend by positioning itself as a pilot region in this field. This can be done through the specialization of town and spa resort treatment facilities towards prevention and anti-ageing treatments that will target seniors. Ana Aslan and Gerovital²⁹ can constitute a starting base in the area of medical tourism. This offer can be completed by general medical check-ups, aesthetic light surgery, anti-smoking program, anti-alcohol cure, weight-loss program, etc.

The second proposed initiative involves the positioning of the West Region as a cross border medical tourism destination. Spa resorts are well known for physical and recovery treatment that are reimbursed by the national, regional private or public European insurance companies. The EU Directive 2011/24/UE, concerning the rights of patients for cross-border healthcare services, has entered in force on the 24th April 2011. This directive creates a general European framework for the delivery of medical services across the EU. The Directive imposes the adoption of national norms for its full implementation starting from October 2013. It can thus represent a development and promotion opportunity for health tourism products in the West Region. The main provisions of the Directive are twofold. First, emergency treatment is covered automatically by the healthcare insurer from the patient's residence country (it requires no pre-authorization). Second, long-term medical treatments (including medical spa and wellness) in a foreign EU country can be also covered by the insurance company of the patient residence country. In that case, the patient should ask for a preauthorization and the insurance company will reimburse the price in the limit of the amount reimbursed for similar services in the home country.

Overall, the tourism cluster can again play a key role, as it will be able to design customized products for specific markets and to provide information and support to regional spa and medical treatment centers for their certification and accreditation process and help them to access this promising market.

²⁹ Romanian cosmetic brands

Ecotourism and Active Tourism

Romania's tourism brand strategy³⁰ identifies (as a result of qualitative and quantitative market studies in 10 European countries) the nature and the countryside as the main competitive tourism advantages of the country.

Rural tourism is the product that represents, in the perception of foreign and domestic customers, the main attractive resource that can compete with foreign destinations. Furthermore, tourism in Romanian rural areas is associated to the notions of authenticity and simplicity.

Ecotourism brings together rural tourism with active and adventure activities and fits with the recent evolutions on the demand side (especially on the European travel market). This form of tourism is based on a bottom-up development approach, providing not only sustainable development and the protection of natural and cultural heritage, but also a maximized local retention of economic benefits.

Romania has already developed, in partnership with the Association of Ecotourism in Romania and the International Ecotourism Society, a list of innovative criteria for certifying eco-tourism destinations. This list of criteria was developed in 2012 and is focused on: i) supporting the involvement of local communities in small investments with important impact: environmental campsites, Greenways trails type, points of information and interpretation of nature and rural life, etc; and ii) assessment and recognition of the first eco-tourism destinations

The West region can become the first Romanian region to develop ecotourism destinations as its natural heritage potential is one the most important of the country. Discussions with tourism stakeholders in the region suggest that, although the influx of tourism to natural parks tends to be low, the share of foreign tourists is a bit higher when it comes to ecotourism and the natural assets of the West Region appear to be highly appreciated by foreign tourists from Serbia, Hungary, Austria, or the Czech Republic.

Urban & MICE Tourism

Urban tourism (business or leisure) has become a key element of wider urban strategy, which encompasses renovation and reconversion of ancient urban areas, economic development, creation and promotion of local brands. In order to capitalize on the potential of the West Region, policy makers could consider two alternative models.

The first one is that of metropolitan areas which have placed the tourism industry and events' management at the center of their strategies. This was the option adopted by cities including Seville, Barcelona, Valencia and Athens. All these cities have in common the creation of a major event such as a launching element or catalyst (Universal Expo in Seville, the Olympics in Barcelona or Turin, European Capital of Culture for Glasgow or Lille). Additionally, these cities have promoted urban renovation; for instance the rehabilitation of the port area in Barcelona for leisure activities, the creation of an adventure park in Seville, the creation of large touristic infrastructure (museum of technics, aquarium, etc) in Valencia, urban renovation in Athens, all with a special emphasis on the touristic and leisure activity.

The second model is the one of metropolitan areas that have invested in leisure tourism, meetings and professional events as part of a broader strategy. Examples include Marseille where the renovation of the port and development of cultural, leisure and touristic activities was a key element of

³⁰ "Realizarea brandului turistic al Romaniei", Ministerul Dezvoltării Regionale și Turismului

its development strategy. Lyon also figures as an interesting case with investments in the MICE tourism – through the creation of a convention center, renovation of Tony Garnier venue and the construction of a expo park - and also in leisure tourism -obtaining a UNESCO World Heritage Site classification and creating a significant cultural center - the Museum des Confluences. Finally, Hanover is also pointed as a city with a strategy based on business tourism, on fairs and expositions. It is worth highlighting here that the Universal Expo center has obtained important external financing from the EU and Germany.

Regarding MICE tourism, the cultural and event strategy can become a key element to attract tourists in cities that are in a constant search of originality. To this end, having an event agenda that is balanced and includes events in each season is an important aspect for an urban destination. Events are also occasions to discover the traditional heritage of the city presented in a different manner (e.g. light shows on the façade of the Chartres Cathedral). Finally, the creation of major events outside of the main touristic season can represent a good way to increase the tourism circulation during the low season: Strasbourg through its Christmas fairs has succeed to have its highest hotels occupancy rates in December

Policies aiming at strengthening the links with other clusters

Industry clusters can be used as efficient platforms that focus on and quickly contribute to smart specialization objectives by providing and mobilizing the necessary resources and by fostering sectorial and cross-sectorial cooperation to create new competitive advantages in the region. In this context, the linkages between tourism and ITC clusters could be explored as an instrument to promote economic development. Figure 37 below summarizes the potential connections between these clusters.³¹For instance, in cities like Timisoara and Arad, digital tools could allow the discovery of local heritage and culture using augmented reality that enables: insertion of virtual objects in a sequence of real images; visualization of multimedia content connected to the real environment of a person (audio, video, photo); touristic guidance through visual perspectives; and virtual re-construction of partially destroyed places.

³¹ Annex 7 presents an outline for the tourism cluster

Figure 37 - Potential linkages between ICT and tourism clusters in the West region

Focus on the Tourism Cluster Cross-sectorial cooperation with the existing ICT Cluster of the West region:

Recent developments in Information Technology including the development of Web 2.0, the rapid adoption of smart phones by consumers and the introduction of powerful social media platforms including Facebook, Twitter and You Tube, have led to a convergence of technologies that offer touristic destination, such as the West region an unparalleled opportunity to reach customers. These developments also offer the opportunity to maximize marketing budgets, facilitate strategies that empower tourists to co-create value with service and product providers and develop new transnational opportunities to attract IT savvy tourists. Developing a strong online presence is a necessity for the West region to build new innovative and competitive tourism experiences. In this context, a strong collaboration with the West region ICT cluster, universities and cultural stakeholders is necessary to promote the West region as a tourism destination but also as an investment destination. Indeed, a town for example that is considered as a smart and modern touristic destination is gaining attributes that makes it attractive not only for tourists but also for its inhabitants and the business sector as a whole.

72 PERCENT OF ALL SOCIAL NETWORK USERS ACCESS THEIR SOCIAL NETWORKING SITES **DAILY** WHILE THEY ARE TRAVELING



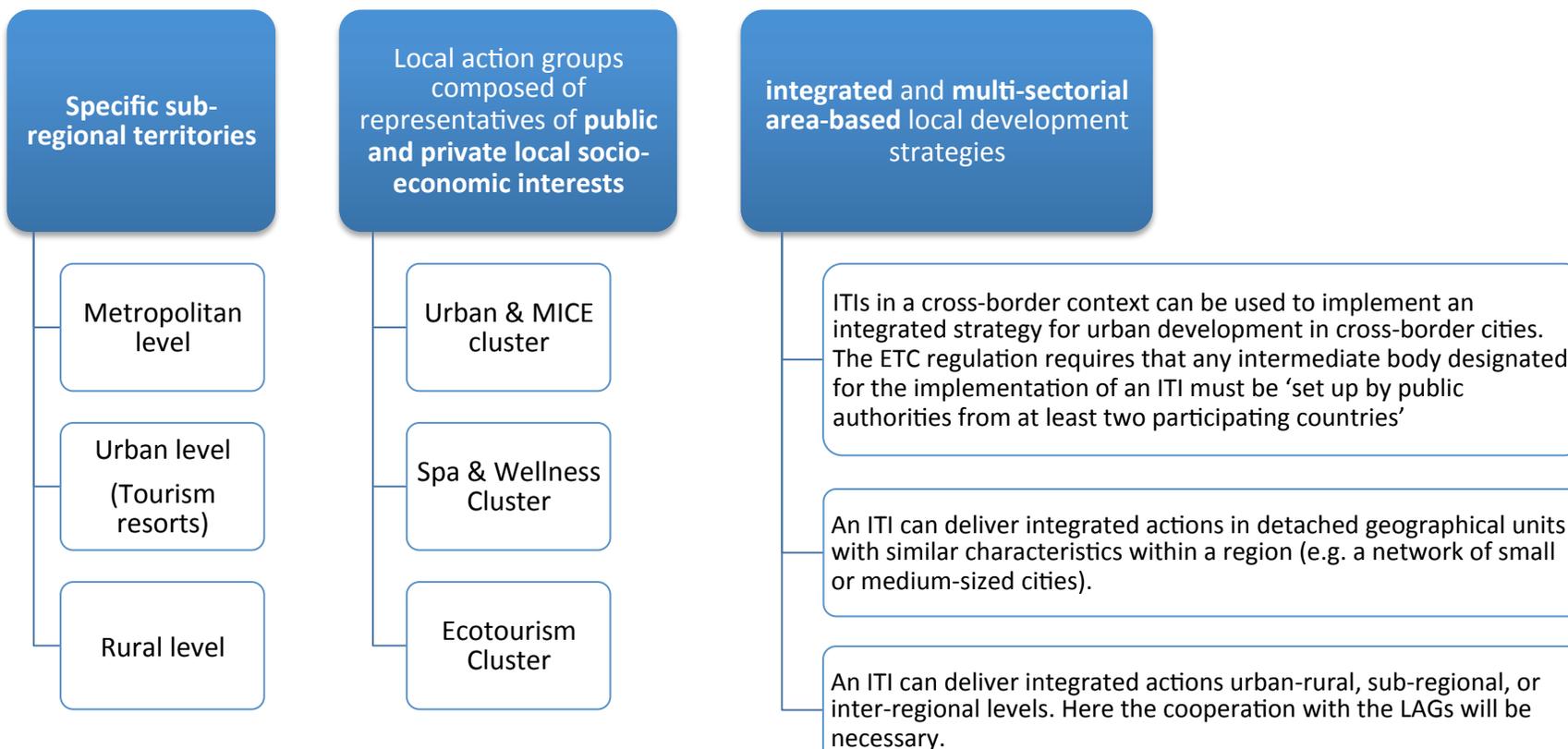
The Facebook travel formula:

- 52% Say that friends photos inspired their next trip
- 46% Say that have been invited to a trip via Facebook
- 45% Say that Facebook makes them visit

Another important strategic function of a tourism cluster will be to sustain the creation of a regional innovation system by providing a market for advanced services and RTDI ecosystem (entrepreneurs, downstream users, universities etc). In the framework of the 2014-2020 programming period, a tourism cluster, by guiding and supporting Public-Private infrastructure investments, would be able to create market opportunities for the related RTDI ecosystem.

For example, the current study has defined three subsectors to be targeted within the tourism cluster: ecotourism and active tourism; spa & wellness tourism; and urban & MICE tourism. In the framework of the 2014-2020 programming period, these three subsectors represent three territorial based strategies which require integrated investments under more than one priority axis or operational programme. These Integrated Territorial Instruments will be carried out through integrated and multi-sectorial area-based local development strategies considering local needs and potential, as illustrated on the next page.

Figure 38 - Integrated local strategies outline



In the framework of these three multi-sectorial area-based local development strategies European funding will be available for Private and Public investments. The role of the tourism cluster is to guide these funding towards innovative investments. For example, the Ecotourism “sub-cluster” will support and give guidelines for the creation of a regional network of ecotourism destinations in which the development of green infrastructures, the use of renewable energy, etc are mandatory because:

- Ecotourists are paying close attention to the use of ecological solutions/products (guesthouse use of renewable energy, ecological and local food, etc.) and to the greer certification of tourism providers.
- It is a legal constraint for any activities/infrastructure developed in or around a natura area.
- It is a legal constraint to be certified as an ecotourism destination according to the Romanian law

In the Romanian current crisis context, where all the construction companies endeavor to offer the lowest price and neglect to propose green building solutions, tourism and more specifically ecotourism is one of the few sector where consumers and providers are focused on green innovation products.

Another example can be the spa & wellness subsector that will support and offer guidelines for the creation of a regional network of spa towns that must satisfy clients which are becoming increasingly sophisticated in their demand for specific services. The following figure summarizes the main guidelines for this case.

Figure 39 - Potential guidelines for the development of Spa towns

Spa town ecosystem	Common urban planning laws for the spa towns network	Marketing
<ul style="list-style-type: none"> •Development of local products based on wellness at a small (food, handicraft, etc)and a larger scale such as a water bottle plant or cosmetical and antiageing products based on thermal water •RTDI on the therapeutic factors of thermal water for cosmetics, healing •Creation of tourism and spa training center •Common offer with urban centers or local medical providers •Upgrade of the spa treatment centers 	<ul style="list-style-type: none"> •Heritage preservation and renovation of the Spa Town centers •Development of specific pipes network to provide thermal water in smaller accomodations •Development of the use of thermal water for the town heating system •Development of leisure infrastructure •Green construction •Building and facilities specially adapted to elderly and disabled people. 	<ul style="list-style-type: none"> •Creation of a common brand •ICT destination management solutions •Development of ICT solutions for post treatment monitoring •Development of preventive & personalized health treatment •Common agreement with foreign Tour operators •Certification and accreditation of spa treatment centers

Overall, the tourism cluster would bring key elements to metropolitan and urban areas integrated territorial investment strategies, especially in the context of urban renewal projects and cultural and event projects that may be financed during the next programming period. The development of MICE tourism will be a priority for the reasons previously discussed (increased revenues from tourism, lower seasonality, etc.) but also because hosting international events allows local students, teachers or entrepreneurs to gain access to the latest developments in their field of activity and to enter in contact with foreign partners. Therefore, an ambitious MICE development strategy can be used by emerging regions and countries to sustain the transfer of knowledge.

5. Concluding Remarks

The West Region is the wealthiest in Romania apart from the Bucharest-Ilfov area, in terms of per capita GDP. Although the degree of economic well-being varies significantly across the four counties (Timis, Arad, Hunedoara, and Caras Severin), continuous improvements in development levels can be interpreted as a signal for the region to shift its focus to higher value added activities, particularly in potential knowledge-hubs like Timisoara and Arad.

In this context, RIS3 policies should focus on increasing the knowledge content and value added of existing production in industries where comparative advantages exist, and facilitate the development of new economic activities through measures which support entrepreneurship and experimentation.

The goal of the current analysis was to provide an assessment of the strengths and weaknesses of the West Region economy at a detailed sector level. Building on these findings, the report aims to recommend areas for policy action and to inform investment priorities to be considered under the 2014-2020 programming period.

In order to develop an efficient and growth-enhancing policy framework, the authorities should be guided by the available information regarding the economic specialization of the region. For sectors in which evidence suggests that the West Region has an apparent or latent comparative advantage, targeted R&D and innovation policies can help the industry maintain or 'unleash' existing competitiveness (vertical interventions). At the same time, the government should strive to create a business environment that supports entrepreneurship by focusing on areas such as: access to information, skills and training, infrastructure, credit markets, and the accumulation of knowledge (horizontal interventions).

In the current report, the economic specialization of the West Region was examined and the sectors under analysis were classified in terms of comparative advantages. Based on available information in the market, **the region has apparent comparative advantage in focusing on automotive, textiles and ICT**, while **agri-food and tourism were classified as sectors with latent comparative advantage**. Finally, the **construction sector was classified as a sector with unclear comparative advantage**. To the extent that distinct degrees of information about economic specialization imply different chances of success with policy targeting, the following sections suggest policy actions that aim to enhance the growth potential of the region. Some of the suggested actions encompass horizontal areas that are common to all sectors, while other are sector specific.

This chapter provides a summary of the horizontal as well as the sector-specific areas for policy action which emerged as a result of the industry-level assessment.

5.1. Horizontal Policy Actions

- ***Introduction of vocational schools focused on industry-relevant training***

Consultations with businesses conducted as part of this assessment have revealed that the lack of vocational schools in the region (and in the country) has had a significant negative impact on the ability of firms to increase productivity or to expand. The number of technicians who can operate advanced machinery and equipment is decreasing rapidly and their average age is increasing. This problem affects all the sectors that were evaluated during this study, including textiles, agri-food, automotive, or construction, although to a lesser extent ICT (particularly software development, which is primarily a high-skill sector). Moreover, a number of companies complain that many of the training

programs offered by human resource service providers and sponsored by EU funds have not been of poor quality and not relevant for the market.

In Romania vocational schools were removed from the national educational structure in 2009. In order to support a sustainable industrial development in Romania for the medium and long term, it is critical that policy makers reintroduce this type of learning institutions in the near future. The curriculum for vocational schools should be developed based on consultations with the private sector at a national and regional level. In addition, this type of training should be appropriately funded and students should have access to modern machinery in order to be able to obtain industry-relevant knowledge. This approach will ensure that new graduates acquire a skills set that meets the demands of the market and that they are successful in finding employment.

- ***Entrepreneurial and business management skills training***

A concern highlighted in interviews with R&D stakeholders as well as with the private sector, was the lack of entrepreneurial and business management know-how. For example, in many cases engineers or researchers do not have the ability to translate innovative ideas into commercially viable projects. Similarly, existing small firms or local producers which aim to become suppliers for multinationals are not successful in presenting their products in an attractive manner or creating a brand.

Business development and management training programs are essential in preparing firms and entrepreneurs to compete on a national and global level. This type of training should be offered through the university curricula (including a focus on presentation skills), as part of incubator services, or be provided to entrepreneurs through specialized programs at the local level.

- ***Improvements in local infrastructure***

The poor quality of the local road infrastructure affects firms in all sectors. Companies which use their own vehicles for transportation of products or supplies mention the increased wear and tear of the trucks and delays in delivery, leading to increased costs and loss of competitiveness. In addition, transportation of workers is problematic for large scale manufacturing activities. A large proportion of blue collar or low skilled workers commute to the production plant from surrounding areas and often there are no public transportation options available to them. Large companies provide transportation for employees using company buses but this leads to increased production expenses and traffic congestion.

Authorities should focus their attention on enhancing the quality of the roads in rural and remote areas, which will not only improve the access of the population in these locations to urban centers but could facilitate the expansion of manufacturing activities to more impoverished areas of the West Region. The new infrastructure could also support the development of ecotourism activities in natural and national parks. In addition, constructing a ring road for the city of Timisoara and extending the connection with the highway would reduce transportation time and costs. Moreover, extending the network of public transportation to better serve the needs of the companies in the region and of their employees would make the region more attractive to potential investors.

- ***Access to Finance***

Discussions with the private sector in the West Region indicate that many firms perceive the lending conditions and interest rates required by banks in Romania as a significant constrain to growth. The amount of collateral necessary for EU co-financing can be prohibitive for smaller firms. As a result of

these financing conditions, many companies opt to use internal funds to purchase new machinery and invest in technological upgrading. However, this approach does not allow most businesses to grow at a sustained pace and limits their capacity to expand operations and compete within a larger European or global market.

A significant proportion of the companies in the West Region interviewed as part of this evaluation mentioned that they had used European Structural Funds between 2007 and 2013 and expressed their intention to apply for this type of financing in the upcoming programming period (2014 – 2020). However, the consultations highlighted a number of challenges regarding access to EU funds. Some firms consider this type of financing unaffordable because it requires significant co-financing, which may be difficult to obtain from the banks (see above). The application procedures often lack transparency, and national or local authorities may impose additional requirements that can render the process lengthy and cumbersome. Additionally, the evaluation period for an application can be very long. Companies that apply for funds to invest in new equipment can wait more than a year for the decision, which in some industries can render a particular technology obsolete. In addition, other firms complained that reimbursements for investments pre-financed by the company may extend past the date specified in the contract.

In order to provide effective support to the private sector and help to nurture sustainable growth, EU Funds should be made available based on clear and transparent guidelines, which take into account market dynamics and which are applied in an efficient manner by officials with basic knowledge of the industry. The evaluation process should be streamlined so that funding decisions are communicated to applicants within a reasonable period of time. Reimbursement of funds should be processed in an expedite manner so as to avoid the potential negative impact which this type of delays can have on a firm's cash flow and operations.

5.2. Sector-Specific Policy Actions

5.2.1 Automotive

- ***Establishment of research institutes and testing laboratories***

In order for the automotive sector to continue to grow in the medium term and remain globally competitive, firms in the West Region must increase levels of value added through the incorporation of more knowledge and technology in production. Although there are many foreign MNCs in the region, the transfer of technology and knowledge to local firms is insufficient, mostly due to the nature of the tasks undertaken by local firms. Establishment of research institutes and labs will incentivize local firms to prepare prototypes, test their new designs, products and processes and help them to become included in the global supply chain of MNCs. Once a firm becomes part of a supply chain, learning and spillovers are likely to be accelerated. The labs will also provide opportunities to conduct more frequent quality tests which will increase reliability of local producers.

- ***Increasing awareness regarding the activities of the auto cluster***

Expanding and increasing the awareness of the auto clusters initiatives (like the Automotivest) would stimulate exchange of ideas, sharing of experiences and would help local producers become better and more connected with the large players.

5.2.2 Textiles

- ***Tax incentives, subsidies, and better financing terms on productive investments in new technology and machinery***

In order to increase the value added generated by the sector, and to be able to enter new export markets, textile firms in the West Region should expand their production to include more knowledge and technology-intensive activities that will allow them to generate new designs and products. These activities will require the use of advanced technology and equipment that can be prohibitively expensive for many local companies, which have difficulties in accessing external finance. To close this gap on financing, the government can provide tax incentives, subsidies, or better financing terms on productive investments, especially on acquisitions of new technology and machinery.

5.2.3 Agro food

- ***Sector-Specific Support Infrastructure***

The authorities should develop targeted initiatives for SMEs to supporting the development of infrastructure for improving quality, health and safety standards, SMEs financing initiatives, marketing initiatives such as the development of a regional brand, or training in marketing, sales, etc. These measures will help build capacity in the sector and could be very helpful in enhancing the competitiveness of West Region food producers.

- ***Basic and Applied Research***

The largest share of innovation and value added in the agro food sector is generated by suppliers through the provision of new machinery, new seeds, new chemicals and fertilizers, and more recently by the application of ICT to agriculture. Therefore, public policy should support innovation in the industry, especially as food engineering, agriculture, and veterinary sciences are areas of strength of the West Region universities.

5.2.4 ICT

- ***Incubators and business accelerators***

While there is agreement regarding the usefulness of incubators and business accelerators, it was highlighted during discussions that in order to be useful these infrastructures also need to provide other services, such as information about the sector and the clients, assistance in drafting business plans, and advice regarding financing options.

- ***Mentorship programs***

Mentorship programs should be structured more efficiently, as the incentives for mentors have to be clear. These incentives can take the form of shareholding, or the right to subsequently participate in the ownership and management of intellectual property. Mentors also facilitate the firms' access to investors. There are different successful models for this type of activity, some of them (such as Endeavor) which operate in different countries and could be franchised to Timisoara.

- ***Angel investors***

In Timisoara there are several potential investors (i.e. angel investors) who are experienced, skilled and well-connected individuals that could provide hands-on support to entrepreneurs. There is space for public action to research the market and connect investors to new creative companies in need of funding.

- ***Links with global customers and with downstream user sectors***

Match-making mechanisms and more efforts to market the West Region ICT sector to downstream users and global customers would also be necessary.

5.2.5 Construction

- ***Policies to support the regional construction and energy cluster (ROSENC)***

The West Region cluster ROSENC can play a key role in promoting collaboration between state authorities, academia, and the private sector in order to encourage knowledge –exchange and support commercially sustainable projects to expand the production of energy efficient construction materials in the region, which could help reduce the cost of such inputs and increase their use in local infrastructure. Thus, increasing awareness regarding ROSENC’s initiatives could help local firms increase competitiveness.

- ***Expanding the award criteria for government infrastructure tenders to include the use of energy-efficient materials***

The authorities should encourage the use of energy-efficient materials in government infrastructure projects and should support the transition to nearly zero energy buildings. These measures would promote the use of energy efficient materials while helping sustain long term economic development.

5.2.6 Tourism

A tourism cluster can support cooperation between tourist actors and between the tourism sector and different innovation actors. Through its capacity to stimulate public and private infrastructure development according to integrated and multi-sectorial area-based local development strategies, it can become a driving force for the development of related innovative associations and companies. The tourism cluster can act as a platform during the 2014-2020 programming period that can implement the smart specialization objectives by using policy tools such as the Integrated Territorial Instrument (ITI) to guide the European funds towards tourism integrated and sustainable projects with major externalities.

Spa and Wellness Tourism

- ***Anti-aging pilot program***

The West Region could position itself as a pilot region in the field of anti-aging treatment. This can be done through the specialization of town and spa resort treatment facilities towards prevention and anti-ageing therapy that will target seniors. Ana Aslan and Gerovital can constitute a starting base in the area of medical tourism. This offer can be completed by general medical check-ups, aesthetic light surgery, anti-smoking program, anti-alcohol cure, weight-loss program, etc.

- ***Promotion of spas as cross-border medical tourism destinations***

The tourism cluster could manage the design of customized products for specific markets and could provide information and support to regional spa and medical treatment centers for their certification and accreditation process.

Ecotourism and Active Tourism

- ***Promotion of the region’s ecotourism potential***

The West Region can become the first Romanian region to develop ecotourism destinations, as its natural heritage potential is one the most important of the country. Ecotourism brings together rural tourism with active and adventure activities and fits with the recent evolutions on the demand side (especially on the European travel market). This form of tourism is based on a bottom-up development

approach, providing not only sustainable development and the protection of natural and cultural heritage, but also a maximized local retention of economic benefits.

Urban and MICE Tourism

- ***Focus on events management and investments in leisure tourism, and organization of meetings and professional events***

Successful metropolitan areas have placed the tourism industry and events' management at the center of their tourism strategy or have invested in leisure tourism, meetings and professional events as part of a broader strategy.

- ***Promotion of a cultural and events agenda***

The cultural and event strategy can become a key element to attract tourists in cities that are in a constant search of originality. Having an event agenda that is balanced and includes events in each season is an important aspect for an urban destination. Events constitute occasions to discover the traditional heritage of the city presented in a different manner. In addition, the organization of major events outside of the main touristic season can represent a good way to increase tourism flows during the low season.

Role of a Tourism Cluster

In the framework of the 2014-2020 programming period, a tourism cluster could guide and support Public-Private infrastructure investments. The role of the tourism cluster is to guide the available funding towards innovative investments. For example, the Ecotourism "sub-cluster" will support and give guidelines for the creation of a regional network of ecotourism destinations in which the development of green infrastructures, the use of renewable energy, etc. Similarly, for the Spa and Wellness subsector, the cluster could support and offer guidelines (see page X) for the creation of a regional network of spa towns that must satisfy market demands. Moreover, the linkages between tourism and ITC clusters could be explored as an instrument to promote economic development. For example, in cities like Timisoara and Arad, digital tools could allow the discovery of local heritage and culture. In addition, the tourism cluster would bring key elements to metropolitan and urban areas integrated territorial investment strategies, especially in the context of urban renewal projects and cultural and event projects that may be financed during the next programming period.

Annex 1 –Definition of Sector Clusters

Among all NACE activities covered by the SBS dataset, some specific sector clusters deserve particular attention: ICT, automotive; agro-food; textiles and leather; tourism; construction; energy; and health. The following tables display the precise NACE 2 description of each one of them. It is worth acknowledging that since information on NACE 2 sector is available only for the 2008-2010 period, all cluster analysis is restricted to this time period.

Table A1.4. ICT cluster: NACE 2 sector list

Sector	NACE CODES	Comments
ICT	261	all (Eurostat definition)
	262	all (Eurostat definition)
	263	all (Eurostat definition)
	264	all (Eurostat definition)
	268	all (Eurostat definition)
	474	all (our definition)
	582	all (Eurostat definition)
	611	all (our definition)
	612	all (our definition)
	62	all (Eurostat definition)
	63	all (Eurostat definition)
	582	all (Eurostat definition)
	951	all (Eurostat definition)

Table A1.6. Agro-food cluster: NACE 2 sector list

Sector	NACE CODES	Comments
Agro food	011-016	all (agriculture)
	03	all (fishing&acvaculture)
	10	all (food processing)
	11	all (beverage)

Table A1.7. Textiles and leather cluster: NACE 2 sector list

Sector	NACE CODES	Comments
Textiles&leather	13	Manufacture of textiles (all without 1392)
	14	Manufacture of wearing apparel
	15	Manufacture of leather and related products

Table A1.5. Automotive cluster: NACE 2 sector list

Sector	NACE CODES	Comments
Automotive	1392	textile article but no clothes (optional choice)
	2219	fabrication rubber products
	2222	fabrication plastic products
	2229	fabrication plastic products
	2433	steel processing
	2511	metal processing
	2550	metal processing
	2572	metal processing
	2573	metal processing
	2593	metal processing
	2732	wires production
	2740	electric lightning equipment
	2790	electric equipment
	2822	equipments
	2841	tools making
	2849	equipments&tools making
	2892	equipments&tools making
	2899	equipments&tools making
	29	all (car manufacture)
3299	industrial activities	

Table A1.8. Tourism cluster: NACE 2 sector list

Sector	NACE CODES	Comments
Tourism	55	all (country definition)
	56	all (country definition)
	79	all (services regarding tour-operators&booking)
	932	all (services regarding entertainment)

Table A1.9. Construction cluster: NACE 2 sector list

Sector	NACE CODES	Comments
Construction	41	all (country definition)
	42	all (country definition)
	43	all (country definition)

Annex 2 - List of RTDI interviews

A set of interviews with RTDI actors was conducted over the period of November 2012 and April 2013 as part of the current analysis. The list below presents the complete set of interviewed institutions.

National R&D Institutes (5) and Universities (4)

- RDI Welding and Material Testing
- RDI for Construction, City Planning and Sustainable Territorial Development - URBAN INCERC
- RDI for Industrial Ecology ECOIND - Timișoara branch
- RDI in Mine Safety and Explosion Protection (Petrosan)
- RDI for Electrochemistry and Condensed Matter – Timișoara
- Universitatea de Vest din Timișoara
- Banat's University of Agricultural Sciences and Veterinary Medicine Timișoara
- Universitatea "Politehnica" din Timișoara
- Universitatea de Medicină și Farmacie Victor Babeș UMFT

Public Authorities (3)

- National Authority for Research (NASR/ANCS)
- County Council Hunedoara
- City Hall Arad

Actors in Innovation Infrastructure (5)

- Technological and Industrial Park Timișoara (PITT)
- Timișoara Software Business Incubator (UBIT)
- TTO- The Regional Centre for Innovation and Technological Transfer (TEHIMPULS)
- Industrial park Hunedoara
- Start up hub (Private, City Business Center)

Private companies (12)

Early stage financing: angel investors (4)

Academic entrepreneurs (2)

Annex 3: NASR-administered projects³² in the West region

Table A3 1- Administered projects in the West region

Total number of applications	Applications by private actors	Applications by RDIs	Applications by universities	Joint applications by universities & private actors
36	20	2	10	4

Table A3 2- Applications to NASR-funded projects by key intervention area

Key area	Explanation	Number of applications
2.1	R&D in partnership between universities, RDI institutes and enterprises in view of obtaining results applicable to the economy	3
2.2	Investments in research, development and innovation infrastructure and development of administrative capacity	21
2.3	Enterprises' access to research, development and innovation activities	12

Table A3 3 Applications to NASR-funded projects by NACE Rev.2 2-digit sectors

NACE code	Sector description (principal activity of the applicant)	Number of applications
10	Manufacture of food products	1
13	Manufacture of textiles	1
22	Manufacture of rubber and plastic products	1
24	Manufacture of basic metals	2
25	Manufacture of fabricated metal products, except machinery and equipment	2
28	Manufacture of machinery and equipment n.e.c.	2
30	Manufacture of other transport equipment	1
32	Other manufacturing	1
33	Repair and installation of machinery and equipment	1
41	Construction of buildings	3
46	Wholesale trade, except of motor vehicles and motorcycles	1
62	Computer programming, consultancy and related activities	2
71	Architectural and engineering activities; technical testing and analysis	3
72	Scientific research and development	3
80	Security and investigation activities	3
85	Education	7
86	Human health activities	2

³² Source: NASR Regional Office

Annex 4: Sources of Funding National RDIs located in the West Region

Table A4 1 - Sources of Funding National RDIs located in the West Region

	47 National RDIs			4 West Region National RDIs		
	2008	2009	2010	2008	2009	2010
1- TOTAL R&D Income (A+B+C+D+E+F)	83%	84%	82%	84%	79%	83%
A- From state budget (total)	75%	66%	61%	62%	43%	48%
Including:						
Program nucleus	17%	29%	27%	17%	21%	22%
NPII and CEEEX (including co-financing for FP6 FP7, etc.)	45%	27%	23%	44%	21%	22%
B-Structural Funds	0%	2%	8%	0%	0%	0%
C- FP6 FP7 (not including state budget financing)	1%	4%	3%	0%	1%	1%
D- Other public international sources (not including state budget financing)	1%	2%	2%	0%	0%	0%
E- Contract R&D with foreign private persons	0%	1%	1%	0%	0%	0%
F- Contract R&D with Romanian private persons	5%	8%	7%	22%	34%	33%
2- Business income TOTAL	17%	16%	18%	16%	21%	17%
Including:						
Other non R&D sources of income (selling non-proprietary products and services)	16%	14%	16%	12%	12%	11%

National RDIs in the West Region: INCD ECOIND, ISIM, INCEMC

Annex 5- Universities located in the West Region

Table A5 1 - Universities located in the West Region

University	Established	Location	Private/Public	CNCSIS Accreditation
Aurel Vlaicu University of Arad	1990	Arad	public	provisionally authorized
Universitatea de Vest Vasile Goldis Arad	2002	Arad	private	accredited
Victor Babeş University of Medicine and Pharmacy, Timișoara	1945	Timișoara	public	accredited
West University of Timișoara	1944	Timișoara	public	accredited
Banat University of Agricultural Sciences and Veterinary Medicine	1995	Timișoara	public	accredited
Polytechnic University of Timișoara	1920	Timișoara	public	accredited
Universitatea Petrosani	1948	Petrosani	public	provisionally authorized
Facultatea de Inginerie Hunedoara, Universitatea Politehnica Timișoara			public	
Universitatea Ecologica "Traian" din Deva	1990	Deva	private	provisionally authorized
Universitatea "Eftimie Murgu" Resita	1971	Resita	public	accredited
Mihai Eminescu University Timișoara	1993	Timișoara	private	accredited
Tibiscus University of Timișoara	2002	Timișoara	private	accredited
Millenium University of Timișoara		Timișoara	private	provisionally authorized
Ioan Slavici University Timișoara	2000	Timișoara	private	information not available

Source: Consiliul National al Cercetarii Stiintifice din Invatamantul superior (CNCSIS), 2012

Annex 6 -Firm Interviews

The main objective of this report is to provide a critical overview of the strengths and weaknesses of the sector's productive system, detailing demand and supply characteristics, as well as an overview of the institutional framework and policy environment for innovation in the sector. The technology absorptive capacity of firms (skills composition, sector-specific regulatory restrictions, access to finance, etc.) were be examined in view of the specific determinants of technological upgrading in each sector. An assessment of the innovation status of each sector was provided whenever possible.

In order to evaluate each sector, interviews with firms in the selected industries (in addition to focus groups that were conducted in December 2012) provide a richer understanding of sector-specific contexts and more targeted policy recommendations. The main objective of the interviews was to understand the relationships between the investment climate variables (labor issues, infrastructure, capital markets/access to finance, competition environment, and innovation environment) and firms' capacity to absorb knowledge export and compete.

For the case studies to convey an accurate representation of the sectorial dynamics and a good assessment of the innovation environment, an effort was made to identify, for each sector, a diverse group of firms in terms of **size, R&D expenditures, export propensity and ownership**. Overall, 31 interviews were conducted. **Table A6 1** presents the sectoral breakdown of this total. For confidentiality reasons the names of the firms are not included in the report.

Table A6 1- Interviews by sector

Sector /cluster	Number of interviews
Agri-food	8
Textiles / apparel	4
Auto	7
ICT	6
Construction*	5

Note: * interviews in the construction sector covered 4 firms and ROSENC

The minutes of these interviews covers, whenever possible, a set of topics as listed below:

- Machinery and equipment
- Technology: Research / Innovation /Product upgrades/ Sources of technology
- Labor: Skills + Training
- Infrastructure
- Quality and certification
- Institutions: Regulatory environment / Relationship with authorities / Judicial system
- Financing / Use of EU Funds
- Collaboration/relationships with suppliers, other firms, and universities/local institutes
- Other (Use of professional services, sector specific questions, etc)

AUTO SECTOR -

The region has developed a valuable know-how in auto sector based on the long history of engagements with important multi-national auto manufacturing companies. The large share of FDI in the sector also reflects the apparent comparative advantages in the region. However the economic developments of the neighboring countries are likely to put pressure on the existing advantages of the West region of Romania. Attaining low labor costs is not a sustainable development strategy for the auto sector to remain globally competitive. Improvements must be made and policies must be developed to move up on the value chain and create higher value-added activities.

The results of the interviews show several areas, improvement of which is necessary to strengthen the existing comparative advantage of the region in this sector. These issues are listed below.

Increasing human capital to work on design and development activities in the region is a major constraint. Timisoara is the only region where such capacity is available, yet to a limited degree. Qualifications of the university graduates in areas of applying theoretical knowledge must be improved in order to be prepared for the labor market. Firms usually have difficulties finding the graduates to fulfill their needs and the skills obtained from the school are not sufficient for the demand of the sector. Interestingly, the concerns on skills are more likely to be expressed as a severe constraint for large, globally integrated MNC subsidiaries than small or medium size auto part suppliers who produce low value added products along the supply chain.

One way to alleviate this mismatch is improving the linkages between the industry and universities. This can happen through collaborations on joint projects, adjusting the curriculum to respond to the industry needs which would help development of the appropriate skill sets for young graduates. A better guided skilled labor force complemented with technological ambition would strengthen the region's comparative advantages in this sector.

In addition to improving tertiary education, vocational training schools also need to be established to supply qualified technicians (specialized labor) for the sector. Lack of skilled workers who can operate mid & high-tech machines add additional burdens on firms and increase cost of production.

- **Machinery and equipment**

In auto sector, machines and equipment are usually supplied from foreign suppliers due to lower quality levels in local products. To assure a certain level of quality in products and designs, well-equipped independent laboratory infrastructure is necessary in the region that can be easily accessed by local firms. Quite often lack of sufficient lab infrastructure inhibits or creates huge delays in testing quality and validity of new products, processes, and designs which are crucial in auto sector. Only few large firms like Continental have access to testing labs available in the West region which are not accessible to everybody. Some of these firms send their products to Germany or Hungary to be tested, but this is not very efficient.

- **Sources of Technology**

The required lab equipment for testing new products/designs in the sector is expensive and definitely beyond the reach of an individual local SME. Development of such labs can facilitate local SME's to be included in the global value chains and provide supplies for first and second tier suppliers. Labs with international standards in the region can attract the attention of OEMs and first-tier suppliers. It will also help accumulation of the know-how in the region.

- **Markets and Integration in Global Networks**

There are few other areas, improvements of which will help SMEs in the sector to become more integrated with the global networks.

One of these areas is unsatisfactory quality level of products which reduces confidence in working with local SMEs. This issue can be alleviated by more regress lab testing as discussed above.

Another area that would be helpful for the future development of the sector is providing consultation, training to improve skills, and mentorship to local SMEs on how they can be included in the global value chains. Attaining certain quality standards/certificates, better efficiency, timely response to client demands, utilization of new technologies and know-how for production, understanding and fulfillment of the necessary paperwork to supply for MNCs or for exporting would be helpful for connecting to global value chains.

Another constraint of SMEs is the lack of capacity to produce large scales of output. First/second tier auto suppliers would not prefer to work with too many small suppliers due to coordination problems this might generate. Yet small firms cannot respond to large demands. Well-functioning and well-connected auto clusters could significantly improve the output capacity of sector in the region especially by allowing SMEs to cooperate in production processes and enable them to jointly handle large scales of order.

- **Collaboration with suppliers**

A final area is increasing the awareness of major, foreign auto suppliers about the accessibility of local suppliers of intermediate products. Many foreign auto producers in the region are inclined to use local suppliers due to lower cost but are not fully aware of the capacity of local producers and are concerned about the quality of services local firms could provide. Once the issues raised above are addressed, establishing better networks between local suppliers and OEM or 1st/2nd tier suppliers would allow them to be included in the value chains. Few auto manufacturers mentioned that the quality of intermediate goods produced locally are not too different and even better in certain areas from foreign intermediate goods that are imported. These capacities should be better advertised and advocated in the region (probably through respective associations).

- **Research and Innovation**

There have been quite favorable developments in the region on auto sector. After years of engagements in low value-added, high labor-intensive tasks, some large MNCs have noticed the capacity built and the potential to use the local know-how accumulated over the years in the region to participate in design and development activities. This creates great opportunities for creation of knowledge spillovers to region. Timisoara and to some degree Arad has developed the know-how and capacity to be successful in these areas. These efforts must be scaled up. Because, still, for the majority of the sector, comparative advantage is generated by low costs. Moving the labor-intensive production facilities from hubs like Timisoara and Arad to regions with lower labor costs can contribute to the developments of these relatively more rural areas of the region while converting Timisoara and Arad to strong knowledge hubs.

- **Access to Finance**

Many local SMEs are extremely cautious in scaling up their production or diversifying their product scope. This mainly depends on the uncertainties in auto market and high interest rates charged by local banks to purchase a new machine/adopt a new technology both of which diminish the aptitude for risk taking. This leads to a bi-modal distribution of firms in the sector where large firms get larger and small ones cannot grow.

Some of the SMEs in the region have used EU funds for their productive investments. Accession to EU funds has been very helpful in alleviating the risks for new productive investments. However application process needs to be streamlined. Most of the time, the firm needs to hire a consulting firm and the evaluation process last long. Another area where EU funds could be helpful is meeting the quality standards requested by large auto manufacturers.

- **Infrastructure**

Two main aspects of investment climate stand out as major obstacles for the sector. Unstable flow of electricity and the unexpected outages affect businesses' operations and damage equipments. Considering the high usage of high-tech machines in the sector, this is a serious concern and a major source of productivity loss.

The second aspect of investment climate that constrains firms is the road infrastructure. The main way of transportation in and out of the region is through roads and there are not sufficient high-ways in the region. With better roads, firms can move their labor-intensive production activities to regions with lower density and keep their knowledge intensive activities like design and development in centers like Timisoara and Arad.

TEXTILE SECTOR

- **Machinery and equipment**

Companies operating in the “Textiles/ Apparel” sector in the region usually purchase all the necessary machinery and equipment from foreign producers (located in Japan, Germany, Italy etc.). These are used for intermediate production phases and sometimes for the entire production process.

Decision upon the technical and financial features of the capital goods required, or regarding the selection of the suppliers is particularly influenced by: i) the products range the company is specialized in which – in turn –is mainly determined by the requests of the client companies, ii) the financial stance of the textile company (including the ability to attract external financing sources from banks, affiliate companies, available EU funds etc.). Information regarding available state of the art machinery and equipment is gained through interaction with large MNCs clients and/ or equipment producers, with fellow/ competing textile producers in local business associations or through own market research.

Due to unpredictable economic conditions and to the increase of the adversity towards risks, some textile companies rather prefer to decline orders for which they do not have the necessary equipment than contemplate the opportunity of investing in machinery and equipment for innovative but risky products. Sometimes the quality of the existing labour force cannot accommodate the operating needs for modern, high tech equipment. Other companies prefer not to decline orders, which may lead to losing clients, and subcontract part of the production to other local firms. This is seen as a temporary solution, until the company will be able to buy new technologies and/ or to increase its capacity accordingly.

According to their production needs or features of their products, textile companies may involve in the adjustment of the machines they buy or intend to buy from machinery and equipment suppliers.

Sometimes, the first hand machinery and equipment purchase agreements include training benefit provisions to be offered by the supplier. However, most of the time such training programs are offered in an intensive manner only to technical staff of the textile company.

For distribution purposes, if the structure or the size of the deliveries allow for it, SMEs operating in the textile sector sometimes prefer to invest in and operate their own transport vehicles in order to reduce production and distribution costs.

- **Technology: Research / Innovation /Product upgrades/ Sources of technology**

Most of the textile companies in the region operate under “lohn” conditions: they own the production facility and hire their own the labour force while the client companies (most of the times large MNCs in the apparel sector) undertake all product research, design and development phases of the production stages. Designs and material inputs are either provided or the suppliers of such materials are imposed to the textile companies by their clients. The clients only hire production capacity from the local textile companies. In such conditions, except for rare cases, RDI activities are quasi inexistent in the textile companies. However, some textile companies have understood the strategic risk that affects their business and started to engage in vertically integrated activities and to offer complete products instead of parts for further assembly process phases. Such integration allows for design and development skills to evolve. Gradually, the production will move-up the value chain towards ever more specialised products and those that have already seized the opportunity are performing well even in the current unpredictable economic conditions.

Understanding the importance of effective and efficient communication in business, one company has been trying to introduce the use of video conferences with foreign clients, in order to facilitate exchange of information regarding alterations/modifications needed when developing a sample. However, written correspondence (ICT facilitated) is still the rule in the business.

Software programmes related to production organization or ancillary activities are in place in most of the textile companies.

- **Labour: Skills and Training**

All the interviewed companies have identified both the insufficient number and the poor quality of the labour force as the main obstacle in front of business development. Textile companies lack sufficient employees, both high skilled technicians and engineers and low-skilled blue collars. The current production structure, the existing machinery and equipment, the lack of significant activities in product design and development does not require many engineers in the textiles sector. Development prospects are affected, nevertheless.

A regional characteristic is that the large automotive international manufacturers located in the region were able to pay higher than average salaries, generating high employees' turnover rates for other sectors with lower levels of labour productivity.

Some of the employers mentioned the lack of confidence in the quality of the education system. Tertiary education graduates lack minimal practical competencies while the size of low-skilled labour force has been continuously shrinking due to closing down of the vocational schools or to their transformation into theoretical high-schools. The decline of manufacturing activities during last two decades may have been the reason for education system reform decisions but their effects negatively affect present day producers. The lack of vocational schools is combined with little interest from young people to work in factories as low-skilled workers at the sewing machines. Some employers expressed their concern regarding the aging of the labour force (blue collar workers) and the prospect of not having enough workers in a few years' time.

The companies have to offer training to their new employees but most of the time this only aims at achieving equipment and machinery operating skills. Although training services are available in the market (usually financed by EU funds) the lack of quality and adequacy to the needs of the employers determine them to engage in developing training programmes. Apprenticeship activities for newly hired employees are frequently undertaken inside textile companies. Provided legal framework becomes more flexible, many of the textiles companies would be willing to offer internships to students.

- **Infrastructure**

Although all the interviewed companies in the textile sector mentioned the poor quality of the road infrastructure, the location of the production facilities in the vicinity of the western border was perceived as a compensating advantage. From the Hungarian border westwards road infrastructure meets their needs. However, local road infrastructure and the lack of public transport services negatively impacts the production cost as employers are forced to hire private transport services for their employees. From the employers point of view, the advantage of hiring cheaper labour force from the rural areas is partly offset by the need offer free transport services to those employees.

It should be mentioned that some of the textile companies perceived the poor development of road infrastructure towards the rest of the country as a competitive advantage against other regions that cannot benefit from FDIs that are "naturally forced to seize their migration towards cheaper east".

The liberalization of the energy market is seen as a threat to the mere existence of some textiles companies. The prices for electricity have been constantly increasing since 2007, which translated in higher costs for the companies. But, from 2014, when the energy market in Romanian will be completely liberalized, the energy prices are expected to be so high that some companies will have to close their business, as they will not have the competitive advantage of lower production costs.

- **Quality and certification**

Due to the specificity of the production process in the local sector of textiles, quality standards are imposed by the major apparel producer clients and local textile/ apparel “lohn” producers have to strictly observe quality standards and obtain adequate certification whenever the client requires it.

Some of the textile companies organize in house quality check of fabrics, quality assurance and quality control for production. Others outsource such services.

- **Institutions: Regulatory environment / Relationship with authorities / Judicial system**

Although seen as offering flexible conditions for the labour market, the current Labour Act is perceived as constraining in respects such as maximum period of working time/ week, minimum period of free time/ week, etc.

While not complaining about the legal framework per se, most of the managers complained about the administrative burden generated by the unpredictable interpretation of legal provisions and arbitrary actions of the public. Too many random inspections have negative impact upon the companies' activities.

Permits and authorizations administrative procedures are considered time consuming expensive.

Textile companies lack negotiating power against large multinational clients and tend to strictly observe contractual provisions. On the other hand if their foreign clients breach ongoing contracts local textile producers lack the capacity to seek contract enforcement abroad (where the governing law courts in their case are usually located).

While most of the textile companies consider that business associations could help their business some of the companies consider existing associations ineffective and “too involved in politics”.

- **Financing / Use of EU Funds**

The financing solutions the textile companies call on are as various as the companies themselves. Some of them, more risk adverse, prefer to use only internal sources (profits and shareholders' loans) to cover for investment needs. For daily operations companies have access to credit lines. Other companies use a mix of own financial sources (reinvested profits and shareholders' loans) for both investment and operational needs. However the level of the interest rates is perceived as high.

Companies are aware of the availability of the EU funds but generally lack clear information regarding application and eligibility. Some of the companies have already accessed or tried to access EU funds but they do not consider this type of financing as affordable because it requires their significant financial contribution towards sustaining the cash-flow of the project. The companies complained that project budgets are restrictive and do not always cover for their particular needs (i.e. training). Another problem with projects from EU funds is the very long evaluation period of the application. Companies that applied for funds for investments in new technology can wait more than one year until they found out if the application is approved or not. Regarding the providers of human resources related services

that accessed the dedicate EU funds the companies complained that they offered only non-relevant and/or low quality training programmes.

- **Collaboration/relationships with suppliers, other firms, and universities/local institutes**

As mentioned before, local textile companies are highly dependent upon large multinational clients that either provide themselves or impose or suggest material, or intermediate production. Such providers, as well as machinery and equipment suppliers are usually located abroad. Local business associations are not considered effective by the interviewed companies. Both local and at the national level there are good quality universities and research institutes for the textile sector but cooperation with business sector needs improvement.

- **Other (Use of professional services, sector specific questions, etc.)**

Business service providers are available locally and the textile companies partly outsource ancillary activities.

Textile companies feel Romania missed a good opportunity in 2009 when unrest in North Africa and rising costs in Asia prompted some apparel companies to relocate production back to Europe. The government could have offered incentives to attract significant textiles and apparel business to Romania at that time.

Non SMEs local companies feel neglected by the government that mostly directs support to large FDIs and local SMEs.

ICT SECTOR

- **Labor Availability, Skills and Training**

Availability of qualified labor is the most pressing issue faced by ICT firms in the region. All firms interviewed agreed on this point. The problem is not the number of total graduates but the number of good graduates of enough quality that could work proficiently as software developers. In Timisoara, labor availability is becoming a big issue because all the firms in the sector (and some auto MNCs) fight for the same pool of software development workers and graduates. In Arad and Hunedoara, the pressure is less intense because there are fewer ICT firms and the ones interviewed are the biggest players in those markets (facing no real competition in the city).

In order to remediate the lack of knowledge and skills of recent graduates from universities, all firms provide extensive training. This training could be extensive and take up from 6 months to more than a year in some cases. Most firms consider that some training is always necessary in the industry as universities provide basic knowledge and most programming skills are developed on the job. However, the two firms from Timisoara consider that the quality of the average graduate from local universities in ICT fields have decreased over time – although they still consider that between five to ten percent of graduates are very good. Additionally, because of the heavy MNC presence in Timisoara, local firms lose software engineers to firms in Austria, Germany and the UK, which increases the pressure to recruit qualified labor.

- **Infrastructure**

Infrastructure is not perceived as a problem for any of the firms interviewed. No problems were reported with electricity or internet connectivity and speed – the latter was highlighted as one of the comparative advantages of the region. The firm located in Hunedoara complained that it is not easy to reach their clients in the West Region (mainly in the Timisoara and Arad areas) and that a highway might help, but this is also a function of the firm's location.

- **Quality and certification**

Quality and certification only seemed important for the firm that was involved in providing networks implementation and maintenance in order to certify that they are preferred IBM server hardware and software suppliers. Other firms have international certifications, even though these are not required, to show that they comply with international standards.

- **Institutions: Regulatory environment / Relationship with authorities / Judicial system**

The constant change in regulations (especially VAT and other taxes) seems to affect medium/small firms more. In terms of software development, patenting and intellectual property issues are not important for any of the firms interviewed because the resulting software is property of the headquarters/mother company and they deal with these issues.

- **Finance**

Most of the financing at the two big firms interviewed is done with internal funds - either from the subsidiary/local company or with funds from headquarters. One of the medium size firms uses its own revenues while the other uses bank credit and EU funds to finance mainly purchases of equipment (servers, computers, etc). The only firm that relies on banks for financing states that paperwork is time-consuming and interest rates are high but that the situation has improved compared with a decade ago. No problems in terms of collateral were reported.

The mid-size firm that used EU funds complained that reimbursements for the investments pre-financed by the firms take a lot of time and even extend past the dates specified in the contract.

- **Collaboration/relationships with suppliers, other firms, and universities/local institutes**

All the firms interviewed develop software exclusively for their headquarters/mother companies (Alcatel-Lucent and OCE) or for a sole foreign firm that outsources this task to them (CVS and Memory). They do not have any clients in the West Region or in Romania and do not seem interested in exploring working with firms in the region (mainly because the work for their only client is already consuming all their time and resources).

Collaboration with universities in terms of developing new courses, provide training and internships is considered good in Timisoara. Firms in Arad and Hunedoara have also contacted universities but their engagement is small in magnitude maybe because they lack the size or critical mass of firms in the region to properly engage the local university and benefit from it.

Linkages with other firms in the ICT software sector are limited in Arad and Hunedoara because the interviewed firms are the biggest players and there are very few firms in their localities doing the same type of job. In the big companies, outsourcing of software development to other firms is usually not possible because of headquarters' directives. However, both firms in Timisoara highlighted that there are firms that could do this job in the area. Conversely, in Arad or Hunedoara this possibility does not exist (or is remote) because there are not many specialized firms with good quality.

AGRO-FOOD SECTOR

- **Machinery and equipment**

Companies operating in the sector in the region purchase all the necessary machinery and equipment from foreign producers (especially from DE, IT, US) through local branches. The machinery is relatively new and major investments were made in the period before the crisis to support enhanced productivity, new products and to respect the EU standards of quality needed after the 2007 accession. 2 out of 6 companies update equipment regularly and buy mostly off the shelf technology, the others consider that they are up to date and made adaptations for new products or technological processes. EU equipment standards (“like in other EU developed countries”) are regarded as a required baseline for good product quality and productivity. The equipment was initially mainly financed through EU funds (but it may not be the characteristic of the sector), Bank lending or equity, while the continuous renewal and adaptation is mainly financed through own capital. The sums invested in machinery average between EUR 500.000 to 2.000.000 for companies that used EU funds. The companies interviewed feel confident that with the current machinery they could compete in quality on the external markets. Maintenance is mostly performed in-house with specialized training provided by the equipment providers.

- **Technology: Research / Innovation /Product upgrades/ Sources of technology**

R&D is a marginal preoccupation within the sector, and is mostly present in the activities animal of cross-breeding and feeding (in order to increase the raw material production). One firm is actively searching collaboration on new bread recipes with an Institute outside of the region for new product development. Another company is actively involved in seed testing as their main focus is on higher cereal yields. The companies are willing to collaborate with Universities but do not trust in the capacity of these for applied research, as previous attempts were timid and unsuccessful. The perception of the firms is that they innovate through developing new lines of production and new technological processes. Four out of six companies have a strong emphasis on product upgrade and diversification while the rest find difficulties in experimenting due to current buying power or because the focus is on traditional products. Companies that have most of their value chain and produce for the national market stand out as innovators in terms of technological upgrades and testing for raw material production. This is based on motivation to develop further market share and because own financing is not an issue for them.

- **Labour: Skills and Training**

All the interviewed companies have identified both the insufficient number and the poor quality of the highly skilled labour force as the main obstacle in front of business development. Highly skilled technicians are mostly needed. The sector requires technical staff that could enter rapidly in production and be flexible, mobile as most of the businesses are in rural areas that are not particularly attractive. Salaries act as a motivational factor mostly in Timis Area and Arad (where near the city), while for the remote areas (Curtici, Bocsa, Resita) the scarcity comes mostly from low quality curricula of regional faculties and lack of fundamental knowledge and skills that could not be replaced by in-house training. Timisoara agronomy engineers are perceived as of good quality.

Lack of professional schools are a gap in production expansion, as skilled workers are difficult to find and most of them need training for at least 6 months to be productive. This category is rapidly ageing and skills needed in the sector are being lost within the new generation. Training is seen as necessary, always in-house and on the job, to compensate the lack of such schools. The highest lack of productivity is found at this level and is mainly linked to practical abilities that used to be acquired in

such vocational schools. The company is planning to set up a vocational school in the area for carving and meat preparation –using European Funds; for this they would like to bring foreign professors and select the best students (meat carving).

While the unskilled workers selection is not an issue in general (as the firms are remote – thus lack of choice towards urban life and no other industries are preponderant). Their retention is difficult and seasonal turnover is a given, as most of them are leaving abroad for seasonal work. The RO companies cannot compete in wages with foreign located companies.

On the seasonality of some agricultural activities, the firms would want more flexibility of the workforce, as they would have a peak and then business gets back to normal. Legislation and people's mentality that consider a job as a lifetime right (not depending on the production level) is a problem for that.

- **Infrastructure**

All interviewed companies in the sector mentioned the poor quality of the road infrastructure, lack of highways. The location of the production facilities in the vicinity of the western border was perceived as important for the exporters, but the specifics of the firms that we interviewed is that they are local/national distributors facing difficulties for delivering within the national big retailers networks. Exporters are not impeded. For local distribution networks (Resita-Timisoara-Arad-Oradea-Satu Mare), roads used to be a problem that has currently drastically improved.

Energy fluctuation is a problem as the national network grid encounters disruptions and blackouts. This is a major risk for the food processing industry and the firms have invested in mitigating such risk through own equipment.

For the water intensive production, the water utilities are problematic (especially Laurul and Pangram) in the country side and mountain areas.

Irrigation is a national wide issue that affects the large scale crop farming and is perceived as a major bottleneck in the years to come in the light of higher yields necessity and climate change effects.

- **Quality and certification**

Quality standards are imposed by the major retailers and for EU exports. All interviewed firms have updated certification requested by EU regulations for internal market and exports. In the case of suppliers, the food processing activity also requires certification of raw materials and it seems that apart for the companies with integrated value chain, there is mistrust on smaller local suppliers in terms of quality certification, especially in the meat production where the black market is a serious issue. State controls on the quality are too numerous and from different local agencies. There were no particular complaints about the access to state testing labs, apart from the milk testing which is done outside the region and takes too much time. Also, lack of complaints could result from the fact that some of these companies have invested in their own labs. The labs are used only in their interest and do not feel a potential commercialization of such services.

- **Institutions: Regulatory environment / Relationship with authorities / Judicial system**

While not complaining about the legal framework per se, most of the managers complained about the administrative burden generated by the unpredictable interpretation of legal provisions and arbitrary actions of the public. Too many random inspections have negative impact upon the companies' activities.

The specificity of the agro-food is the alimentary security which at the lowest suspicion of flaw has a strong echo in consumers' decision and firm reputation. Moreover, state controls peak arbitrarily as soon as a media make such allegations. There is no business association at local level or national level, or even the Government that could protect local firms for such unfair allegations. There was a series of scandals that unfairly and indirectly touched upon Romanian producers (pork, milk, eggs) and the communication was a big problem, therefore product demand dropped dangerously.

- **Financing / Use of EU Funds**

The financing solutions are as various as the companies and specific agro food sectors. Most companies use a mix of own financial sources (reinvested profits), Bank credit lines and EU funds. The interest rate is generally perceived as high. Most companies developed at the beginning through FDI or Bank loans. As they grew and wanted to expand, EU funds mostly through SAPARD funds were accessed. They generally used it for new production lines, plants, machinery, testing labs. EU funded programmes exist but the collaterals required sometimes make them inaccessible for small producers. Moreover, EU funds rules are very bureaucratic, more restrictive than EU regulation in general and require a more flexible implementation by EU funds administration staff. The big companies interviewed all benefited from EU funds.

- **Collaboration/relationships with suppliers, other firms, and universities/local institutes**

FMCG retailer chains dominate the distribution market and pose very restrictive margins on the local producers. The companies with integrated value chains and high production have enough negotiation power in contracts with retailers. The value chain integrators have developed small shops chain that secure the main market share they have. An innovation is brought from a firm which has a plan to develop egg and liquid egg automatic machines in urban areas. A peculiar aspect is that it seems there is a lack of offer and demand communication in the region (one firms produces EU quality certified meat while two others imports such meat because they thought no Romanian producers are EU export standard certified; and a fourth firm uses for the pastry imported liquid eggs as they were not aware than only 40 km away a local company is the first liquid egg producer in Romania).

Associations should play a higher role in representing local interests. In this regard, promoting Romanian products through branding and marketing campaigns, as well as communication on food safety and local producers' observance of the rules could be useful strategies.

There is a lack of raw materials, and it proves difficult to collect it from small local suppliers. When such shortage exist (in all cases except the value chain integrators), the firms import from near EU states (AU, DE, FR, IT).

Universities and institutes are perceived as not bringing value added to most of the company's efforts of innovating. Timid collaboration with universities is being made for R&D (cross breeding and new recipes) and in finding graduates as workforce through internships.

- **Other (Use of professional services, sector specific problems.)**

Business service providers are available locally and provide satisfactory quality. Whenever the case they outsource legal services to professionals. EU funds consulting companies could be much improved in order to implement successful EU funded projects. Labeling and marketing companies are not well developed for those companies searching for national or international product expansion and diversification. Some firms have such services in house, others use Bucharest based services or international expertise mainly recommended by international shareholders.

Non SMEs local companies feel neglected by the government that mostly directs support to large FDIs and local SMEs. EU subsidies allocated to Romania are insufficient as compared with EU neighboring countries affecting cross border market competition for raw materials.

Association: Market-orientation and funding eligibility of most agricultural holdings are restricted: The Romanian agricultural sector does not fully utilize its widely recognized agro-climatic potential, as it continues to be dominated in number by miniaturized (semi-) subsistence holdings with limited market orientation and eligibility for CAP funding.(Kray – CESAR project)³³ Thus association of small scale farmers could greatly improve access to finance, production sustainability for food processors, lower food processing costs and a more robust employment in rural areas.

Land consolidation, as well as the development of the land market is required. The still uncompleted land and property reform and development of the land market continues to limit access to credit and other rural financing options, and has delayed the restructuring of farms in accordance with market demand and the need to enhance competitiveness.³⁴

Black market (especially flour –bread and pork meat) is an issue for local interviewed companies that need to cope with competitors that use non-registered, not quality certified raw materials from Romania or neighboring countries.

³³ http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2007/11/07/000020953_20071107100638/Rendered/PDF/40998010RO.pdf

³⁴ ibidem

CONSTRUCTION

- **Machinery and equipment**

The majority of machinery and equipment used by construction companies in the West Region is imported, primarily from Germany, Spain, Italy, or Czech Republic (the necessary technology is not available in Romania). Most of the materials used are also imported (even though they may be purchased from companies based in Romania). The acquisition of these supplies is mainly financed by bank credit. Companies are interested in European Funds that could be used to introduce new technology but one problem is that the lengthy procedures associated with this type of financing do not always match the fast business needs of the private sector and sometimes, if the process takes as long as two years, the target technology can become outdated.

- **Technology: Research / Innovation /Product upgrades/ Sources of technology**

The majority of construction companies in the region adapt the existing off-the-shelf technology to the specific needs of the project of client but do not have an organized R&D division. Research is expensive and the availability of capital for this type of activities constitutes a major obstacle. However, some companies manage to run small research initiatives. These companies are mainly located in the Timisoara area, where they have access to higher levels of know-how than in other counties in the region, and can collaborate with students and teaching staff at the Politehnica University. Some companies have managed to introduce certain innovative production techniques or are working on a product prototype. These small projects usually started from the company's attempt to better meet the needs of its clients or by observing trends at international fairs.

- **Labor: Skills + Training**

Highly-Qualified Labor. Companies (especially in Timisoara) can usually find qualified labor force, although they complain that many graduates, in fields such as engineering, do not have sufficient practical (and sometimes theoretical) skills. Proximity to Politehnica University is essential for companies as this way they can recruit interns, collaborate on research and product development or provide technical training for staff. Small or medium-sized firms face wage competition from multinational companies and can sometimes invest in training for highly-skilled employees who choose to leave soon after they acquire better qualifications. The economic crisis had alleviated some of the pressure on labor availability.

Skilled and Unskilled Labor. The lack of vocational schools has had a significant negative impact on the availability of skilled labor (masons, electricians, etc). The courses offered by unemployment agencies fail to provide blue collar and unskilled workers with the necessary abilities. Companies train the workers in-house or contract specialized training if they have the financial means or the opportunity to do so (ex: worker training programs sponsored by German funding). Worker turnover is also a problem for unskilled labor (people used to leave to Western Europe) but the trend has been reversed with the onset of the economic crisis.

- **Infrastructure**

The general perception is that the local roads and the quality of the infrastructure have degraded due to lack of investments. Companies have usually managed to adapt to the situation but they are affected by the state of the road infrastructure to various degrees. Firms that use their own

trucks for transport complain most stringently, as this leads to vehicle depreciation, delays and loss of competitiveness. Most pressing issues: the general poor quality of the roads in the region and the lack of a ring road for Timisoara.

- **Quality and certification**

In general companies meet all the necessary standards required by the clients or as a condition to participate in government procurement auctions.

- **Institutions: Regulatory environment / Relationship with authorities / Judicial system**

Changes in legislation occur often and are unpredictable. This concerns both horizontal regulation (tax code or labor code) as well as sector-specific legislation concerning the rules for renewable energy. For example, uncertainty related to the distribution of 'green certificates' can derail a company's business plan.

Litigation procedures take a very long time and negatively impact business. Contract enforcement can be improved, and outside judicial courts arbitration procedures are considered a realistic solution.

- **Use of EU Funds**

EU Funds are very important for construction companies in the West Region via two main channels: i) large scale development projects in which these companies can participate via government contracts; and ii) Smaller projects for which the companies can apply which are focused on technology development and research (sometimes in collaboration with Politehnica University) and upgrade of own technology and equipment

However, some stakeholders mention that the procedures required to access European Funds are not transparent. Sometimes national/local authorities impose additional requirements which make the process slow and cumbersome. Long delays in project approval can render the particular technology (the end-use of the funds) obsolete. As a result, these delays can make the company waiting for funding lose competitiveness.

- **Sector Specific Issues**

The sector is highly dependent on the government either as supplier of contracts (particularly in times of economic downturn, when private investment decreases significantly) or as regulator and provider of subsidies for renewable energies.

In the case of state contracts, the lowest price criteria used in tenders often restricts the quality of materials used by construction companies. Also, if the state does not make payments on time, this affects the company's capacity to pay the banks (which can put small companies into bankruptcy)

The legislation regarding renewable energies changes often which can impact the ability of companies activating in this field to make business plans. Many state aid and other incentive schemes that are currently in place are mainly directed towards large FDIs.

- **Associations/ Cluster Activities**

ROSENC is a Romanian NGO organized as a cluster association of: firms and industry, research organizations and public institutions with the aim of promoting renewable energy sources, energy efficiency, new sustainable energy sources within the West Region and across Romania.

One of the most important functions that ROSENC fulfills is that it focuses on providing the necessary (but missing) incentives to foster collaboration. For instance, for a project to produce solar panels they created a new enterprise because firms were reluctant to collaborate or conduct joint research/invest resources with other firms fearing some could free ride. Their solution was to create a new company in which all involved parties were shareholders. This way all parties would have an incentive to bring the project to a commercialization phase. Also, university professors were made shareholders in order to increase the incentives for collaboration.

The leadership of the organization ROSENC approaches each project with a comprehensive look at the value chain in order to identify what links can be provided in the region, what is lacking, how the work can be organized among its members, and what parts of the supply chain need to be strengthened in order to improve the project's chances of success. For instance, for their project on poles of competitiveness, ROSENC mapped the whole value chain and found that the missing link was the power cells (which were not produced in the region) so it proposed a project to fund a factory that will make that missing component.

In the future, ROSENC could play a key role in the West Region for mobilizing existing know-how in the field of renewable energies and for promoting collaboration which can result in innovative and marketable solutions in the area of energy efficiency.

Annex 7 –Map of Tourism Cluster

