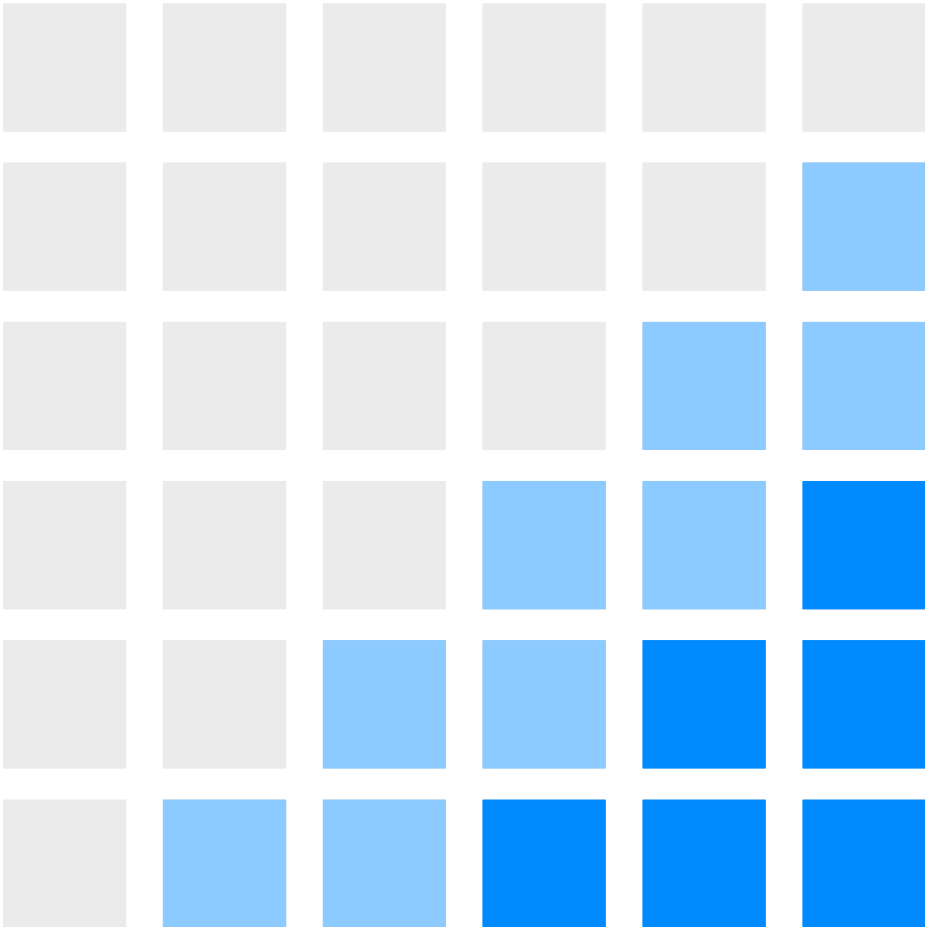
Smart Specialisation

Diagnosing the potential of regions

2015



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Abstract

Smart Specialisation is a new innovation policy concept as part of Europe's growth strategy. Its aim is to support regions in their economic advances. It means identifying the unique characteristics and assets of each region and thus highlighting each region's true competitive advantages and unique potential. But Smart Specialisation requires a substantial amount of knowledge in order to be designed and implemented successfully.

The paper develops a possible stepwise process and defines the tools in regional economic analysis and benchmarking necessary for a successful use of the Smart Specialisation policy tool.

This process can include the following 10 steps:

1. Defining the region (Functional Urban Regions)
2. Assessing the region's international position
3. Assessing the region's own position (region focused status quo)
4. Assessing the framework conditions of the region
5. Global megatrends and their validity for the region
6. SWOT-Analysis
7. Thinking Smart and defining the strategy
8. Implementing the strategy
9. Acting according to the strategy
10. Monitoring and evaluating

The paper focuses on steps 1 to 6 and how a "smart" economic analysis can support the design of a regional Smart Specialisation strategy. A "smart" economic analysis means analysing in depth, re-arranging and re-combining standard approaches and relying on facts and data. The paper demonstrates the interplay between the process of Smart Specialisation strategy development and economic analysis based on a number of examples, particularly on the development of a Smart Specialisation strategy for Ticino.[1]

[1] BAKBASEL (2015): Analyse der Tessiner Branchen: Internationales Benchmarking und Smart Specialisation (download: http://www.bakbasel.ch/publikationen/berichte-studien)

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1 Introduction

Smart Specialisation is a relatively new policy concept which grew in importance within the last years and has become a key element of Europe's growth strategy.

It has been defined by many authors and all those definitions vary slightly. For instance, the European Commission defined Smart Specialisation[2] as an "innovation policy concept designed to promote the efficient and effective use of public investment in research" and foster "regional innovation in order to create economic growth and prosperity by enabling regions to focus on their strengths". It should be based on a "sound analysis of regional assets and technology and potential partners in other regions to avoid unnecessary duplication" and include a "strong partnership between businesses, public entities and knowledge institutions".

The OECD defines Smart Specialisation[3] as an approach that "combines industrial, educational and innovation policies to suggest that countries or regions identify and select a limited number of priority areas for knowledge-based investments, focusing on their strengths and comparative advantages."

In accordance with those definitions, we state that Smart Specialisation means identifying the unique characteristics and assets of each country and region and thus highlighting each region's true competitive advantages and potential. This process enables more effective rallying of regional stakeholders and resources around an excellence-driven vision of the future. It also means strengthening regional innovation systems, maximising knowledge flows and spreading the benefits of innovation throughout the entire regional economy.

Obviously, defining and implementing a Smart Specialisation Strategy needs a substantial amount of knowledge and a sound method. In this paper, we present a stepwise process and tools in regional economic analysis required for a successful use of the Smart Specialisation policy. The papers focus on the economic analysis. The processes, methods and tasks required for defining, implementing and monitoring a regional Smart Specialisation Strategy are not part of this paper. For the economic analysis we do not propose a "new" method, instead we show how standard regional economic analysis tools can be used, re-arranged and combined in order to yield a sound basis for the creation of a strategy driven by empirical evidence.

The paper presents a possible stepwise process and outlines tools in regional economic analysis necessary for a successful application of the Smart Specialisation policy idea. In chapter two, we shortly introduce the concept of this paper. Chapter three illustrates the first six steps suggested by the authors in order to prepare a Smart Specialisation Strategy. Within this chapter, various methods and tools which can be applied in empirical analysis are outlined and illustrated using the example of the region of Ticino. Chapter four summarizes those steps and adds some concluding remarks.

[2] European Commission: Research and Innovation, Regional dimension of innovation; URL:http://ec.europa.eu/research/regions/index_en.cfm?pg=smart_specialisation
[3] OECD: Smart specialisation; URL: http://www.oecd.org/sti/inno/smartspecialisation.htm

2 Concept

In this paper, Smart Specialisation is defined as a process to identify the unique characteristics and assets of the regional economy and thus highlighting each region's true competitive advantages and potential of its industries. This requires answering the following questions:

- What is the "real" geographical delimitation of the regional economy beyond administrative boundaries?
- Which industry sectors are nationally and internationally successful?
- What is the future potential of these industries?
- Where are key sectors and clusters? Where are they located within the region and in neighbouring regions?
- How can sectors be combined in order to increase the region's value added and improve its competiveness?
- What are strengths and weaknesses of the regional industries and the whole economy? What could be threats or opportunities for the regional economy?

There isn't a single empirical tool to answer all these questions together. For a sound empirical economic analysis, a variety of tools has to be applied. Each tool enables us to analyse a certain aspect of the regional economy. Nevertheless, compiling the different analysis results should help us to identify the potential of the regional economy.

The identification of a Smart Specialisation Strategy is a difficult task because modern economies are highly interconnected. In addition, there exists no established analytical approach. To overcome these obstacles, we suggest a stepwise analysis process based on empirical data. This stepwise process serves as an analytical framework, even though single steps may only concern parts of the regional economy and the line between them may not always be clear-cut. Our suggested process aims at yielding a range of options for a Smart Specialisation Strategy. In the end, it is crucial to assemble the steps and to balance the options.

An important first task is the definition of the region based on a functional definition. The building of functional regions is important to generate a better identification of the region, especially when going beyond political borders (such as Cross Border regions or metropolitan regions). In a next stage, regions need to measure their competitiveness and future potential by assessing their economic position in the national and international context. After defining the region and assessing its economic potential, more knowledge for prospection and strategic planning can be gained in depth via SWOT analyses which takes both national and regional framework conditions and the impact of relevant megatrends into account. Thinking Smart means how innovative approaches can be used when establishing new strategies.

In more detail the process can be described in the following 10 steps:

1. Defining the region (Functional Urban Regions)
2. Assessing the region's international position with respect to its performance and its industry structure
3. Assessing the region's own position with an in-depth analysis region of the industry structure of the region and its innovation potential
4. Assessing the framework conditions of the region
5. Global megatrends and their validity for the region
6. SWOT-Analysis
7. Thinking Smart and defining the strategy
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In the following, steps 1 to 6 will be outlined.

3 Steps

3.1 Defining the region

A question which seems trivial on first sight but which might well develop as a key success factor for a Smart Specialisation Strategy is the definition of the region. Without a clear definition, without the acceptance of this definition by all stakeholders, and without a concept applied commonly by all subsequent analyses, it is not possible to successfully develop and implement a strategy, particularly not a strategy focusing on Smart Specialisation. Therefore, in a strategy process, the definition of precise geographical limitations of the regions, the strategy is supposed for, should be an explicit first step, instead of following implicit definitions and creating possible misunderstandings and finally failure of the strategy.

To achieve a broad acceptance of the region's definition as well as to fit the idea of Smart Specialisation, it is useful to follow an accepted concept. We propose the concept of functional regions as a starting point. Regions are functional regions if the economic activities within the region are heavily interconnected, while the connections with areas outside the regions are less intensively connected. Of course, in today's globalised economy, every single economic actor is interconnected with any other actor. Still, connections are much stronger within some geographical areas than to the outside. Although there is no theoretically defined cut-off level, indicators like commuting patterns (for jobs, recreation and shopping), cluster relationships or activities, innovation co-operations, the catchment areas of institutions of higher education or culture, among many others, can help to identify a functional region. The pro of applying such a concept of "functional economic linkages" is that the precise idea of Smart Specialisation, of fostering strength by identifying smart combinations of economic activity, depends on the opportunity to create or enhance such economic linkages.

Of course, there is another important precondition in the definition of the region: It must reflect the geographical delimitations for which the stakeholders of the Smart Specialisation Strategy can be active. Therefore, the definition often follows the administrative definitions of regions.

In our example for the canton Ticino, the political delimitation precisely was the key driver for the commonly accepted definition of the region to be analysed. Although the economy of the canton is heavily interconnected, it is a priori not clear if the Ticino indeed constitutes one functional region. Therefore, it was important to analyse the internal structures of the region as well, as we will see further down. In some cases, it might be the smartest thing to develop two differing strategies or different parts of the region if they do not form one functional region but differ substantially from each other, even though they cannot be separated for political reasons.

3.2 Assessing the region's international position

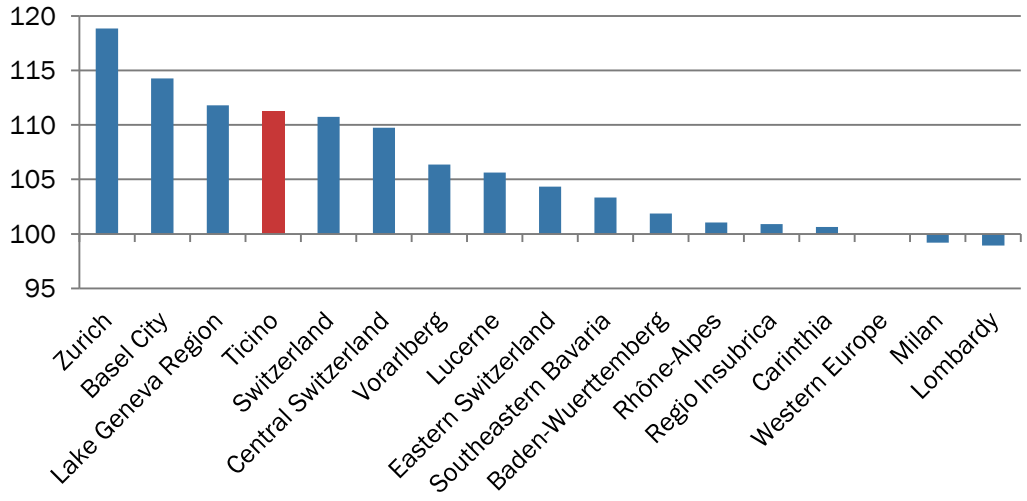
A sound analysis of the regional industry and its structure is a requirement in order to successfully implement a Smart Specialisation strategy. One step is to assess the region's international position using the method of international benchmarking. International Benchmarking – the comparison within a group of peer regions – allows identifying the international position of the region, particularly of its industries and their competitive advantages.

The international benchmarking serves as a starting point and foundation of the further process. Its goal is to get an overall view of the region's economic performance and identify viable and sustainable sectors of a region's industry, strengths and weaknesses and show existing potential for development. Besides from studying general performance indicators, our main question at this stage is: which industry sectors are nationally and internationally successful?

A first step is therefore to study some general performance indicators (GDP per capita, GDP growth and employment growth) in comparison with a benchmarking sample in order to know how the region has performed in the past.

Fig. 1 gives an example for the case of Ticino using the BAKBASEL Performance Index that combines GDP per capita, GDP growth and growth of the workforce in order to get a comprehensible measure for a region's economic performance compared to other regions (here: Western Europe). The higher the value, the stronger was the region's economic performance in the past.

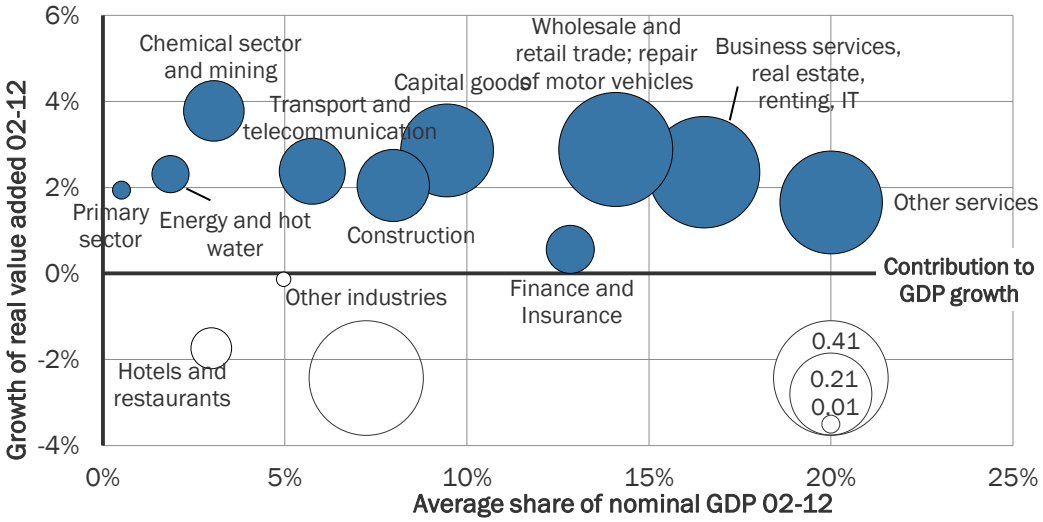
Fig. 1 BAKBASEL Performance Index



Selected NUTS2-Regions, Index: Western Europe = 100, Standard Deviation = 10, 2002 - 2012
Source: BAKBASEL

Interregional growth differences can arise through differences in the industry structure. The classical benchmarking tool of industry growth analysis is a decomposition of GDP growth in its sectoral contributions. With this decomposition, we get a first impression of the importance of certain industries within the region. Fig. 2 illustrates this for Ticino: We find that the retail and trade sector, the capital goods sector and the sector of business-related services, the real-estate sector and IT accounted for most of the GDP growth. Surprisingly, considering its relative size, the growth contribution of the financial sector has been quite low. In addition, the contribution of the tourism sector – one of the former leading sectors – is both low and shrinking.

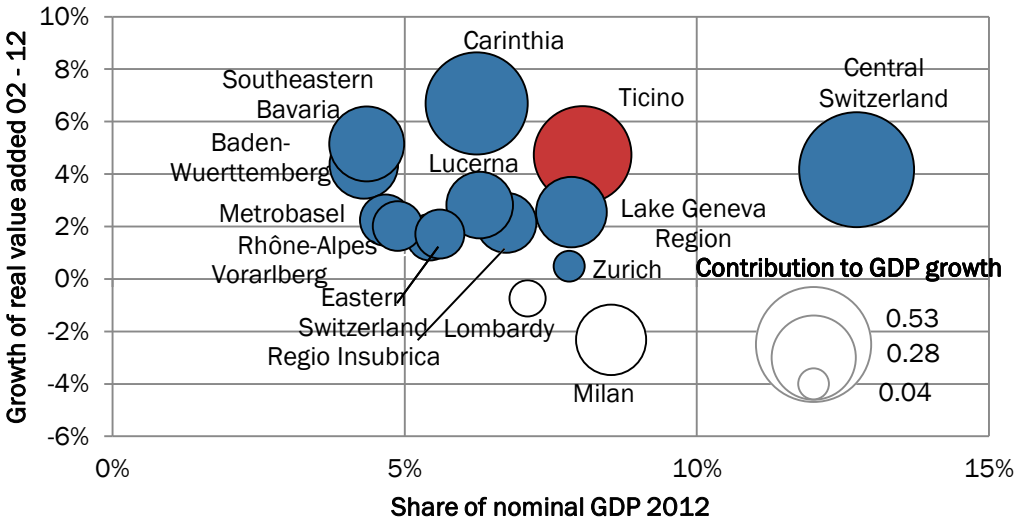
Fig. 2 Sectoral Contributions to GDP-Growth in Ticino 2002 - 2012



Horizontal: share of overall economy in % (nominal GDP, adjusted for purchasing power)
Vertical: average growth of value added (real, adjusted for purchasing power) in % p.a.
White: negative growth contribution
Source: BAKBASEL

In a next stage we can compare the growth decomposition in different regions. This gives an indication of the importance of sectors in the peer group with respect to their growth contribution and can give first hints towards a potential analysis. If we compare Ticino's sectoral drivers of growth with those in other regions - Fig. 3 gives an example for the wholesale sector - we see that Ticino's wholesale sector was among the top-contributors.

Fig. 3 Contributions to GDP-Growth in Wholesale Sector 2002 - 2012



Horizontal: average share of overall economy in % (nominal GDP, adjusted for purchasing power)
Vertical: average growth of value added (real, adjusted for purchasing power) in % p.a.
White: negative growth contribution
Source: BAKBASEL

Until now, we could identity which industries were the regional growth drivers and which industries performed well in an international perspective in the past.

Since Smart Specialisation aims at creating future economic growth and wealth, we continue with an analysis of the industry's growth potential. To do so, we combine information concerning the region's industry structure with the growth potential of different sectors. Sectors which compete internationally are of particular importance, therefore we analyse their competitiveness compared to other regions.

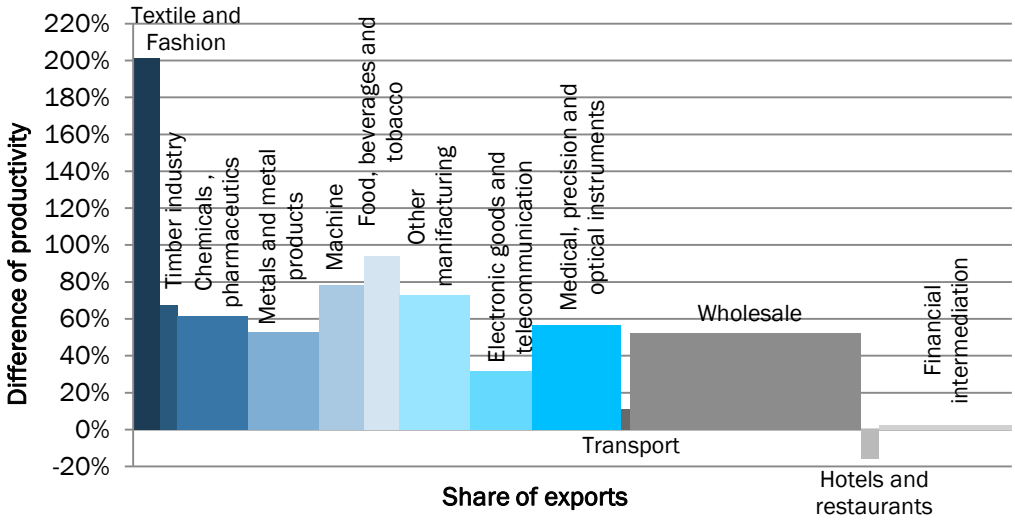
One of our goals is to identify industry sectors which might gain in importance and create future economic growth. To achieve that, we propose

- investigating the growth potential of the industry's sectors based on a meta-analysis of economic institute's forecasts,
- analysing the capacity to compete of those sectors which compete interregionally and internationally.

In order to estimate a sector's capability of contributing to the region's GDP growth, we look upon its relative size (value added by sector compared to total value added) and its growth potential. An industry including relatively large sectors with high growth potential is likely to grow in the future. Vice versa, it is beneficial if sectors which are assumed to have low growth potential account for a relatively small share of a region's GDP. With this method, it is possible to sort the regional industries according to their importance within the region and their assumed future growth potential. The result is a matrix indicating which industries are over- or underrepresented in the region according to their assumed growth potential in the future.

When analysing the capacity to compete of a region, the first task is to identify sectors which actually compete interregionally and internationally, i.e. all sector that can be seen as export-oriented. Industrial goods are usually transportable for relatively low costs and local demand is not that important when firms choose a location. Hence, we perceive the whole industrial sector as export-oriented. On the contrary, most services are not internationally tradable with appropriate costs and meet only local demand. However, some services can be traded internationally, e.g. financial services, communication services or wholesale. Therefore, we regard particular services as part of the export sector. A sector's competitiveness is highly depending on its productivity. For that reason, we use the productivity of a sector relative to the productivity of this sector in Western Europe as a measure for competiveness. Our findings for Ticino (see Fig. 4) show that all export-oriented sectors expect for the tourism sector are more productive than their Western European equivalents. The textile and fashion industry, for instance, has a productivity which is three times as high as in Western Europe. Such a lead in productivity indicates that an industry has a competitive advantage.

Fig. 4 **Capacity to Compete 2012: Sectoral contributions Ticino in relation to Western Europe**



Sectoral contribution as product of share of exports and advantage in productivity in % relative to Western Europe
All contributions are average values for 2010 - 2012
Source: BAKBASEL

To conclude our analysis of the region's capacity to compete, we include the relative size of all export-oriented sectors. Obviously, an industry consisting of highly productive sectors which amount for a high share of all exports is highly competitive.

After assessing which industries have been regional growth drivers, internationally successful and might have a future potential, a further step is to assess their innovation potential.

3.3 Assessing the region's own position

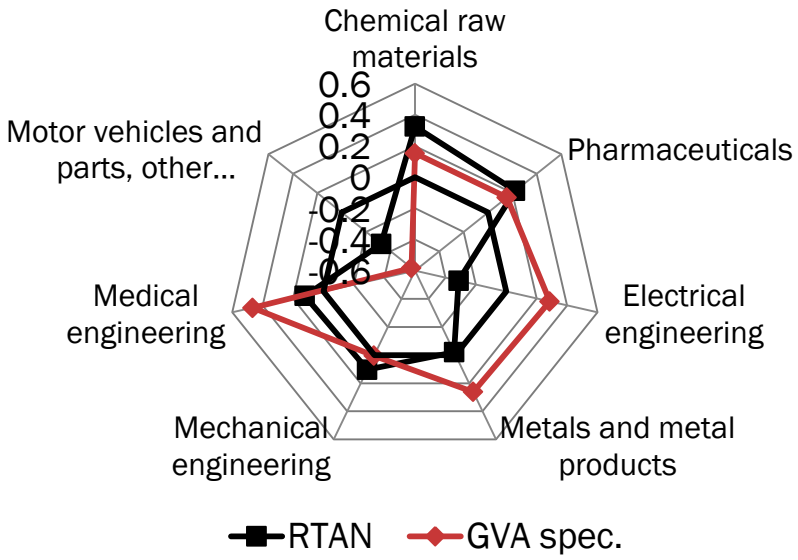
To complete the status-quo analysis, we suggest assessing the region's innovativeness and consequently deepening the analysis of the region's industry structure (specialisation of the region).

In order to get an impression of the overall innovativeness of a region, we propose studying the quality of the universities, the patent- and publication density and the expenditures on research and development in relation to other regions. However in the context of Smart Specialisation, a deeper analysis of regional innovation systems is required.

A good starting point for that is: What are the core areas of private and public research activities? One possibility to answer this question is looking for patent specialisations. A patent specialisation is present if the share of patents in a particular field is higher in the region than in a comparison region (e.g. Western Europe). A follow-up question is whether the industries which account for a high share of the region's value added are also the most innovative. This can be answered by comparing patent specialisation with industry specialisations, i.e. the share of value added of an industry within a region in relation to the share of value added of this industry in the comparison region.

For the example of Ticino, we find patent specialisations in the industries of medical engineering, pharmaceuticals and chemical raw materials that match the industry specialisation (see Fig. 5). This illustrates the strength of Ticino's Life Science industry. With respect to electrical engineering, Ticino has an industry specialisation, even though it is de-specialized concerning patents, which indicates that this sector might become less important in the future. This deeper analysis helps assessing whether the region's patent specialisation matches its industry structure and whether the patent specialisation exists in a productive industry with strong future prospects.

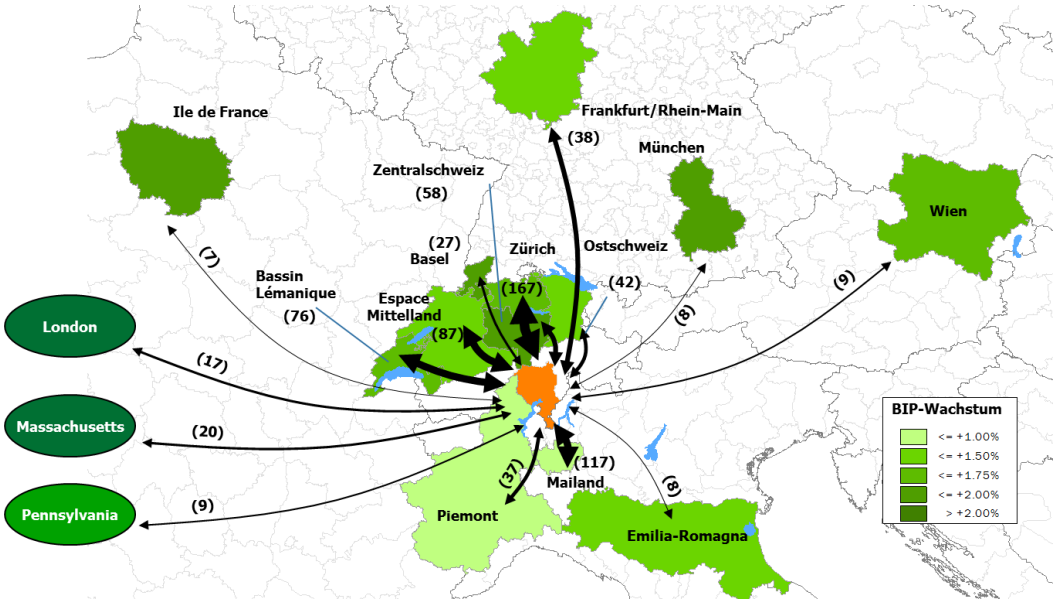
Fig. 5 Patent- and industry specialisation in Ticino



RTA-Index of value added specialisation (GVA spec.) and RTA-Index of patent specialisation (RTAN)
Values are between -1 and +1, where -1 means total de-specialisation and +1 means total specialisation
Values in relation to Western Europe
Source: OECD, REGPAT database, July 2014, BAKBASEL

A further task is to trace the linkages of the regional innovation system beyond the region's boundaries. A region's innovativeness is highly depending on how well local researchers are internationally connected. Thus, analysing research networks of a region is relevant. Fig. 6 answers the following question for Ticino: How many patent applications resulted from international or regional cooperation and where are partners located?

Fig. 6 Research networks of Ticino



Cooperation of patent researchers of Ticino with researchers from other regions
In parentheses: Number of patent collaborations 1991 - 2011
The darker the colour of a region, the higher its real GDP-Growth
Source: OECD, REGPAT database, July 2014, BAKBASEL

This analysis can be extended through analysing these research networks according to the research/technology fields to detect fruitful innovation exchanges which are important for certain technology fields or industries. On the basis of this kind of analysis, cross-border innovation systems can be detected.

Furthermore, a deepened analysis of the industry structure, which illustrates regional specialisation, is valuable. Data such as the "Statistic of company structure" (STATENT) in Switzerland allow for insights on a very detailed industry and regional level (based on employment statistics).

The following measures have proven to be helpful to increase the significance of this analysis:

- Location Quotient: Measure for under- or overrepresentation of particular industries in a sub-region in relation to the whole region.
- Growth contributions of selected industries to total growth of the work force

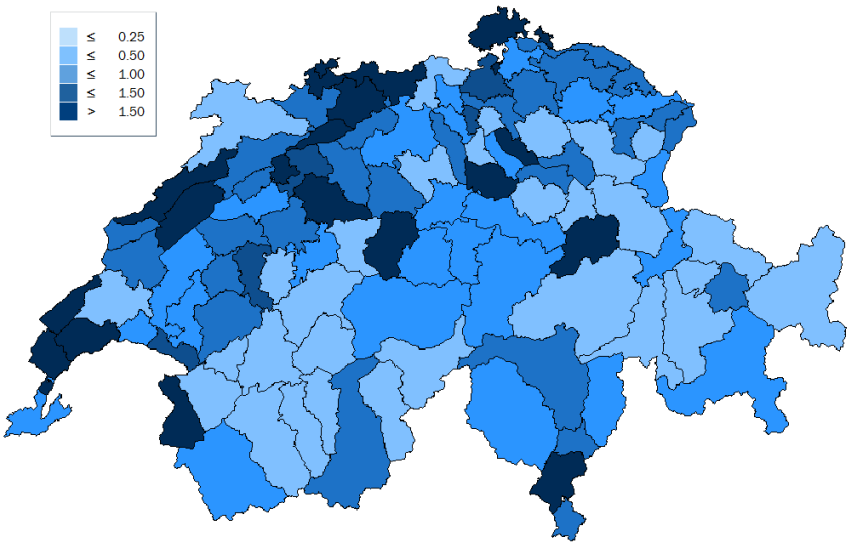
Combining up- and downstream industries to aggregates can be helpful in order to identify relevant clusters of a region and observe them over time. This is especially important since sectors are highly interconnected and must not be seen as isolated entities. In Ticino's case, the sector aggregate "Life Science" has been created (see Table 1). All sectors within this aggregate are part of the same value chain and highly depend on each other. In the following, we will use Ticino's Life Science sector as an example. A deeper analysis will take place focussing on inter- and intraregional comparison.

Table 1 - Sector Aggregate Life Science

Life Sciences	
Production	
G202	Agricultural chemistry
A21	Pharmaceuticals
K2660	Manufacturing of irradiation, electrotherapeutic and electro medical equipment
G325	Manufacturing of medical and dental equipment and material
Wholesale	
464601	Wholesale of pharmaceutical products
464602	Wholesale of medical, surgical and orthopaedic products
Research	
721100	R&D in Biotech

For an **interregional comparison**, the industry structure of the country will be regionally subdivided. This enables us to identify regional specialisations in particular industries at a glimpse. Concerning the Life Science sector – a sector, which is traditionally strongly represented in Switzerland – we find an overrepresentation in Ticino (see Fig. 7).

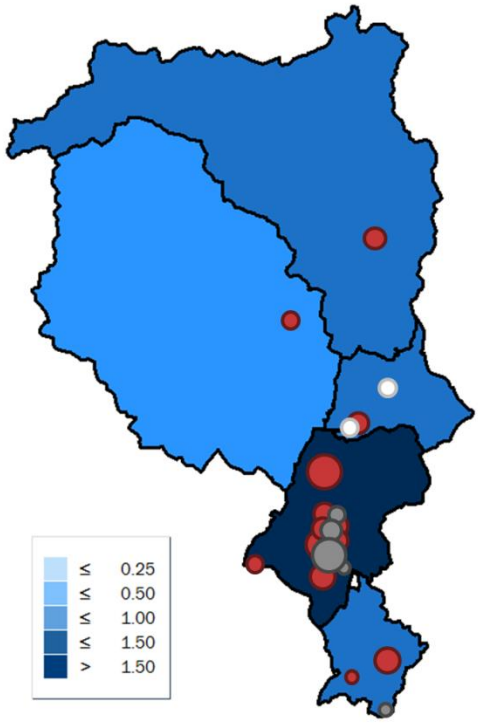
Fig. 7 Location Quotient for Life Science sector in Swiss Labour Market Regions, 2011



Location Quotient is derived by comparing the employment share of the Life Science sector in the local economy with the same share in Switzerland as a whole.
Source: BAKBASEL

During the **intraregional comparison**, the industry structure of a sub-region can be analysed down to community level. This aims at illustrating the regional allocation of key industries or industry aggregates. Are industries of a value chain allocated in clusters or do they spread over the whole region? Fig. 8 illustrates this for Ticino's Life Science industry. Research facilities as well as production and trade are mainly allocated in the south indicating a strong Life Science cluster. To extend this analysis, it is possible to look at the Life Science industry in Northern Italy, existing trade relations and research cooperation with Ticino.

Fig. 8 Location Quotient in Life Science Industry in Ticino, 2011



Location Quotient is derived by comparing the employment share of the Life Science sector in the economy on community level with the same share in Ticino as a whole.
Value > 1 = Industry overrepresented; Value <1 = Industry underrepresented
Bubbles: Red = Production; Grey = Trade; White = Research
Size of bubbles depends on absolute amount of full-time-equivalents in community
Source: BAKBASEL

So far, our analysis has been focussing on the economic development of the region in the past.

3.4 Assessing the framework conditions of the region

Another relevant part of the status quo analysis is the attractiveness of the region. The economic success of a region is strongly depending on its attractiveness for businesses and highly qualified employees. Hence, we suggest including this aspect into the status-quo analysis of a region. How are companies and highly qualified employees taxed? Especially for export-oriented industries, accessibility is crucial. We suggest studying both the intercontinental and global accessibility of a region. Furthermore, regulation of the product and the labour market is relevant. A thorough analysis may also take industry-specific regulations into account, particularly for key industries.

Compiling and appraising the results from step one to four allows for identifying the strength and weaknesses of the region's economy. To complete the analysis of the potential of the regional economy, in the next section, we try to include the possible impact of future developments on the regional economic via the analysis of the megatrends.

3.5 Spotting opportunities: Global megatrends and their validity for the region

Continuing the analysis, long term trends (megatrends), which may influence the future development of a region and its industry, are considered. Megatrends are defined as "transformation processes, which are observable over decades and influence the society as a whole."

Present megatrends are for instance:

- Demography: Global population growth, ageing societies and immigration, manpower
- Globalisation and global risk
- Climate change and scarcity of resources
- Technological change and digitalisation

Megatrends unavoidably build the framework all regions will have to cope with. Even though, the different megatrends may be more or less relevant for different regions. To be prepared for future developments, each region has to answer the following questions: What impacts do global long term developments in particular fields have on the regional economy? How is the regional economy positioned in order to deal with challenges resulting from megatrends or even to benefit from them? Which megatrends can especially be utilized?

3.6 SWOT-Analysis and key sectors

We suggest creating a summarising analysis of the region's strengths, weaknesses, opportunities and threats (SWOT).

With respect to strengths and weaknesses, we focus on:

- Wealth: General performance of the region relative to other regions.
- Employment: How did employment develop in the region? Which sectors were drivers?
- Industry structure: How is the region specialised? Did we observe a diversified industry or industry cluster? Which industries might be interrelated?
- Productivity: Which sectors are the most productive? Which industries contributed to productivity growth, which slowed it down?
- Capacity to compete of export oriented industry: How productive are the region's export-oriented industries in international comparison? Do the regional export industries have a productivity advantage?
- Innovativeness: Where did we observe patent specialisation? How well connected are researchers internationally and interregionally?

A region has to know its position in the world. Strength and weaknesses can be absolute, but often they are relative to competitors.

Opportunities and threats are assessed based on our analysis of the megatrends, the framework conditions as well as on the growth potential of the industry's sectors.

4 Conclusion

Our stepwise process uses a set of tools which allow for identifying key industries and sectors that should be focussed on when preparing a Smart Specialisation Strategy. It is crucial to summarize these results comprehensively. This includes balancing and prioritising of criteria such as productivity, innovativeness, size, specialisation etc.

Furthermore, competitive advantages are highly relevant. Competitive advantages are achieved through critical mass and excellence and often based on the creation of international value chains. Thus, they can be identified based on the size, productivity and innovativeness of a sector as well as on interregional or international interdependences. Analysing the region's industry with respect to the location of key sectors, framework conditions and long-term prospects plays an important role in this context. After the region's competitive advantages have been assessed, those results can be used to reinvent the economy.

5 Literature

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