European Commission

ESIC European Service Innovation Centre

REPORT

Summary Assessment of Upper Austria

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ESIC in brief

Increasingly service innovation plays an instrumental role in the transformation and upgrading of traditional economic sectors and industries into more productive, competitive and high value-added business eco-systems. Considered as being multi-dimensional in nature, service innovation comprises innovation in services, service sectors or service industries that are provided by service entrepreneurs and service firms. It also takes place in manufacturing industries, adding further value and contributing significantly to overall productivity and profitability. There is a growing need to assess, analyse and demonstrate what impact service innovation has on industrial change and to assist Member States and regions towards a greater understanding of service innovation as a driver of industrial transformation and future competitiveness.

The European Service Innovation Centre (ESIC) is a two-year initiative commissioned by the European Commission's Directorate-General for Enterprise and Industry to capture and demonstrate the dynamics and large-scale impact of service innovation as well as to assess how service innovation impacts on competitiveness, industrial structures and regional development. It will also focus on assessing the implications and impacts of service innovation on employment structures, economic patterns and on value creation.

Primarily, ESIC will provide customised advice to six selected model demonstrator regions (the Canary Islands, Emilia-Romagna, Limburg, Luxembourg, Northern Ireland and Upper Austria). The initiative will also help other Europe's regions and Member States to make better use of the transformative power of service innovation in strengthening existing and emerging industries and markets and to develop better industrial policies and smart specialisation / cluster strategies. The goal of creating a favourable eco-system for service innovation will boost supportive infrastructures and business conditions that, in turn, will facilitate the take-up of innovative services throughout the economy.

This work is a part of a service contract for the Enterprise and Industry Directorate-General of the European Commission.

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Introduction

A strong, healthy, high value-added services sector is essential for the efficient operation of a modern economy, for facilitating commercial transactions and for enabling the production and delivery of other high value added goods and services. Service innovation represents the systematic development, design and testing of new and/or improved service offerings, processes and business models, using multidisciplinary social science, engineering and technology-enabled models, methods and tools. As it addresses the whole economy and not only the service sector, service innovation is very relevant to achieving the EU2020 goals of smart, sustainable and inclusive growth.

In this context, the European Service Innovation Centre is instrumental in pointing up the innovation potential of service activities across Europe and supporting the assessment of how regions can both unlock their service innovation potential and increase their economic performance significantly.

The purpose of this summary assessment report is to assess whether the regional policy mix of Upper Austria is conducive to the emergence of new business sectors/models or the transformation of existing sectors/models, via the application of service innovation processes and concepts. This includes a mapping of the economic change induced by service activities and service innovation and also an assessment of policy options and policy support measures. Based on the analysis, the report provides policy recommendations for a systemic approach to policies and better support for innovative companies, which offers a favourable business environment conducive to structural change.

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Executive Summary

Upper Austria (UA) consistently ranks as Austria's most competitive region. Manufacturing is dominant in this region, and particularly the automotive, mechanical engineering, metal processing, chemicals, plastics, paper, wood and automation sectors. These highly specialised sectors have made UA the country's most export-oriented region. Despite this relatively good performance in manufacturing, it is also apparent that the development of knowledge-intensive services is increasingly lagging behind the rest of Europe and that opportunities to transform existing manufacturing strongholds through service innovation are not being fully realised.

A comparison of UA with other European regions and a series of face-to-face interviews with stakeholders in the region revealed that the present regional technological competences and knowledge base can be better exploited by using (innovative) services. The report identifies four ways in which the wide scope of manufacturing firms can benefit from services and service innovation, namely by:

- Using external service providers to outsource non-core activities;
- Acquiring knowledge on how to improve existing or new practices;
- Starting to think of their own service offering from a 'service-dominant logic'; and
- Providing services around, together with, or even instead of, goods.

Based on an analysis of developments in the current policy mix, it is evident that, although more and more stakeholders are aware of the potential of services, existing actions are still modest and fragmented. In recent years, however, the focus on services and service innovation has increased continually. Some formerly, technology-focused innovation policies have been re-oriented over time with the addition of schemes dedicated to services. This has resulted in a relatively large number of up-dated schemes and a rather complex governance structure. The new, strategic economic programme currently being constructed for the region includes the role of Knowledge Intensive Services (KIS) and how these can transform manufacturing, and there is a clear political momentum behind making this type of change. This programme is an opportunity to develop policies which will enable UA to use services to transform its traditional manufacturing based economy into a world class region. The way the region is bringing together various stakeholders including firms, academia and government institutes, to explore how services can help to increase its industry's strengths, represents a process of 'large-scale experimentation'. To this end, six policy themes or actions have been identified that deserve further deliberation and development:

1. Launching a cross-disciplinary Service or Servitisation Factory where leading edge research, education and entrepreneurs could meet and work together, facilitated (partly) by the government. Such a factory would need to be financed by the triple helix. It would also be essential to develop a strong identity and a clear strategic programme, along with incubator and intelligence functions for servitisation;
2. Refocusing existing policies, as most current policies largely ignore the relevance of services. The effect, efficiency and transparency of a transformative policy would benefit from a coherent and focused service-inclusive strategy rather than a multitude of small, and often isolated, measures;
3. Securing the supply of more skilled labour, which can be done by working on the brain drain especially of young people and by developing new curricula combining in-depth engineering knowledge with courses in business, strategy, design, environment and policy to create a new generation of engineers;
4. Fostering productive links between knowledge intensive business services (KIBS) and manufacturing firms within an ecosystem setting. This can be achieved by looking into the role of design, by developing a systemic approach to the development of highly specialised creative services as well as other KIBS, and by continuing to address servitisation, for example, in the activities of existing cluster organisations;
5. Supporting those processes of internationalisation that could combine 'local buzz' with international linkages. This can be achieved by actively tapping into international knowledge on servitisation, by making Upper Austrian success stories in servitisation more visible – *"if it's good tell others"* - and by becoming more open to international experts and targeted FDI;
6. Recognising the need to identify promising product-service combinations in the areas of health/ageing society, mobility and logistics, food and nutrition and energy, based on local strengths in manufacturing. Service innovation can increase the transformation throughout Upper Austria and is compatible with ambitions in other policy areas.

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1. The Challenge

The starting point of this assessment is the concept note *"For the application as a model demonstrator region with predominance of traditional manufacturing industries to receive advisory support from the European Service Innovation Centre"*. The response to this concept note was submitted by Upper Austria's Technology und Marketinggesellschaft (TMG), Unit 'Technology, Strategy and Programmes,' in summer 2012.

In this concept note, TMG addresses the question of how Upper Austria, as a heavily industrialised region, can benefit more from service innovation. Awareness of the potential of service innovation was acknowledged in the note with the following statement, *"Service innovation as such and innovative product-related respectively product-integrated services are major keys to maintain and increase the competitiveness in global markets. Technological innovation has to be accompanied by service innovation to offer innovative product-service-combinations to successfully compete with competitors from low-wage countries"*. Converting this vision into adaptations to its innovation policy is the objective TMG is currently dealing with as, *"The challenge for the innovation policy actors in Upper Austria lies in the development, formulation and implementation of adequate tools and instruments to enable, stimulate and enforce service innovations – both in the service as in the industrial sector – to ensure the future competitiveness, wealth and wellbeing of Upper Austria in the 21st century."*

How TMG, at the time of writing the concept note, was trying to take up her challenge, is explained as follows, *"The vision for Upper Austria is to become a model region for Smart Production through the intelligent combination of products and innovative services. Upper Austria aims to demonstrate to other traditional industrial regions in Europe, how the strategic shift to knowledge intensive production can be achieved and how the transformative power of service innovation, especially in the field of technical services, eco-efficiency, green engineering, design, and so on, can be unleashed".* One reason for the application for support from the European Service Innovation Centre was that Upper Austria is currently developing its next strategy and research programme. This provides TMG with an excellent opportunity to introduce service innovation into a comprehensive innovation strategy.

Reading guide

In this report, the region's performance and potential is initially described in Chapter 2, which covers the socio-economic context and, in particular, the strengths and weaknesses of the Upper Austrian innovation system. This chapter adheres to the perspective of innovation systems as a combination of 'functions' that jointly stimulate the creation and application of knowledge. Based on an appraisal of the region's sectoral structure and specialisations, the chapter also provides an identification of the main opportunities and demands for service innovation. The assessment by the ESIC team is compared with responses from a self-assessment tool (SAT), completed by four local stakeholders. In Chapter 3, the regional policy strategies and policy mix is discussed. This section contains an analytical overview of the extent to which Upper Austria's policy instruments are service-oriented. An actual assessment of the region's current and envisaged approach to service innovation is provided in Chapter 4. The report concludes with an outline of the main observations and the resulting policy considerations that deserve further attention.

2. Regional Performance and Potential

2.1. Socio-economic context for service innovation

General socio-economic situation

The federal state of Upper Austria, is home to around 17% of the national population, and is considered to be a rather prosperous region. In the latest available reports covering growth, prosperity, labour market, knowledge, and business costs, Upper Austria consistently ranks as Austria's most competitive state.[1] Similarly, in the 2012 regional 'innovation index', it ranks 66th amongst the 260 regions of all 27 EU countries.[2] This result, based on 130 OECD indicators can, in particular, be attributed to the exceptional strength of variables commonly associated with the outcome of innovation such as competiveness, income, labour and exports. Thanks to its traditionally strong manufacturing sector, Upper Austria's economic performance as "*the industrial motor of Austria's economy*" is largely due to the production of material goods that represents 26.3% of the national total.[3]

Upper Austria's relatively positive socio-economic status is demonstrated especially by its strong employment growth. Although the region suffered from the economic crisis, particularly in 2009, its rate of unemployment of 4.2% in 2012, compared to the national average of 6%, remains quite small. In terms of purchasing power per inhabitant it has an index value of 99 compared to the whole of Austria with 100, and its income per worker is 2.2% above the national average. Thus, Upper Austria's labour market has an average performance but substantial differences exist within the region.[3]

Specialisation in medium to high-tech manufacturing makes Upper Austria the nation's most export-oriented region. Austria's accession to the European Union in 1995 greatly boosted the trade in goods, resulting in the creation of more than 30,000 additional jobs during the period 1995-2007. In addition, the positive effects for the local economy, which grew by nearly 0.5 percentage points per year, also positioned Upper Austria in Europe's top league of regions with a high GDP per capita.

Despite Upper Austria still being the nation's second biggest economic powerhouse after Vienna, the region's economic per capita output is currently below the national average. The region's industries are facing more and more challenges due to the effects of globalisation and corporate mobility.[4] The desired development into a knowledge and information society demands new professions and qualifications. Currently, the proportion of low-skilled labour is relatively high. Apart from acquiring new skills, Upper Austria also recognises the challenges of maintaining existing competences and dealing with reduced labour supply and demographic change, as a result of an ever-ageing population.

Sectoral structure and innovation orientation

As already noted, Upper Austria's leading sector is manufacturing, specifically the automotive sector that represents 40% of Austria's output, followed by mechanical engineering, metal processing and manufacturing, chemicals, plastics, paper, wood, and automation. This is also reflected in Upper Austria's export quotas, which indicate the region's strengths in the vehicle industry (94.9% of national exports in this industry), foundries (86.9%), the electrical and electronics industry (74.5%) and the chemical industry (69.5%). Besides a few large established firms like Voestalpine that produces steel, many of the present medium-sized companies are suppliers to Original Equipment Manufacturers (OEMs) that produce products for German firms like BMW. Additionally, many Upper Austrian manufacturing firms are successful globally in highly specialised niches.

Over the past decade, concerns have been raised with respect to the region's position in terms of knowledge intensive services.[5] Whereas many strong economies contain a balanced combination of manufacturing and service activities, the latter have been relatively poorly developed in Upper Austria. Looking at industrial classifications, the proportion of employees in service jobs is around 65% of the Upper Austrian working population. Besides business-oriented services, prominent service sectors also include wholesale, retail and trade repair of motor vehicles, health and social work and tourism. It is estimated that the knowledge-

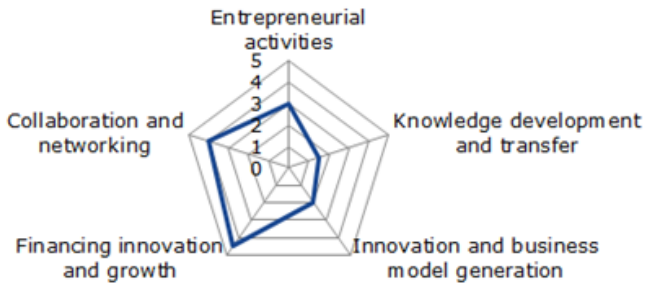
[1] StandortRADAR 2009: Österreichs Bundesländer im Wettbewerb. Internationales Central Europa Institut Wien, 2010
[2] InnovationsRADAR Upper Austria 2012. Internationales Central Europa Institut Wien, 2013
[3] Standort- und Technologiebericht 2012. TMG, 2012
[4] Press release (March 2013). Business, science and politics work together to solve pressing issues for the future
[5] Stahlecker, T. (2012). Regional Innovation Monitor: Regional Innovation Report Upper Austria (2012).

intensive service sector accounts for roughly a quarter of regional employment. Of course, this figure might be higher if service jobs within manufacturing industries were included.

Strengths and weaknesses of Upper Austria's innovation system

The figure below summarises observations that indicate the strengths or weaknesses in Upper Austria's innovation system, grouped per system function.[6]

Figure 1: Strengths and weaknesses per function of Upper Austria's innovation system



Function of innovation system	Strengths	Weaknesses
Entrepreneurial activities	Low administrative burden, attractive cultural environment, many start-ups	Most start-ups are based purely on technology.
Knowledge development and transfer	Reasonably good research landscape	Lagging education, brain drain, labour force demand for new skills
Innovation and business model generation	Strong innovation capabilities, high percentage of BERD, large share of patents	Innovation focused on manufacturing; low diversity in business models
Financing innovation and growth	High proportion of national research funds and FDI flows to Upper Austria	GERD/GDP below national average, lack of venture capital
Collaboration and networking	Strong clusters	Quality of (physical) infrastructure

When it comes to **entrepreneurial activities**, Upper Austria appears to be performing relatively well. The region considers its administrative organisation to be streamlined and highlights the short time taken by its administrative procedures, both of which are beneficial to entrepreneurship. Also relevant to the 'strong entrepreneurial basis' is the acclaimed allure of the local culture and environment, which are deemed to attract professionals and (new) companies. There were almost 5,000 start-ups in Upper Austria in 2011 and these represent 14% of all start-ups in Austria, with only Vienna and Lower Austria having a higher proportion. However, its start-up intensity of 7.5%, which is the percentage of registered firms being a start-up, is below the national average of 8%. The area claims there is a positive trend in the number of Upper Austrian start-ups, in which the lack of start-ups in R&D-intensive industries is partially compensated by an increase in R&D intensive business services.[7] Appeals have been made for more financial support for young companies with high growth potential that might result from university spinoffs.[3]

In **knowledge development and transfer**, Upper Austria is currently facing considerable challenges. Indicators of the strength of the region's research base appear to be somewhat inconsistent. On the one hand, the region is reported to have a strong research landscape, both when it comes to university and non-university research activities.[3] On the other hand, there are signals that public research and education are relatively weak.[5,2] Part of this apparent contradiction can be explained by the fact that the region's well-developed study and training opportunities are in permanent competition with other regions. Existing concerns in this respect focus on technology transfer and the availability of qualified personnel. The proportion of people with higher educational qualifications is known to be relatively low in Upper Austria, and this is recognisably a crucial factor in restructuring the economy. It is worrying that large numbers of students are leaving the region and heading for large cities like Vienna or Graz, or crossing national borders after completing their education. In order to counter this 'brain drain', significant attention is currently being paid to 'return migration' and to attracting foreign students, teachers and scientists. In addition, the need

[6] For more information about the functionalist perspective on innovation systems, see e.g. Wieckzorek & Hekkert, 2012.
[7] Regio 13, Impulse for Upper Austria. Business development and start-ups, company transfer, venture capital.

for new skills might affect job security for the existing working population. Progress in life-long learning is reported to be average, and offers possibilities for the further enhancement of the innovation system.

The current status of Upper Austria's **innovation and business model generation** is demonstrating an exceptionally high innovation capability amongst local SMEs.[2] Also private innovation investments are reported to be relatively high. Business expenditures amount to 77.4% of the region's total R&D spending, which considerably exceeds the national average, and is 21.1% of the national BERD (2009 figures). Although overall figures do not reveal what type of R&D activities firms engage in, for example, whether the focus is on technology or services, expenditure relies heavily on the research performed by a very small number of large manufacturing enterprises. Looking at employment in R&D, there are nearly 9000 FTE in Upper Austria in 2009, which is 11.7% higher than 2007, and represents 15.9% of all researchers in Austria. Thus, Upper Austria only ranks behind Vienna with 35.9% and Styria (18.9%). In terms of patents, the innovativeness of local firms also appears to be reasonably high. Based on 2010 and 2011 figures, Upper Austria ranked first amongst Austrian regions in terms of patents granted at the Austrian Patent Office (APO) as well as the European Patent Office (EPO), and second in terms of APO registered trademarks, EPO patent applications and APO patent applications per inhabitant.

What the above figures do not reflect is the concern that innovative efforts are very focused on manufacturing. Although this has helped Upper Austria to gain a competitive edge, there are fears about the sustainability of this strategy, especially in the light of increasing globalisation.[5] One criticism that has been made, is that local firms are poor at exploring new business models. Rather than commercialising present (technological) competences in various different ways, there is still a major focus on simply producing and selling goods.

With respect to the government's role in **financing innovation and growth**, Upper Austria's expenditures on research and development are more or less in line with its position as Austria's second-largest region. With 16% of gross domestic expenditure on R&D (GERD), Upper Austria ranked third in 2009. As for the region's economic output that had a GERD of 2.59%, in 2009, and 2.17%, in 2010, this performance was somewhat lower than that of other regions. However, Upper Austria managed to obtain a considerable amount of research funding from national institutes that support research such as the Research Promotion Agency (FFG). Upper Austria and Vienna are both major beneficiaries of these research funds, with each receiving 25% of the funds' annual budgets. Although the funds are primarily aimed at academia, firms benefit from the fact that cooperation with industry is often required. Also relevant in this respect is the fact that Upper Austria received 41% of its loans from the Austria Business Service (AWS), which aims to support research projects with close links to market commercialisation. The fact that a high proportion of R&D projects is co-financed by industry also testifies to the presence of a strong entrepreneurial base.

Apart from regional and national support, Upper Austrian firms also benefit from investments from foreign companies. For example, about €11.4 billion, or 13% of Austria's total incoming FDI, flowed towards Upper Austria, in 2009. This accounted for 35,000 jobs in 371 companies, which correspond to 15.5% and 14.4% of the national total, respectively, and these are relatively, though not exceptionally, high. Comparatively higher is the number of firms with foreign shareholders. The only issue reflecting a weakness, in Upper Austria's ability to finance innovation, is the lack of venture capital.[2]

Finally, **collaboration and networking** are strong features of Upper Austria's innovation system.[2] For instance, in 2010, the European Cluster Observatory identified one three-star cluster in production technology and five two-star clusters in: Building fixtures, equipment and services; Furniture; Lighting and electrical equipment; Metal manufacturing; Sporting, recreational and children's goods. In 2000, there were no three-star clusters but the region had seven two-star clusters in: Building fixtures, equipment and services; Furniture; Heavy Machinery; Metal manufacturing; Processed food; Production technology; and Sporting, recreational and children's goods.

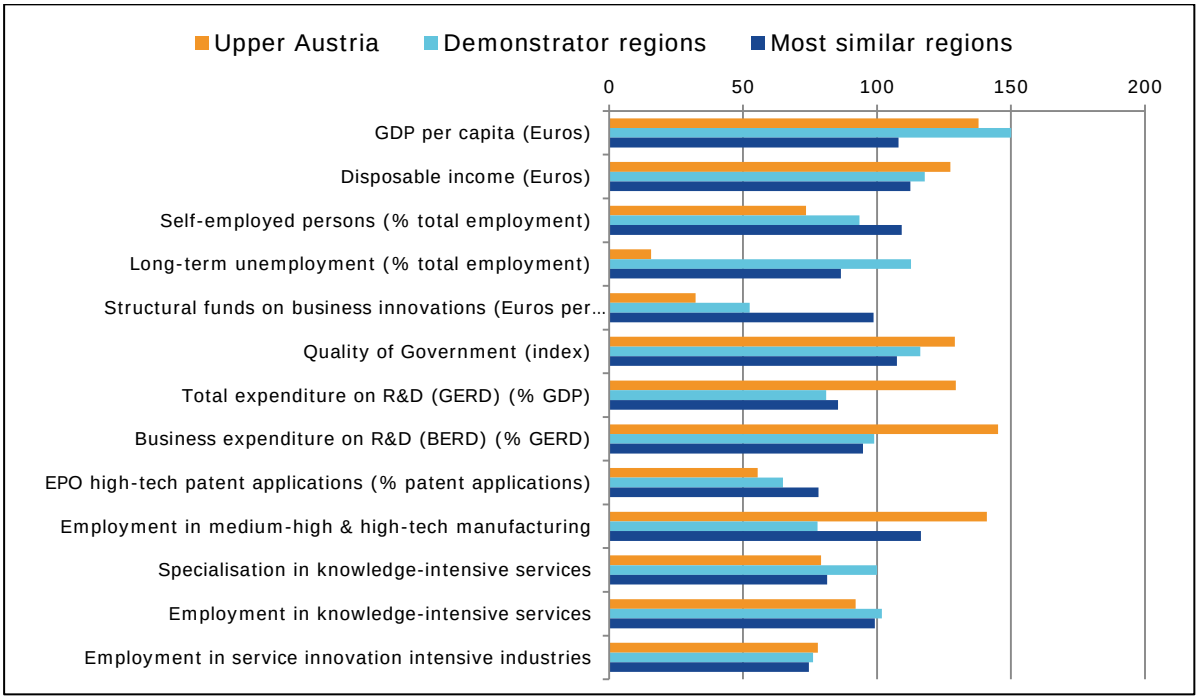
In the context of this study, it is remarkable that all the starred clusters are predominantly oriented towards goods. The **infrastructure** conditions are of great importance in this respect. Whereas Upper Austria's ports are relatively well positioned for tri-modal transport, the region recognises the need to improve and expand its motorways. Significantly, although not exceptionally better, is the quality of broadband and the ways in which it is used.2 Despite delivering a great share of the economic value, traditional specialisations are expected to become partially obsolete due to falling transport costs and the liberalisation of trade in goods. One of the ways the region is aiming to cope with the threat of globalisation is by seeking strategic international partnerships and strengthening international cooperation, for example, through involvement in European research programmes.

2.2. Regional benchmarking

Benchmark analyses based on data from the European Service Innovation Scoreboard (see Appendices C and D), enables the characteristics described in section 2.1. to be placed in a wider perspective. Comparing the strengths and weaknesses of Upper Austria's innovation system with other demonstrator regions, similar

European regions,[8] or the average of all European regions (EU27), gives us a better picture of its relative performance. A comprehensive view of the regional specificities of Upper Austria will, in turn, be helpful in assessing which (service) innovation policy interventions might be appropriate. In the next figure indexes for several key indicators are presented.

Figure 2: Index-based benchmark of Upper Austria, EU27=100



First of all, benchmarking reveals that whereas Upper Austria's GDP per capita might be below the averages in Austria and other demonstrator regions, it is still high compared to the EU27 and most similar regions. Upper Austria's apparent weakness in terms of economic output can also be underlined by looking at its labour market. Although not as productive as other demonstrator regions, Upper Austria's disposable income is relatively high and long-term unemployment is very low. Consistent with these observations is also the finding that only a few people in Upper Austria are self-employed compared to the EU27, the demonstrator and most similar regions.[9] Together, these benchmarks indicate that Upper Austria's socio-economic system is relatively prosperous, with a modest GDP per capita being compensated for by strong social conditions.

With a GERD of 2.17% in 2010, Upper Austria has an above-average share of total R&D expenditures (GERD), compared with the benchmark regions. As already noted, the high contribution of private businesses is rooted in the industrial character of the region. Equally, the high number of patent applications to the EPO and the above-average proportion of employment in medium-high and high-technology manufacturing highlight the research and innovation intensity of this region's industries. This is also confirmed by the number of starred clusters. Nevertheless, Upper Austria has below average numbers of high-technology patent applications to the EPO, which shows that the regional industry is strong and innovative, but in sectors that do not predominantly belong to high-technology fields.

Recognising that its specialisations might not be a sustainable source of wealth, when facing competition from countries where wage and natural resources costs are lower, Upper Austria is increasingly seeking to add value to its products and an aspect that is important in this context is the fact that regional strength in high and medium-high technology manufacturing sectors corresponds with a slightly weaker position in knowledge-intensive services. Employment and specialisation in knowledge-intensive services reveal overall below-average figures for Upper Austria. Over the past decade, the proportion of employment in knowledge-intensive services has not shown much variation. The modest development of a 0.74% shift in employment is below the benchmark regions and the EU27 levels. Also the regional proportion of employment in service innovation intensive industries is below the EU27 average, but does show a slightly above-average or similar position when compared to the demonstrator and the most similar regions. The same pattern can be seen

[8] See Annex D for clarification of how similar regions are identified.
[9] Given Upper Austria's concern with its ageing population, it is remarkable that across all comparisons, the region has a low proportion of older employees.

when looking at the change in proportion of employees in service innovation industries between 2000 and 2010.

In sum, the benchmark demonstrates that although Upper Austria is currently performing well, progress in knowledge-intensive services is increasingly lagging behind the rest of Europe. Comparing the situation of Upper Austria with other demonstrator regions provides ample opportunities for mutual learning.

Based on these indicators, it is possible to provide a comparative impression of the strength of the functions in Upper Austria's innovation system. The structural indicators in the table below are largely in line with the quantitative and qualitative assessments reported earlier. Collaboration is strongly developed; albeit not in service-oriented directions, whereas entrepreneurship and knowledge development, notably in terms of education and not when it comes to the share of researchers or GERD, are recognised as being weaker. Moreover, innovation and business model generation is only confirmed to be strong, in the field of technology, and not in service innovation.

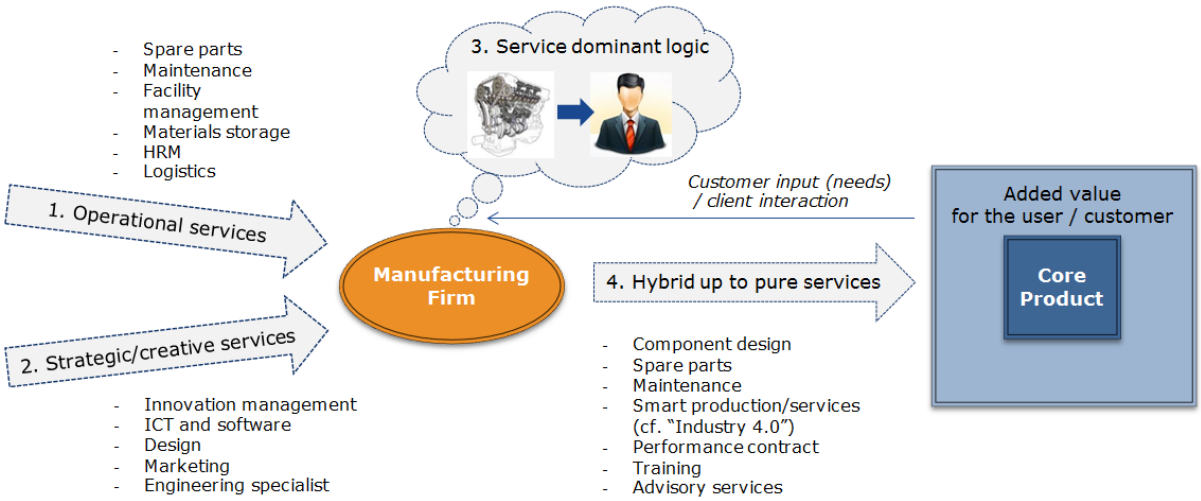
Table 1: Structural indicators for the functional strengths of Upper Austria's innovation system (retrieved from European Service Innovation Scoreboard, ESIS)

Function of innovation system	STRUCTURAL INDICATORS	REGIONAL VALUE (2010)	EU 27 (2010)
Entrepreneurship activities	Self-employed people (%age total employment)	11.1	15.1
	Labour productivity growth	1.58	2.20
	Start-up intensity	7.5	8 (national average)
Knowledge development and transfer	Total expenditure on R&D (GERD) (change in the %age of GDP)	2.17	1.68
	Share of employees with a higher education degree (in %age)	17.2	30.4
	Share of researchers among employees (in %age)	0.62	0.34
Innovation and business model generation	Business expenditure on R&D (BERD) (%age of GDP)	88.9	61.3
	Employment share in medium-high-tech and high-tech manufacturing	8.83	6.39
	Employment share in knowledge intensive services	28	35.32
	Employment share in service innovation intensive industries	3.8	4.85
	Companies with service innovations (in %age)	14.2	8.1
Financing innovation and growth	Gross Fixed Capital Formation (%age of GDP)	19.2	-
Collaboration and networking	Share of innovators collaborating with others (in %age)	23.2	9.9
	Specialisation in service-oriented clusters	0.66	0.87 (demonstrator average)

2.3. Opportunities and demand for service innovation

The typical strengths of the industrial region of Upper Austria or 'Industrieland Oberösterreich' lie in its manufacturing sectors. The competitiveness of the present technological competences and knowledge base can be better exploited by making use of (innovative) services. From the region's manufacturing perspective, four main forms of opportunities and demand for service innovation can be distinguished (see Figure 3).

Figure 3: Demand and opportunities for (innovative) services in a manufacturing context



1. To start with the demand-side, manufacturing firms can be helped to develop their core competences effectively by relying on high quality expert services. An ecosystem that facilitates further specialisation requires a sufficient amount of services to which non-core activities can be outsourced. Organisational support can be provided in the form of engineering, administrative, financial or legal services. A local example of a lean manufacturing firm that outsources services to capable industrial service suppliers is MIBA, which is known globally, amongst other things, for its leading position in engine bearings.

2. Besides taking over 'ordinary' operational processes, knowledge-intensive services can also contribute on a more strategic or creative level. Typically, this relates to service providers in the fields of design, marketing or innovation management. By relying on these types of services a (manufacturing) firm can potentially improve, or even renew, its products whether these are in the form of goods or services. For instance, involving a communication agency might provide complementary knowledge that enables a firm to develop a better branding strategy for its products, thereby increase its potential to commercialise these in existing or new markets.

3. Thirdly, manufacturing firms aiming to increase their added value might adopt a so-called 'service-dominant logic' (Vargo & Lusch, 2004). This marketing-based line of thinking shifts the attention from the technological and physical characteristics of a product, towards the functionality or 'service' it provides. Accordingly, a firm's ultimate objective then is not just to deliver artefacts, but to fulfill a need. This perspective acknowledges that the value of a firm's output always depends on how it is used. A central concept within the service-dominant or S-D logic is therefore co-creation of value - by engaging in close interaction with its client, a firm can develop a better understanding of the consumer's actual needs. Even when bound to a tight contract for supplying diesel engines to a car manufacturer like BMW, thanks to S-D logic an Upper Austrian supplier might discover what BMW really requires. By developing a better relationship with their clients, firms might discover new possibilities for adding value to their core product. In addition, this 'pulling of ideas' might kick-start the exploitation of the opportunities offered by using innovative services, whereby a manufacturer uses service development to 'push' additional solutions.

4. Finally, thinking in terms of services, manufacturing firms can decide to add value to their products by actually delivering a range of services themselves. A common way to do this is by providing services 'around the product', which include activities such as maintenance, materials storage and spare parts

delivery. A further step in the process of hybridisation lies in the various possibilities to truly integrate goods and services. In the most extreme form of servitisation, manufacturing firms stop producing goods themselves, and focus on commercialising their knowledge through services. Knowledge-intensive industrial services such as specialised engineering advice represent a growing commercial area for businesses supplying solutions to end users.

BOX 1: EXAMPLES OF LOCAL FIRMS TRANSFORMING INTO MORE SERVICE-ORIENTED BUSINESSES

Various Upper Austrian firms have already been able to adopt a strategy or even actual business models in which services have a prominent role. A good example of a 'smart service' is the distance condition monitoring by Anger Machining, an Upper Austrian firm specialised in high speed cutting machinery. Instead of simply providing machines and ordinary maintenance services, Anger uses online communications technology to continually keep track of its products' performances. In this way, Anger learns more about how its machines are used, when various types of maintenance are required, and how product performance can be improved. The knowledge acquired also improves its advisory services.

Another notable example of local servitisation is the well-known firm Rosenbauer, a worldwide top-3 producer of firefighting equipment. Besides regular services like refurbishment, including spare parts and recycling, Rosenbauer also offers all sorts of training programmes. Just like Anger, the firm has also started to deliver online condition monitoring. Service4fire is a smart service which provides an equipment owner with real time data on the status of various product attributes. Finally, genuine S-D logic is demonstrated in Rosenbauer's decision to start offering 'fire safety', as it does to Linz airport. By not only offering trucks, gloves and helmets but a total solution, Rosenbauer is able to meet more of its customers' needs and also make more profit.

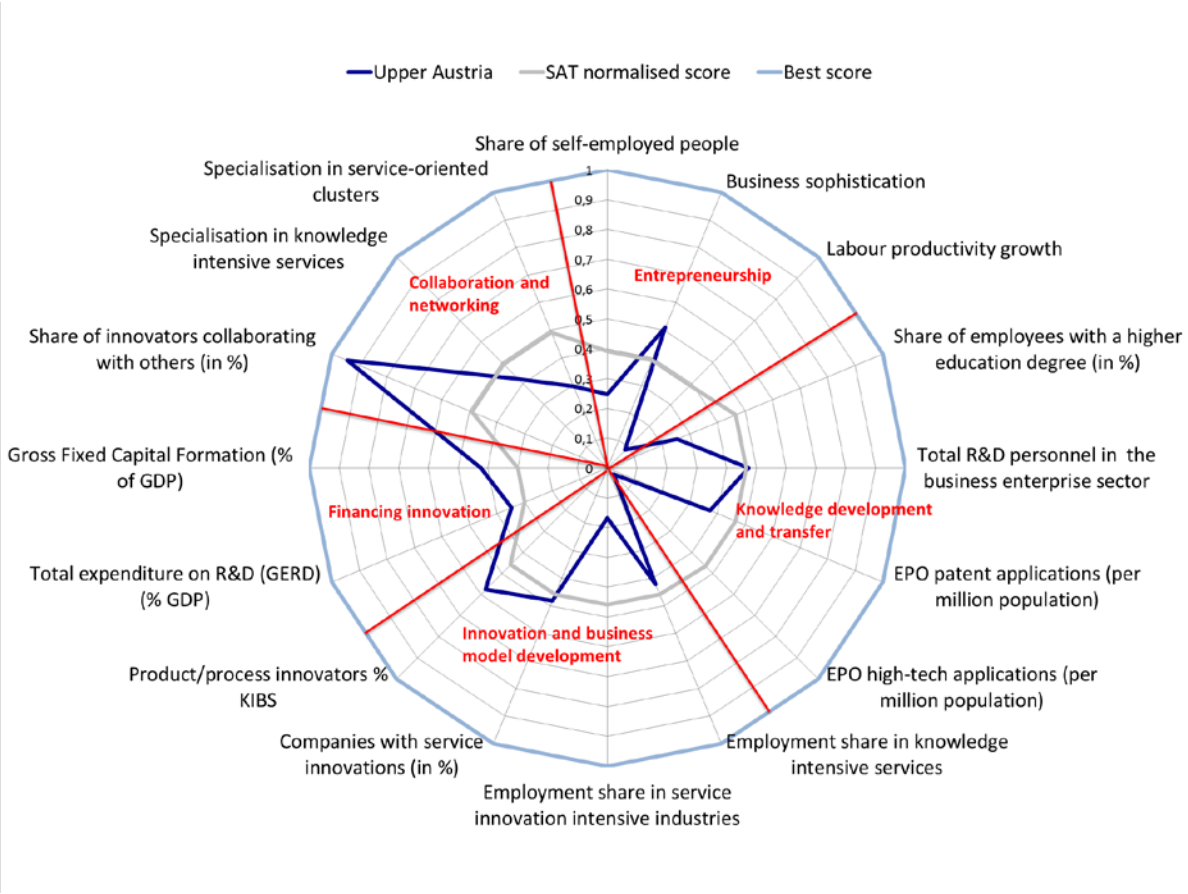
Similar developments have taken place at Fronius. Headquartered in Pettenbach, in Upper Austria and also located at other nearby sites including a sales office in Wells, Fronius offers battery charging systems, solar electronics and welding technology. Although the latter might be mainly associated with physical equipment, Fronius not only earns money from selling its machines. The comprehensive service package it offers includes common services like maintenance, pre-assembly and testing, warranty and installation. Some of these are included when a client buys a piece of equipment, but for others, Fronius can charge extra fees. This is, for instance, the case when firms hire an expert trainer to train, and even certify, their own personnel. Its innovative development 'Fronius Virtual Welding' is a combination of hardware and software that enables welders to practice in a kind of simulator. Thanks to the guidance of a virtual instructor, and with no need to use actual material, this service, which is based on paid registration and low-cost updates, is regarded as being highly cost-effective. Fronius is yet another example of an Upper Austrian firm that is adopting new, service-based, business models in order to commercialise its experience and expertise and assist clients in different ways.

2.4. Assessment of regional performance and potential

To sum up, Upper Austria (UA) consistently ranks as Austria's most competitive region. Particularly strong points of its innovation system are the functions of collaboration and networking and financing innovation and growth. When it comes to entrepreneurship, knowledge development and business model generation, the region appears to be suffering from difficulties in adopting a service-oriented approach to innovation. This is related to the fact that manufacturing has traditionally been the dominant sector in the region, in particular the automotive sector, mechanical engineering, metal processing, chemicals, plastics, paper, wood and automation. These highly specialised sectors have made UA the country's most export-oriented region. In order to sustain this, Upper Austria should recognise and exploit opportunities to infuse existing manufacturing strongholds with service innovation. This could be done either by increasing the presence of enterprises that take over operational services or contribute strategic and creative input, or by adding smart service concepts to manufacturing-oriented business activities.

An additional way to provide an overall assessment of the performance of Upper Austria's innovation system is by benchmarking the strength of its system functions against the best scores of the five other demonstrator regions studied by ESIC and Figure 4 below shows the results. Again, collaboration is observed to be a strong point, whereas functions like knowledge development and business model generation score substantially lower than the best scores. The figure also includes normalised scores obtained from a self-assessment tool (SAT) that was completed by stakeholders in Upper Austria (see also section 3.3). The impressions of the local stakeholders are remarkably close to the results of the comparison between demonstrator regions.

Figure 4: Strengths of Upper Austria's innovation system, benchmarked against the best scores of other demonstrator regions.



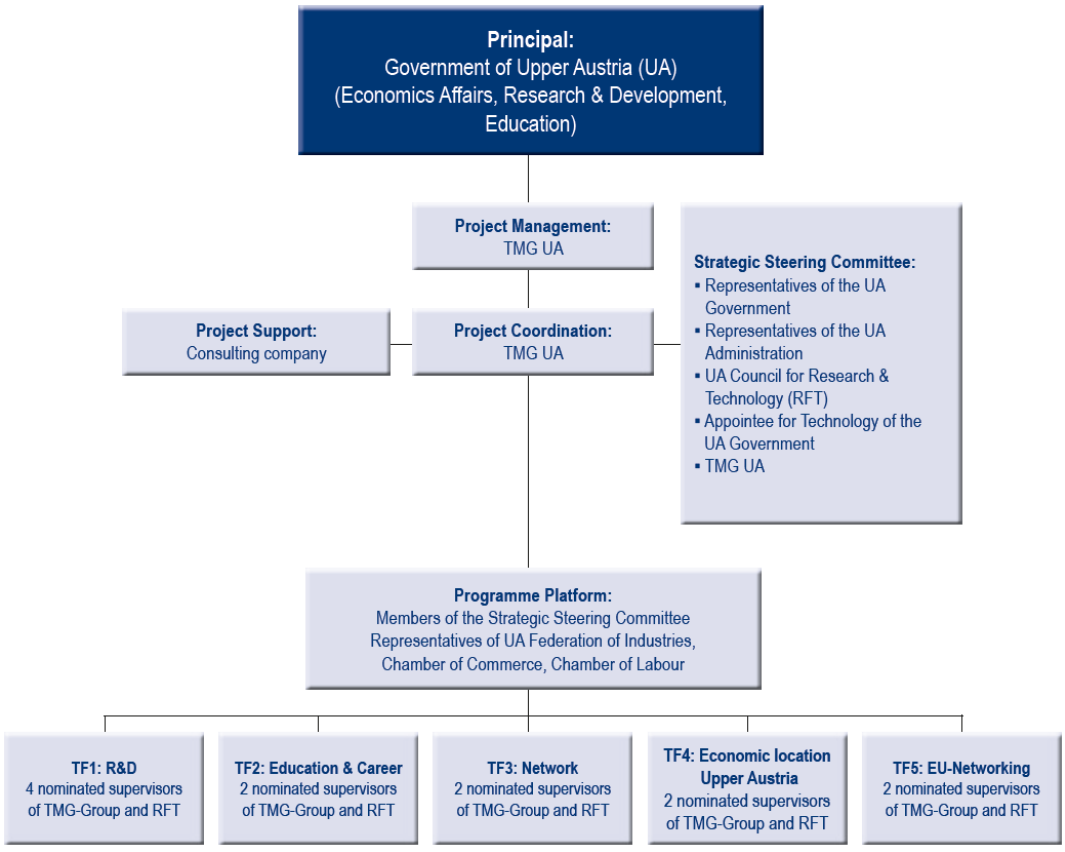
3. Regional Policy and Policy mix

3.1. Innovation policy and institutional background

Innovation policy governance

As a federal state with a significant degree of autonomy, Upper Austria is heavily involved in shaping its regional innovation system. Especially over the past two decades, the region has developed a governance structure that is intensively involved in implementing policy instruments, which supplement those deployed at national level. Selling off publicly-owned company shares created the funding to implement a broad range of policy interventions, as part of multi-annual strategic programmes. Figure 5 is taken from 'Innovative Upper Austria 2010+', pp. 15,[10] and shows the actors that are responsible for the design and execution of the current programme.

Figure 5: Governance structure of the Strategic Programme 'Innovative Upper Austria 2010+'



Ultimately responsible for the strategic programme are two directorates or departments of the Upper Austria Government, covering 'Education and society' and 'Regional planning, the economy and rural development," respectively. In the context of innovation policy, both departments are advised by the Council of Research and Technology. However, as the figure above indicates, the actual design and implementation of strategic programmes are largely in the hands of Technologie und Marketinggesellschaft (TMG). Previously involved in location marketing and innovation and technology policy, TMG's activities in, and beyond, the strategic programmes make it a dominant player in Upper Austria's innovation system.

[10] TMG (2010) The Strategic Economic and Research Program Innovative Upper Austria 2010+.

Although originally set up to manage Upper Austria's first strategic programme, TMG is currently part of a central authority, Upper Austria Innovations Holding, covering other key institutions as well. The most notable subsidiaries are Clusterland Upper Austria, Upper Austrian Research, and CATT Innovation Management.

Strategic and Economic Research Programmes

With the development of its first Strategic and Economic Research Programme, Upper Austria launched a new era of innovation policy. The 'Upper Austria 2000+ Strategic Programme' ran from 1998 to 2003.[11] A budget of € 300 million, € 80 million of which was contributed by the State Government, aimed to provide support for technology/R&D, trading and qualification and location marketing. Based on positive evaluations, a new programme named 'Innovative Upper Austria 2010' was implemented in the period 2004-2010.[12] This time, with a budget of € 600 million, one third of which was provided by the authorities, the programme covered the five similar areas of R&D, professional qualifications, networks, the economic and technology location of Upper Austria and EU networking. Those areas also form the core of the extended 'Innovative Upper Austria 2010+', for which € 450 million, again with one third from the government was allocated for the period 2010-2013.[10]

Through 14 strategies and 37 measures, Innovative Upper Austria 2010+ focuses on: supporting mechatronics, business locations and location development; increasing international student exchanges; expanding clusters to form professional cooperation platforms; energy management, energy efficiency and renewable energies; direct funding of innovative cooperation projects; promotion of the creative economy and knowledge-intensive services; securing the presence of highly qualified personnel in Upper Austria by means of attractive conditions; and innovation benchmarking with leading countries. When it comes to choosing which industries to support, Upper Austria opts for domains in which both industry and science are strong, adopting a 'Double Strongpoint' strategy. Rather than copying international mega trend technologies, there is a preference for developing innovation leadership in niches.[13]

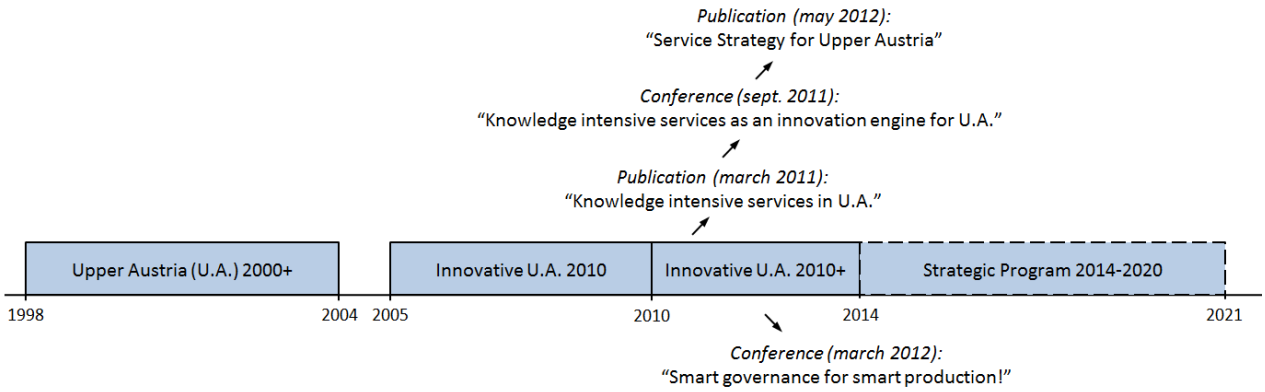
Having been commissioned by the Upper Austrian Government and Council of Research and Technology, TMG is currently engaged in developing the 'Strategic and Economic Research Programme of Upper Austria 2014 – 2020'. Following its tradition of policy design in close interaction with regional stakeholders and experts, this is being done by inviting various parties to reflection meetings for joint vision creation and setting out a call for ideas on which domains should be addressed and how.[14] The core strategies this time will be: site development; industrial leadership; internationalisation; and future technologies. Additionally, the main focus will be on action fields including: industrial processes; health/ageing society; energy; food/nutrition; and mobility/logistics.

The focus on service innovation

At a first glance, Upper Austrian strategies with respect to economic change seem to be largely focused on supporting technological activities. In recent years, however, services and service innovation have been developing gradually and the timeline in Figure 6 illustrates the crucial milestones in this development.

[11] TMG (1998). Strategic Programme Upper Austria 2000+.
[12] TMG (2005) The Strategic Economic and Research Program "Innovative Upper Austria 2010".
[13] Brandstätter, C. (2012). Smart Governance for Smart Specialization Upper Austria.
[14] Press release (June 2013). Make Upper Austria fit for global competition - increase momentum for innovation in UA.

Figure 6: Timeline with events demonstrating a focus on service innovation



In the first strategic programme, which laid the foundations for successive programmes, innovation mainly referred to topics like strengthening technology transfer and support for future technologies. One of the rare places where services appear is in one of 13 guidelines related to innovative tourism. Here, however, innovation is merely seen as an adaptation in the sense of *"use of electronic information, reservation and booking systems".* The other context in which services are mentioned is in enhancing the strength of Upper Austrian clusters. Although these are all focused on manufactured goods, the strategic programme does acknowledge the unexploited potential of including production-related services within a business environment, *"By international standards, the industrial services sector is underdeveloped, primarily due to demand problems."* It is remarkable that rather than supporting private enterprises in the domain of production-related services, actual policy measures involve the delivery of public services for information and consultancy services, as well as educational and lifelong-learning measures for professionals.

The subsequent strategic programmes are largely consistent with the original programme. Technological development and technical education are key issues. Looking at the focus of Innovative Upper Austria 2010, R&D is particularly well-supported in the fields of mechatronics, information and communications technology, life sciences, innovative materials and logistics. Only logistics is a service sector, but it is not approached as such. Again, the programme mentions services predominantly in the context of 'high quality tourism' on the one hand, and inclusion of commerce and industry-related services suppliers in clusters on the other. With respect to the latter, the government intends to provide more business-related services, as evidenced by the multiplicity of policy measures on this topic.

The introduction of 'Innovative Upper Austria 2010+', currently in its final phase, marks a slight shift in awareness of, and commitment to, unleashing, the transformative power of services. Measure '26', part of the topic 'Upper Austria as a business and technology location', is called 'Creative economy and knowledge-based services'. Here, as evidenced below, explicit attention was paid to the way services could strengthen the regional industry, and their current status[15]:

- *"Knowledge-based services and the creative economy are growth sectors and drivers of innovation. As a region with a high proportion of material goods production, Upper Austria has to open itself still more to the trend to the service society and especially to emphasise knowledge-based enterprise-oriented services. The adaptation to these business branches, whose structures and peculiarities represent considerable departures from those of classical branches, poses a great challenge for Upper Austria. It is important for Upper Austria to address itself directly to the protagonists of the creative economy with various well-aimed measures and to make its existing creative potential more visible."*
- *"Because of the great importance of this sector, the goal of the activity area 'knowledge-based services' is to elucidate its current situation in Upper Austria in respect of its innovative behavior, as well as its critical success factors for the growth of enterprises. A special focus should therefore be placed on the area of industry-oriented services."*

Despite acknowledging the transformative power, the financial dimensions of the measure fall into the lowest category of < € 1 million. Envisaged activities include the actual *"preparation and implementation of specific subsidising instruments and supporting structures for the service sector'"*, but most actions merely involve *"awareness-promoting activities, PR work, the organisation of workshops, training sessions,*

[15] The Strategic Economic and Research Programme "Innovative Upper Austria 2010+", p. 104.

competitions and events". Effectively, the measure mainly led to initial investigations into the importance of services, in order to develop and implement actual innovation policy measures later on.[16]

As demonstrated by the timeline, a research report was one of the first results of 'measure 26'. Together with the Upper Austrian Industrial Association, TMG commissioned the consultancy firm Pöchhacker to write the 2011 study on knowledge intensive services (KIS).[17] In line with the perspective of earlier strategic programmes, the report focuses on 'Hybrid Value', which refers to the strategic importance of industry-relevant, technology-oriented services in the manufacturing and services sectors.[18] Academia Superior, a society for future research that characterises itself as a think-tank for Upper Austria's socio-economic challenges, promoted the report at the conference: *"Knowledge-intensive Services as an innovation engine for Upper Austria"*. At this event, the potential of hybrid value creation was emphasised by the Federal Minister for Economy, Family and Youth (BMWFJ), the Managing Director of the Austrian Research Promotion Agency (FFG), as well as Upper Austrian politicians, including the current Minister of State for the Economy and the President of the Junior Chamber, and various international experts. Moreover, representatives of a wide range of institutions and enterprises joined in discussions concerning the role of KIS in relation to health and social services, energy and the environment, ICT and the digital society, and the creative industries.

In the official reaction of the Upper Austrian Government, companies were also represented.[19] This gives the impression that KIS was on the agendas of a variety of innovation system actors by mid-2011. The President of the Industrial Association Upper Austria, for example, stressed that it was time to modernise the Upper Austrian economy by shifting to smart service solutions, developed either internally or by service providers. The fact that the successful fusion of goods and services can create jobs was regarded as a reason why government support was needed.

Following up the conference, Academia Superior and the Junior Chamber of Upper Austria asked Pöchhacker to develop a 'Service Strategy for Upper Austria'.[20] Added to the earlier preparatory study, this strategy aimed to provide concrete opportunities for promoting KIS.[20] A major source was the interactive strategy forum that Academia Superior organised in May 2012. Its recommendations are related to improving the framework conditions for a knowledge-based economy. For example, increasing awareness and understanding by developing education and research structures devoted to service science, the establishment of a programme for the funding of service innovations in Upper Austria, strengthening KIS companies by empowering them to enter new markets and customer groups and providing a dedicated financing and funding portfolio, and the promotion of hybrid value creation by developing the potential for cooperation between universities and industry in the design of product-service combinations and partnerships.

Another result of the increased focus on KIS was an action plan for smart production, hybrid value creation and knowledge-intensive services in Upper Austria.[3] Accordingly, in August 2012, TMG and the Upper Austrian State Ministries of Research and Economics organised a workshop on 'Smart governance for smart specialisation!' Again, science, business and politics were all represented. Although services were scarcely mentioned, service industries were reported as being one of the four economic sectors which the next smart specialised strategic programme will target – the others being life sciences, logistics and renewable energy. Further reports indicate that services and smart specialisation were increasingly being seen to relate to one another.[16]

This section demonstrates how Upper Austria's attitude towards service innovation has become more specific and specified over time. Having a widely-shared and focused vision, TMG is currently incorporating the role of KIS in relation to manufacturing business into the new strategic programme.[21] According to the recently appointed Minister of State for the Economy, a sophisticated service innovation strategy, including a funding programme, is likely to be included in this strategy.[22] The actors currently involved in service innovation are shown in Appendix E.

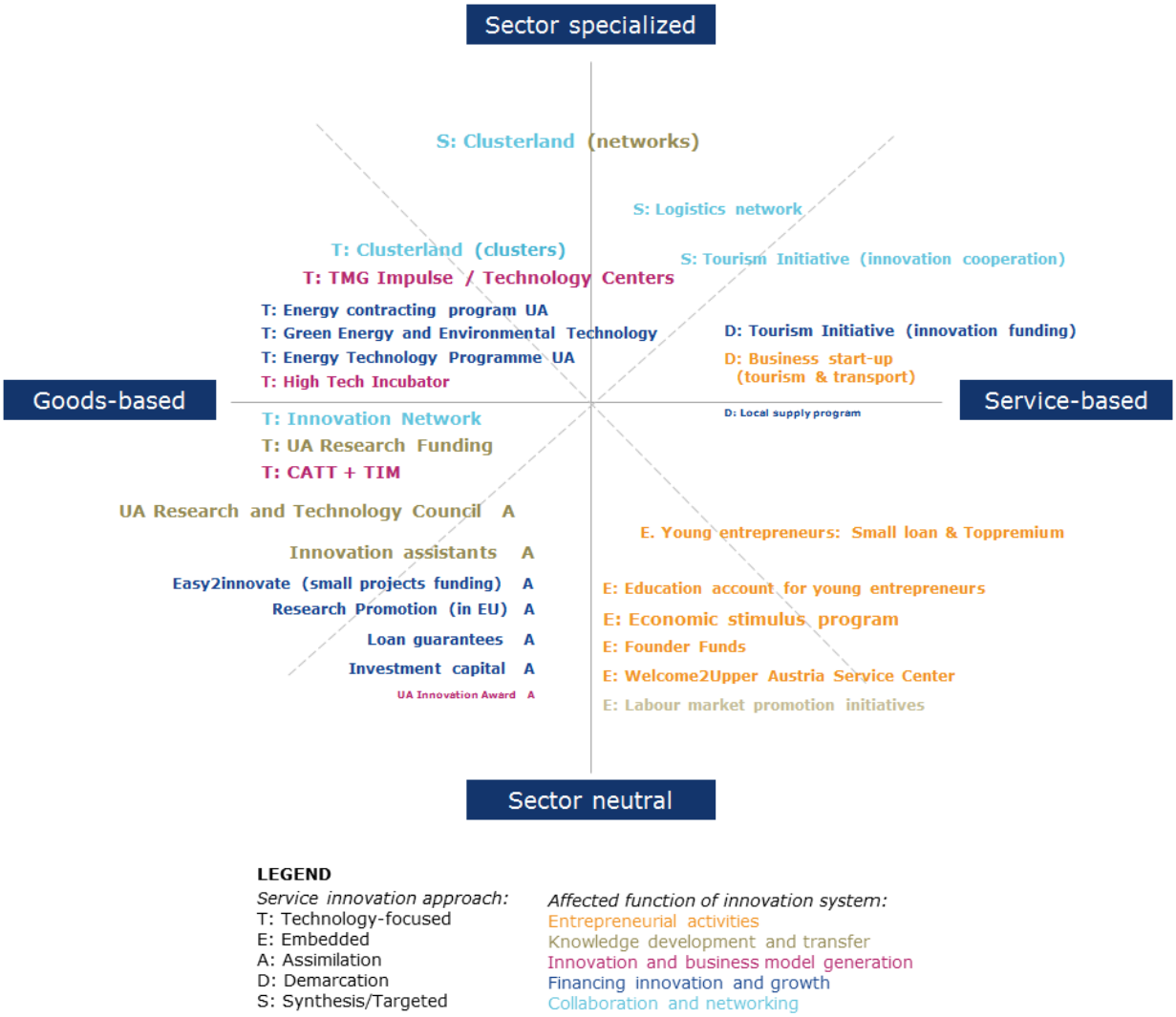
3.2. The policy mix

Within Upper Austria, the variety of regionally governed policy measures relevant to structural change is relatively large. Besides interventions clearly aimed at innovation that are often implemented in the context of strategic programmes, other types of policy instruments are also important to economic performance and growth.

[16] Midterm Assessment Innovative Upper Austria 2010+, 2012
[17] Pöchhacker Innovation Consulting [P-IC]. (2011). The strategic importance of industry-relevant technology-oriented services in the manufacturing and services sectors for Upper Austria. Linz.
[18] Press release (March 2012). Study proves: Knowledge-based services and smart production on the rise.
[19] OÖ2010plus (March 2012). Smart Production: Knowledge-intensive services provide high added value in Upper Austria.
[20] Academia Superior (2012). Upper Austrian Services Strategy.
[21] TMG (2012). Concept note on ESIC demonstrator region calls for proposals.
[22] Press release (April 2013). Equip business community of Upper Austria for global competition.

Figure 7 provides an analytical overview of the regional policy mix (see Appendix F for references to individual policy measures and more detailed information). Current policy measures are plotted on a matrix in which the horizontal axes indicate the extent to which a certain measure is specific to goods or services. If a measure is not particularly dedicated to either of these domains, the vertical axis enables a distinction to be made between measures that are not specific for any sector at all or 'neutral' and measures that explicitly address goods or technology and services activities or sectors at the same time and are thus, 'specialised'. These axes correspond to a great extent with common classifications for the way service innovation is addressed by policies or the 'Service innovation approach', marked by the letters T, E, A, D and S,[23] which are applied when presenting Upper Austrian innovation policy measures. The colours, in turn, refer to the earlier used functions of the innovation system to which a particular measure is relevant.

Figure 7: Categorisation of regional policies



Firstly, a large proportion of policy measures is exclusively focused on technology (T) and thus, these measures rarely address the topic of services. In Upper Austria, this does not only apply to obvious cases such as the Energy Technology Programme or the High Tech Incubator 'tech2b', but also to the Innovation Network and Research Funding, on the neutral side of the horizontal axis, as well as the TMG Impulse/Technology Centres and various clusters united in Clusterland, with each centre or cluster being sector-specific, and therefore positioned in the upper half. Although these latter policies can all be easily imagined in a service-inclusive form, the descriptions of their missions and activities reveal that innovation

[23] Our framework is mainly based on the classifications by Den Hertog et al., (2000), 'The Smart Guide to Service Innovation' (EC Enterprise & Industry, 2012), and 'Strategies, policies and rationale for service innovation'(Dialogic/OECD, 2012).

is only perceived in a technological sense. The fact that their names are displayed larger in Figure 7 means they are relatively prominent measures within the Upper Austrian policy mix, in terms of the financial commitment.

Clusterland, as mentioned earlier, is a TMG subsidiary, managing Upper Austria's strong clusters in fields like automotive, plastics, furniture and timber, mechatronics and IT. The organisation is involved in initiating and supporting cooperation and increasing the visibility of industry and partners in the international environment. Similarly, the 21 Impulse and Technology Centres have been established to support the creation of technology-based enterprises, innovation, technology transfer and cooperation at the regional level. Both the clusters and the centres are elements within the broader UA Innovation Network or Technology Network, which facilitates collaboration between a variety of partners engaging in R&D, technology transfer or education. One way for these partners to finance their R&D is by relying on UA Research Funding. This is an initiative whereby applicants from the national Research Promotion Agency (FFG) can receive additional funding from the regional government. Projects *"in which new products and/or process with technological novelty are developed"* are eligible to apply.

Yet another type of policy measure aimed at promoting technological R&D, is the innovation management provided by CATT, owned by TMG, and its consultancy initiative 'Technologie und Innovations- Management' (TIM). Through these mechanisms, technology-intensive innovation is supported by helping companies with innovation funding, technology transfer and assessment.

Some of the former technology-focused innovation policies have been re-oriented over time. When extended to the domain of services without further significant adaptations, policies are classified as **assimilated** (A). Resulting innovation policies are not limited to any individual or group of industries, although the notion of 'innovation' itself might implicitly remain associated with goods and technology, which is why the policies are listed on the lower left side of the matrix. Again, several relevant examples are important within the regional policy system.

Most notable is the UA Research and Technology Council. Although the name suggests that this institute is predominantly engaged in supporting technological R&D, the Council has recently been involved in various activities promoting knowledge-intensive services such as providing advice on the content of strategic programmes. The prominent recommendation is to strengthen Upper Austria's competitive position and it is increasingly irrelevant whether this is done through technology or services.

Innovation Assistants is a policy measure, coordinated by CATT, in which SMEs are supported in the implementation of innovative projects by young university graduates. These innovation assistants are usually accompanied by an experienced counsellor. Other policies fitting the assimilation approach are the funds provided by easy2innovate that are also for SMEs' projects, Loan Guarantees that are provided by a pool of banks and Standardbeteiligungen, which offers long-term investment capital for companies needing to expand their capital base. An original variant is the Research Promotion Fund, which provides financial support to companies preparing an application for a project under the European Commission's Framework Programmes such as Horizon 2020.

Lastly, a minor assimilation initiative is the UA Innovation Award. For twenty years, Upper Austria has been presenting this award to recognise innovative ideas, new strategies and products that have led to sustainable business success.

The **embedded** (E) class of policy measures is occasionally very similar to the previous category and covers instruments that are neutral with respect to the domain(s) they support. The major difference between the two is that assimilation policies 'turned neutral' by extending technology-focused innovation policy to services, whereas embedded policies are neutral or unspecified by their nature because they concern economic growth and labour markets, in general, rather than specifically innovation.

To start with, Labour market promotion initiatives are widely available in Upper Austria. An excellent illustration is the Pact for Employment and Training (PAQ), through which government and companies agree every year on a wide range of initiatives to support and enhance the labour market participation of various sections of the Upper Austrian population.

Most other embedded policies are aimed at entrepreneurship. For instance, the Education account for young entrepreneurs funds training through courses and seminars, vocational training and the personal development of people who want to become entrepreneurs or take over and lead an existing company. Furthermore, the 'Gründerfonds' or Founder Funds also support the establishment of a new enterprise. Gründerfonds' equity can also be used for acquisitions. For more mature enterprises of any size, Upper Austria's economics department offers the 'Economic stimulus programme'. This funding for material investments enables firms to start a new business, move their production site, or expand their operations by introducing *"a basic process, product, or service innovation".* The Welcome2Upper Austria Service Centre is also an initiative aimed not so much at creating new companies, but rather at attracting foreign companies by helping them to find their way into Upper Austria.

Finally, and somewhat harder to classify, are the Small loan and Top-premium offered to young entrepreneurs. Although the establishment of start-ups in tourism and leisure are explicitly excluded, the measure does focus on *"modernization and expansion investments, as well as establishing new or substantial additions to existing services or business"*. This latter requirement suggests that the policy might apply to the next category as well.

Specific to services are the measures corresponding with the ***demarcation*** approach (D). The 'Local supply programme' supports an entire range of service sectors including butchers, bakers, catering, confectionery, the grocery trade and postal services. Local companies can apply for funding when they want to renew, establish, extend or acquire a store. Marketing activities are also supported.

Two other demarcation measures, slightly more sector specific, are clearly in line with the aim of increasing tourism in Upper Austria, as cited in the first strategic programme. The 'Business start-up' measure provides consultancy to support the foundation of companies in the tourism and leisure industries, as well as cable railways and passenger shipping transport. Addressing the same industries, the Tourism Initiative provides funding for marketing and sales activities in the pre-opening and opening phase of a hotel. Just like the Local Supply Programme, none of these measures involves policies aimed at knowledge-intensive services.

Lastly, there is the category of policies adopting a **systemic** or **targeted** approach (S). Characteristic of this approach are policies that apply a systemic view and aim to benefit from synergies resulting from mutually reinforcing relationships between technologies and services. Upper Austrian examples of this type remain very scarce. One is the independent part of the Tourism Initiative which is focused on innovation cooperation along the *"tourism service chain"*. This funding scheme is designed to strengthen innovation and the competitiveness of the Upper Austrian tourism industry by promoting innovative supply and product development. Funds are provided to cover the costs of planning and implementing an innovative distribution system, the development of a partnership or the monitoring of success. The relationship with technology is particularly prevalent thanks to the possibility of obtaining funding for the construction, expansion and modernisation of tourist infrastructures, which could include modern technical equipment. Nevertheless, this link mainly applies to the adoption of technology in a service sector, rather than a smart combination of competences.

A better example, therefore, is the Logistics Network that was formally managed by its own association rather than by Clusterland. This *"growing network of industry, trade, service and research and design"* is primarily focused on delivering solutions by coupling issues like logistics technology, material handling, integrated logistics services, transport, storage and consultancy.

Finally, a synthesis perspective is clearly present in the part of Clusterland, which focuses on networks rather than clusters. An essential difference between the two is that the clusters all have a strong industrial focus, while the three Clusterland Networks are centred on the multidisciplinary topics of Human Resources, Design & Media, and Resources and Energy Efficiency. In these cross-industry networking initiatives, business success is pursued *"especially in the form of non-technological innovations"*.

Policies at the national and European levels

In addition to policies at regional level, the dynamics of the Upper Austrian innovation system are influenced by policies at the national and European levels. Like many countries, Austria applies R&D Tax Credit, which gives tax exemptions to firms engaging in innovative activities. In principle, the measure is available to all sorts of R&D, but adaptation of the OECD 2002 Frascati Manual definition of R&D expenses might favour technology-focused innovation. In 2005, high and medium-tech industries accounted for 59% of the € 420 million budget, compared to 29% for service industries, in general or 22%, for specific KIS-firms. As such, it is regarded as appropriate for enforcing *"structural change in the direction of knowledge-intensive sectors"*.[24]

The importance of knowledge intensive services is also recognised by the Cluster Platform Austria, in which the Upper Austrian clusters mentioned above also participate. A working group has been established at national level, which is specifically devoted to the topics of knowledge-intensive services and clusters.

Of great relevance to research activities are the National Research and Innovation Plan of the Austrian Council and the National Research Promotion Agency (FFG). Besides traditional methods of promoting research, FFG also supports collaborative research through its programme 'Competence Centres for Excellent Technologies' (COMET). In addition, FFG stimulates the transfer of knowledge by issuing Innovation Vouchers that enable firms, and notably SMEs, to make use of research partners' expertise. Something similar is provided by the Austrian Economy Service (AWS). This institute supports innovative firms, rather than well-defined R&D projects. One recent and popular initiative has been the use of vouchers

[24] WIFO (2009). Evaluation of government funding in RTDI from a system perspective in Austria: Tax Incentive Schemes for R&D. p. 7.

that enable firms to turn to the creative industries for assistance. No less than 21% of the nationally available vouchers went to Upper Austrian firms.

The fact that FFG is to some extent engaged in the topic of service innovation, as its CEO has explicitly claimed[25], is evidenced by the Services Initiative it has been running, since 2009, on behalf of the Ministry of Economy, Family and Youth. The initiative supports innovative service projects by providing funding to a dedicated research programme, the Basic Programme for Innovation in Services, as well adding a budget, conforming to the assimilation approach to service innovation, to the existing structural programme for Cooperation and Networks (COIN). In these various ways, FFG is trying to target both current and new clients. Contrary to the dominant perspective in Upper Austria, services are offered a broad scope, including knowledge-extensive and non-industry related service activities. Out of the 221 projects funded in 2011, around 20% were located in Upper Austria.

Besides a national research programme devoted to services, Austria also has a couple of policies that deliver exclusive support to a single service sector. Examples of these demarcation policies are Film-location (Filmstandort) Austria, the Tourism Programme Austria, and the creative-industry projects receiving Impulse support from the Austrian Economy Service (AWS).

Finally, the Upper Austrian innovation system is supported by EU programmes such as the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the European Agricultural Guidance and Guarantee Fund (EAGGF Guidance Section). Of particular importance for this report is the regional competiveness programme 'Regio 13 – Impulse for Upper Austria', managed by the Provincial Government, Directorate of Spatial Planning, Economy and Rural Development in Linz. Through this ERDF programme, European funds are used to supplement the budgets of measures aiming to strengthen Upper Austria's economy. The fact that these are largely embedded in Upper Austria's strategic programmes, implies that the EU support is consistent with the regional perspective. The current programme, running from 2007-2013, delivered significant financial contributions to Innovative Upper Austria 2010 and 2010+. In line with each of the three Region 13 priority areas of knowledge base and innovation, attractive region, and technical assistance, funding was granted to projects originally stemming from the Upper Austrian strategic programmes. At this moment, the partnership between Upper Austria and the European Commission is involved in developing STRAT.AT 2020, detailing the priorities for the next programming period of EU Structural Funds.[26]

3.3. Assessment of the regional policy mix

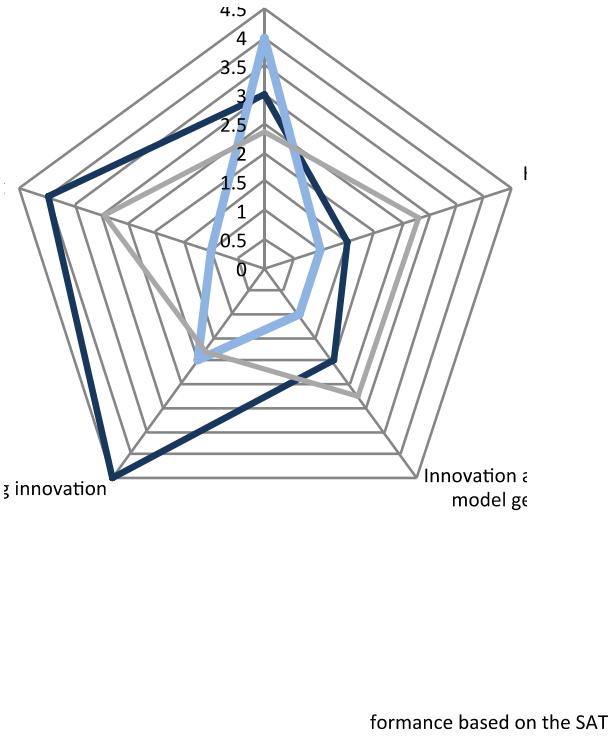
Although more and more stakeholders are aware of the potential of services, actions and policy interventions aiming to promote service innovation are still fragmented and modest. In recent years, however, the focus on services and service innovation has increased continually. Some former technology-focused innovation policies have been re-oriented over time with the addition of schemes dedicated to services. This has resulted in a relatively large number of schemes and a rather complex governance structure. An overview of the regional innovation policy mix is presented in Figure 7.

The multiplicity of available measures stretches over all of the system functions, but varies in the extent of service-inclusiveness. Measures providing access to finance mainly concern technology, whereas entrepreneurial support is more neutral. Services are most prominently present in collaboration initiatives. The new strategic economic programme that is currently being constructed for the region contains a prominent role for Knowledge Intensive Services (KIS) and how these can transform manufacturing, thereby opening up possibilities for unleashing the potential of service innovation.

In addition to the ESIC assessment, an indication is provided of how stakeholders in Upper Austria, and notably TMG, regard their innovation system, together with their views on the opportunities to stimulate structural change through service innovation. This was measured by asking them to complete several questions in an online self-assessment tool (SAT). In the figure below, the average response of four respondents is mapped together with the assessment by ESIC. Clearly, some differences exist.

[25] Pöchhacker Innovation Consulting [P-IC]. (2012). Service Strategy for Upper Austria!
[26] See: www.oerok.gv.at/eu-regionalpolitik/eu-kohaesionspolitik-2014/nationale-strategie-stratat-2020.html.0

Figure 8: Comparison of assessment by ECIS and response to self-assessment tool (SAT)



The most remarkable discrepancy concerns the system function 'financing innovation and growth'. Whereas enterprises in Upper Austria appear to be investing substantially in innovation, the self-assessment suggests that the innovation system is rather weak in this respect. Although indirect funding possibilities for service or hybrid innovators are considered to be available, it is the presence of business angels and seed and venture capital that is perceived to be poor.

Just like for 'financing innovation and growth', the self-assessed strength of the function 'collaboration and networking' is below ESIC's appreciation of these functions. For the networking, agreement exists with respect to the presence of strong clusters. However, the local stakeholders who filled out the self-assessment are slightly more critical when it comes to the involvement of users in those innovation networks, as well as the presence of incentives for cross-sectoral encounters.

For entrepreneurial activities, the assessments appear to be quite consistent. The regional ability to create new business models is consistently scored as weak. In addition, the local stakeholders also point to weaknesses regarding the tax and regulatory framework conditions for the setting up of new businesses.

In the case of the function 'knowledge development and transfer', there is consensus that the region is facing difficulties in attracting skilled migrants and international students. The region itself is quite positive about the presence of physical and virtual infrastructures that are supportive to service innovation, probably due to the presence of the influential clusters. The stakeholders seem to disagree about the strength of technology transfer offices and their ability to support multi-sectoral projects into which service innovation is integrated.

Finally, the self-assessment is not unanimous in judging the regional strength in 'innovation and business model generation'. Overall, the average score lies just above the ESIC assessment. The presence of knowledge-intensive service providers and creative industries and an IPR regime favouring service innovation are all perceived to be reasonably fair.

Looking to what extent existing instruments are sensitive to service innovation or the 'service innovation approach', responses coming from the SAT assessment are very much in line with the ESIC assessment. For financial measures, both assessments indicate that they are evenly spread between technology-focused and an assimilation approach in which the funding instruments are becoming relevant for services, as well. Both

the ESIC assessment and the stakeholders' assessment regard policy instruments for business-model generation mainly as technology-oriented, although some of the stakeholders indicate that these cover the topic of service innovation as well. Furthermore, knowledge development and transfer is unanimously judged as being technology-focused, just like measures affecting entrepreneurship activities are predominantly regarded as following an embedded approach. Finally, the SAT confirms that cluster initiatives are technology-focused but open to services. In some of the networks, it appears that there is little room for a thematic approach in which services and technology reinforce each other, but it must be said that these networks are significantly less substantive than the major traditional clusters.

4. Large-Scale Demonstrator Strategy for the Future

The previous chapters provide an overview of Upper Austria's current socio-economic situation alongside the regional, national and European strategies and policies relevant to service innovation in Upper Austria. This chapter provides an assessment of the focus and approach that TMG formulated in its concept note, combined with an appraisal of recent policy developments and the future ambitions of various stakeholders in the Upper Austria region. Several observations and considerations are discussed, which could be taken into account when designing the regional policy mix in order to better unleash the transformative power of service innovation.

The focus of the Large-Scale Demonstrator (LDS) strategy

In its concept note, Upper Austria presented its ambitions to transform its traditional manufacturing industries by adopting more service-oriented business models. Currently, the interest in service innovation and servitisation is gaining momentum among various actors. The large base of manufacturing firms can use external service providers to outsource non-core activities, acquire knowledge on how to improve existing or new practices, start thinking about their own offerings from a service-dominant logic and move towards the delivery of services around, or even instead of, goods. Overall, services innovation can be a catalyst for a development away from traditional manufacturing and R&D towards open and user-centric business models and innovation.

Although an increasing number of stakeholders seem to understand the potential of services, related actions are still very modest and fragmented. A closer look at activities in the innovation system reveals that universities, including the applied institutions, are engaged in the topic but, as yet, there is no education in the form of dedicated master or graduate studies. Several academic researchers are involved in services, but their efforts are very widespread and there are no joint research programmes so far. Similarly, some manufacturing firms are experimenting with new services, but again these are not very visible. Rather, these attempts to move towards services are unstructured and implicit, rarely being regarded as a way in which firms could learn with, and from, each other. One positive example is the Mechatronics Cluster, where a few firms have been dealing with the topic for almost two years.[27] The adaptation of service-based logic is still emerging and most firms are not yet embracing it. In addition, those firms that do recognise the potential are facing problems with understanding how services could be included to increase the added value in their own particular case, and how such a process might be managed.

Continuing the focus on service innovation as presented in earlier programmes, the new Upper Austrian Minister of Economy announced that services is one of the three major topics that he will be promoting extensively. As mentioned in the previous chapter, the Regional Government recently commissioned TMG to develop a new Strategic Economic and Research Programme. This programme, '2020', is an opportunity to develop a policy for Upper Austria to use services as an enabler for transforming its traditional manufacturing based economy into a world class model region. The way the region is bringing together various stakeholders such as firms, academia and governmental institutes to explore how services help increase its industry's strengths can be regarded as a process of 'large-scale experimentation'. This development underlines the region's willingness to move forward and provides a basis for suggestions on how Upper Austria can include services in its next Strategic Programme for creating critical mass and concentrating efforts to advance its renowned manufacturing industry and to sustain its leadership position.

Assessment of policy measures

Building on the SWOT analysis of Upper Austria's socio-economic system (Chapter 1), the overview of the current policy measures (Chapter 2) and various interviews with local stakeholders (Appendix B), this assessment section highlights six observations and suggestions on supporting industrial transformation. The ultimate aim is to apply the various roles of services to address the region's major challenges. Significantly important are issues such as an increasing lack of a skilled workforce, insufficient internationalisation and problems with business models that go beyond selling manufactured goods.

a) Absence of a flagship initiative

It is essential for the future competitiveness of the manufacturing industries in Upper Austria to rethink their business models and the opportunities that services, service innovation and servitisation offer in adding more value to products and in eventually serving final users better. This is a major challenge that requires contributions from all the actors in the triple helix. Top notch manufacturing firms cannot risk concentrating

[27] This led to an interest group on service innovation. Successful cluster members shared their best practices, and small events (workshops) were organised. Although interest in services is increasing, services have not been adopted by most of the Mechatronics firms or the other clusters. The potential to do so has been recognised.

solely on making more advanced products, as many of the manufacturers are already at, or close to, the technological frontier. Despite being top performers in carefully selected niche markets, as 1st or 2nd tier suppliers to OEMs or manufacturers of final products, local firms are likely to increasingly face clients, in global markets, demanding 'total' solutions or integrated product-service offers that can solve their problems. Also academia has to respond to the need for more knowledge on transformation through services, new business models and service engineering, both in their educational curricula and in their research, including applied research together with students and firms. This cannot just be done by individual academics, higher education institutions or research groups that deal with the various aspects of this transformation through service innovation. Such incremental steps would take too long and may end up in institutional 'turf wars'. Finally, research and innovation policy-makers and their respective funding and implementation agencies cannot afford to make incremental changes to their instruments and measures in order to deal with service innovation and servitisation. There is a need to flag up to industry, academia and government that service innovation/servitisation requires more immediate and focused action.

By setting up a cross-disciplinary institute, Upper Austria can bring together the key ingredients of innovation including engineering, business and creative services such as design. This 'service factory' could be a leading edge research, education and applied industry project and a focal point where actors not only meet, but learn and work together in what could become a shared facility. This flagship project can highlight the unique opportunities of service innovation in manufacturing and other fields of the economy. Globally there are various examples of younger and more established service factory initiatives that could serve as sources of inspiration,[28] but which cannot be copied exactly because Upper Austria requires a Service Factory that suits the region's economic and institutional infrastructure. Also, the flagship initiative would provide opportunities for implementing measures that address other local issues like the brain drain and internationalisation (see the following sections).

A sophisticated business plan for such a Service Factory needs to be developed in more detail, but the following design criteria or elements should be considered when constructing the envisaged platform:

- The Service Factory needs to be a **triple helix effort** where all three parties, industry, government and academia, come together and concentrate their efforts on creating a real centre of expertise for servitisation. This implies that the centre does more than just create awareness. It should also facilitate the actual execution of collaborative projects in which the possibilities for service innovation are exploited. Academia can contribute insights, as well as learning from the activities taking place under experimental conditions. Similarly, governmental institutions could be involved in facilitating activities and they, in turn, might understand better the needs of local businesses wishing to transform their business models;
- The Service Factory needs to have its **own budget**, funded by its founders from the triple helix. These three parties need to make a serious commitment and the centre should be much more than a meeting place financed from public funds;
- A **strategic programming** effort , linked to the budget and reflected in a multi-annual development plan. This plan should at least cover educational efforts and initiatives and research and applied research projects with firms, organised along a limited number of themes that are linked to real needs of the region's firm;
- The Service Factory needs to have its **own strong identity** and **function as a meeting place** where engineers meet service innovators and service innovation experts. An ideally-suited central location is the old tobacco factory or Tabaksfabrik in the Hafenstrasse in Linz. Being a listed building of historical interest, this large complex currently needs to be used for other purposes. Using a part of the building would illustrate perfectly that whilst the Service Factory is still dedicated to manufacturing, it is reaching out to service specialists. Given the type of occasional activities the building currently hosts such as festivals and theatre events, the Tabaksfabrik is increasingly becoming a lively and entrepreneurial setting with a youth-orientated, urban vibe. It is a place that boosts creativity, where manufacturing can literally be infused with service innovation/servitisation knowledge. As Upper Austria is in competition with other nearby regions, the building can also play a role in keeping and attracting talent to nullify the effects of the brain drain;
- As the Service Factory should develop into an important player in the manufacturing ecosystem, an **incubator function** for this type of firm would also be desirable. This could help in create an atmosphere and an image of the Service Factory as being the place to find fascinating new product-

[28]For instance: the Design Factory at Aalto University Finland is the symbiosis of state-of-the-art conceptual thinking and cross-disciplinary hands-on action. It has led to a paradigm shift in education and business by providing a constantly developing collaboration environment for students, researchers and business practitioners. See: http://designfactory.aalto.fi/.
Furthermore, Table 5 in the OECD-report on strategies and policies for service innovation (2013) provides clickable links to the following examples: ServLab (DE), Service Science Factory (NL), AMSI (NL), Service Science and Innovation Centre (SE), Centre for Service Innovation (NO), and the Public services innovation lab (UK).

service solutions or dedicated services linked to the well-established manufacturing cluster in Upper Austria. However, established firms that would fit well with the profile of the Service Factory should also be able to co-locate there.

- The Service Factory should also function as a **hub that links into international service innovation thinking**. This should preferably be a two-way linkage. On the one hand, the Service Factory should reach out and link especially to those initiatives that have worldwide connections with manufacturing regions and clusters. This would mainly be an **intelligence function** making sure that relevant knowledge developed elsewhere is spotted and, where necessary linked to the Service Factory by inviting international experts to spend time in Upper Austria or by developing joint projects. The Service Factory could also be used in the not too distant future to flag up at international level that Upper Austria is a focal point and model region in dealing with servitisation knowledge, research and entrepreneurship within a top manufacturing area (see also recommendation e).

b) A technology-focus in a plethora of existing policies

The improved inclusion of services and service innovation into a regional innovation policy does not necessarily require new measures. The overview reveals a plethora of existing instruments resulting from a process in which new programmes add new instruments without abandoning the older ones. The effect, efficiency and transparency of a transformative policy, however, are likely to benefit from a coherent and focused service-inclusive strategy rather than a multitude of small measures, each with its own governance structure and, consequently, relatively small budgets. Therefore, an attractive approach to unlocking the transformative power of services and service innovation is to refocus existing policies, possibly as a complement to a minor number of dedicated policies, such as the one outlined above.

In line with the assimilation approach to innovation, many of the existing initiatives can be renewed so that they support service innovation, as well as technological innovation. Typically, this means adjustments to the mandate and selection criteria and the promotion of the measure as a support to service innovation. As for the criteria, a telling illustration is the difference between two funding schemes at national level. Whereas access to funding for R&D projects by FFG is limited by very strict conditions, even in the case of the Service Initiative, in which technological feasibility or novelty is the key,[29] the funding from AWS is open to broader forms of innovation. The AWS creative industry initiative, for instance, adheres to more sector-neutral criteria like the potential for job creation and economic growth. Shifting the focus from R&D to innovation is a relatively simple way of allowing firms to benefit from the potential of innovative services. How this can best be done depends on the type of measure being adapted and similar policy measures from other regions might provide useful examples of what criteria to use and how to evaluate service innovation projects. The examples of funding by both FFG and AWS also suggest that a regional policy mix should be balanced in how it relates to policies at national level. Redundant or abundant instruments can be avoided by seeking complementarities between measures that require larger-scale investments, and those that need to be customised to local specificities and conditions.

As indicated in Figure 7, some existing Upper Austrian measures have already been 'broadened out' to services. Good examples are the Innovation Assistants or Innovation Award, as both are now taking a more neutral perspective, being eligible to service innovation as well. Other policy instruments, however, are still biased towards R&D and technology. For instance, the CATT and TIM agencies that are both providing services like innovation management and consultancy, could easily be opened up to more firms seeking assistance with the development of new services,[30] and might even be combined into a single organisation. Also the high-tech incubator 'tech2b' that is the responsibility of the Ministry of Economics and the small projects' funding Easy2innovate that is the responsibility of the Ministry of Research, could easily be recalibrated. The fact that both these interventions focus on technology does not mean they can ignore services, particularly as many service innovations in a manufacturing context build on a smart use of technology. The key is that the policy measures acknowledge that smart service applications might create as much, or even more, value as projects which are based entirely on the production of technological goods.

Finally, a more advanced possibility for renewing existing policies is found in the Clusterland activities. As stressed before, the recently established Clusterland Networks follow a synthesis approach by focusing on multi-disciplinary topics such as Human Resources and Design & Media. A way of extending this type of thinking is to infuse the regular clusters with cross-sectoral activities. The design, sales and marketing of services are typically relevant to each manufacturing-based cluster that is moving towards new business models. In the past two years, the Mechatronics cluster has been pioneering servitisation with workshops, events, interest groups and the sharing of internal best-practice. This small-scale experimentation with a number of local firms interested in services has been successful and this tends to imply that there are

[29] Note that the Upper Austrian Research Funding is an extension of FFG activities, and thereby adheres to the same criteria.

[30] For instance, besides providing information on how to patent a new invention, the agencies can also focus on how to use trademarks to protect a service brand. Similarly, training in service management might help firms to develop capabilities for service innovation in addition to their skills for developing new technological products.

opportunities for larger-scale deployment of service innovation support. Here, it is possible to think of initiatives that cross the various clusters, uniting heterogeneous types of manufacturing firms around a service-related topic that is relevant to each of their specific situations. Incrementally building service innovation support into such an existing structure, based on actual demand, has the advantage that there is already a strong basis of trust and interaction. This reduces the risk that local players will regard services as being irrelevant or even in opposition to their own businesses. Rather, it enables eager firms to learn quickly and spread their awareness and knowledge to their 'natural' peers, including those who might be somewhat reluctant to follow the path towards service-inclusive business models.[31]

c) Shortage of skilled labour

Shortage of skilled labour is increasingly becoming a serious threat to Upper Austria's economy, as indicated by the SWOT analysis in Chapter 1. On the one hand, there is a need for traditional engineers in order to continue the currently strong practices in manufacturing. Although the living and working environment in Upper Austria is considered to be attractive, the region faces the problem that many young people leave to study elsewhere and do not return afterwards. In this respect, it is important to note that Upper Austria could benefit from a systematic development programme in which the region is better positioned as an attractive studying environment for young people. One possibility for TMG is to extend its location marketing by engaging in (further) collaboration with regional municipalities. In such a joint effort, Upper Austria and its cities should not only be promoted with respect to their industrial strength or cultural attractiveness that could both be appealing to the working population, but also with respect to characteristics that might be attractive to young people. For instance, the renowned Arts Electronic Centre in Linz and its corresponding festival provide a basis for promoting a different image than the one which adults especially seem to enjoy, namely the culture and serenity of Upper Austria.

Apart from the environment for students, the actual content of the studies offered has a major impact on the local level of education. Increasingly, there is a demand for a new type of engineer who is able to develop not just technology, but also new value propositions, new designs and new means of communication. One way to fulfil this need is by adapting the type of education offered by the Johannes Kepler University and applied universities in the region. Specifically, these institutes could consider developing study programmes in which students receive both basic engineering training, as well as a complementary set of courses that make a link to the wider socio-economic context in which they will be operating. Such a 'T-shaped' curriculum could combine in-depth engineering knowledge with a broad education in business, strategy, environment or policy, which is probably more appealing to new generations of students. An advantage for local firms would be the fact that these types of students would be able to speak the same language as 'traditional' engineers, but at the same time have more understanding of the importance of the non-technological elements of engineering. As such, these students and such an education might be a natural way of equipping top notch manufacturing firms with the skills needed to deal with the challenges of providing service solutions and complex product-service combinations. Internationally, there are various examples of extended engineering education and a variant specifically designed for service engineering can be found nearby, at the University of Graz.[32]

d) Balancing the ecosystem

Unlike traditional goods innovation, service innovations are not the result of a concentrated R&D effort in a specialised department or lab environment and cannot therefore be managed as a classical R&D process. On the contrary, many service innovations, including product-service combinations, emerge from distributed and less formalised efforts spread over various departments or even firms and organisations that together develop new combinations and solutions.[33] It is therefore crucial that Upper Austria develops a regional innovation system in which knowledge intensive business services (KIBS), supporting manufacturing firms in servitisation processes, feature prominently. These KIBS can play an important role in supporting regional processes of economic transformation and adaptation, as they can act as knowledge distributors themselves by spreading good practices, as system integrators by bringing various actors together and as co-innovators by supporting the innovation processes of their clients.[34] Apart from taking over 'ordinary' operational processes, KIBS can also contribute on a more strategic or creative level. Typically, this is done by service providers in the fields of design, marketing, engineering, ICT and software and innovation management. These types of services can result in a (manufacturing) firm improving or even renewing its output. Upper

[31] In order to avoid resistance to the widened eligibility of policy measures, it is highly advisable to consider increasing the corresponding budgets. Financing could be obtained by streamlining the entire policy mix.

[32] http://www.serviceengineering.at

[33] The initiative for new services, new product-service combinations or "solutions" can originate from marketing and sales departments, ICT departments, new business development, operations, after sales etc. In this context the service innovation process (or for that matter innovation processes involving services) have been described as a loosely-coupled system (see Sundbo & Gallouj, 2000) or the distributed innovation model (den Hertog, 2010). Many service innovations are also "disguised" as client specific solutions. If these are identified and can be made regular offerings, they are important sources for new services, product-service combination or "solutions".

[34] See for example Miles et al. (1995); den Hertog (2000); Muller & Zenker (2001) and Toivonen (2004).

Austria should aim to foster productive links between KIBS and manufacturing firms. This can be done in various ways, including:

- Making systematic use of design at all levels. This includes operational issues like product and service design as well as usability. At a strategic level, thinking in terms of design can transform the way people formulate their entire business propositions. There is plenty of opportunity to learn from examples abroad. For instance, the Finnish Kone Corporation has adopted the concept of people flow instead of 'just' lift construction.[35] Such a shift in this highly capable engineering firm created a major change in the strategic thinking and in the entire management of the firm: the organisation now realises that providing consultancy services is an additional (and more profitable) way to commercialise the unique knowledge base it has developed over time. An example of a design firm operating worldwide that has allowed various manufacturing firms to transform is IDEO. With its expertise in design IDEO helps firms with positioning and shaping products in a way that differs substantially from just trying to create functional artefacts. By supporting firms with thinking in terms of solutions and experiences, IDEO altered the way how companies see themselves and the products they deliver. It is important to incorporate this type of capability into the region.
- Adopting a systemic approach to the development of creative services, by making use of existing elements in the area, such as the Museum of Modern Art and the Centre of Electronic Art in Linz. Nurturing people's creativity is a way of attracting and securing skilled professionals and preventing a brain drain from the area and this could be an interesting by-product of such an effort. The above average use of the voucher scheme for creative services, which is operated by AWS in Upper Austria, shows that there is local potential for developing the creative cluster. Creative partners are local, which suggests that these forms of collaboration-support could be governed effectively at a regional level.
- Continuing the experimentation within the existing clusters in fostering cross-overs between KIBS and manufacturing firms in cluster activities, as is carried out by involving creative enterprises in Clusterlands' Mechatronics cluster. It is important, in general, that a class of KIBS emerges in the region that is truly specialised in supporting, and co-creating with, manufacturing firms and their specific needs instead of having general KIBS for marketing, accounting, legal issues, design and strategy. For them to be successful, the manufacturing firms also need to open up to KIBS and help establish a strong ecosystem. A focal point in the region in the form of a Service Factory could be instrumental.

e) Internationalisation, as a parallel track to servitisation

For almost two decades, Upper Austria has been developing clusters based on the technology that is sold to parties all over the world. In the regional SAT interviews, servitisation is typically mentioned in the same breath as the need for further internationalisation, which is one of the core elements in the new strategic programme. However, future success requires both industry and the rest of the regional system to open up to, and engage with, international communities. A key factor is combining what has been coined 'local buzz' with 'global pipelines'.[36] Local buzz refers to the idea of an attractive production environment appealing to many firms, as relevant and new knowledge is *"in the air"* and innovation is thriving thanks to a local pool of specialist labour and firms and research institutes that cooperate together to provide knowledge spill-overs. Global linkages, on the other hand, refer to the belief that thriving regions have to make sure they are outward looking and linked with knowledge development elsewhere. Global linkages can help to inject relevant knowledge, capabilities and contacts into the region. These global linkages can be used for exporting the locally produced products and product-service combinations (inside-out), but importantly also for attracting new knowledge (outside-in). For instance, the latter can be achieved by looking at good practices on a global scale or attracting international firms to the region that could add to its profile by bringing in international players that have a servitisation track record or bringing in a capability that is still less well represented such as attracting KIBS that could support servitisation processes. Some options for Upper Austria to develop further internationalisation and openness, in relation to services, are the following:

- Processes of servitisation are taking place in other countries and regions. It is essential to tap into this international knowledge base, where possible, and to benefit from this know-how. Firms in Upper Austria should not only share and learn from regional best practices, but also look internationally for relevant best practices. The universities, Clusterland and TMG could facilitate this search, preferably through the Service Factory's intelligence function mentioned above.
- At the same time, and in order to be able to establish these global linkages, it is essential to also make the Upper Austrian examples of successful servitisation more visible.[37] By highlighting the examples of firms such as Rosenbauer and Anger and others, Upper Austria can position itself more actively as an excellent region not only for manufacturing, but also for smart product service combinations in niche

[35] http://www.kone.com/corporate/en/Pages/default.aspx

[36] See Bathelt, H., A. Malberg & P. Maskell (2004), Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation, in: Progress in Human Geography, vol 28, 31-56.

[37] Internationally, the Rolls Royce (see http://www.rolls-royce.com/) and Caterpillar (http://www.cat.com/cda/layout) are well known.

markets. Eventually, such promotional activities might also affect the regional strategy for attracting Foreign Direct Investments and making sure that foreign firms become part of a localised eco-system or regional 'fabric'.

- More widely, there is a need to attract international researchers, industry experts and innovation management specialists to the region. To make this possible, it is important to set up international schools and other services than can cater for the needs of foreign experts, employees and their families. This may also help to secure the supply of skilled labour.

f) Servitisation in other domains

Upper Austria, with its excellent reputation in manufacturing, is well positioned to excel in business models that combine manufacturing and services in a smart way, wrapped around or integrated into product-service combinations. However, even a regional economy like Upper Austria has more than manufacturing. The European Commission takes its EU 2020 and Horizon 2020 strategy societal challenges as the starting points for many trajectories. So does the regional economic and research programme Innovation Upper Austria 2020 ('Innovatives OÖ 2020') that is in the making. The plan defines five action fields that coincide with the EU/Horizon 2020 goals to a significant degree. Thus far, service innovation, and hence servitisation has been discussed mainly in relation to the manufacturing action field or *"Industrial Processes"*, as this is where Upper Austria excels. Notwithstanding the necessity of focusing on regional strengths, preventing unnecessary spending of scarce regional resources and spreading the budget thinly, there is clearly a need to think through how service innovation might also transform the other four action fields.

It would be useful to address the scope for innovation through service innovation in each of the four action fields starting from the typical strengths in manufacturing. Just as in many other regions, it is necessary to address the topics of health and ageing. The renewal of the healthcare sector requires service innovation as much as the adoption of the latest technology. An immediate appetite for pure service experiments was not observed, but there is clearly scope for experiments with manufacturing based solutions combined with new service concepts that could lead to new propositions in health. The manufacturing stronghold should open up to these societal challenges and start thinking about how mechatronics could provide solutions that are valuable in health/ageing. Similarly, there are challenges in energy that could be partly solved by projects based on the strong manufacturing tradition. Why not develop the locally successful biomass furnace technology further and link it to the energy challenge, but with an added services component? The latter can be done by developing not only the latest oven technology, but also by seeking a combination with integrated energy solutions for small communities. Having a stronghold in manufacturing and choosing to focus more clearly, does not mean ignoring the societal challenges in other domains completely. A feasibility study that identifies promising product-service combinations in the areas of health/ageing, mobility and logistics, food and nutrition and energy, based on local strengths in manufacturing, is needed to widen the transformation through service innovation in Upper Austria.

5. Conclusions

The preceding chapters provided an extensive analysis of the Upper Austrian economic system and policy development. Based on additional insights gained from interviews with local stakeholders, various observations relating to the use of policies for innovative services in order to transform local industry have been discussed. A crucial realisation is that Upper Austria's strong position in several manufacturing domains forms a solid basis for the successful development of smart business models, in which existing competences and service-thinking can be combined in novel ways. In the Upper Austrian context, a number of opportunities for using services (innovation) to create (and capture) more value and better fulfil consumer demand can be identified. Besides securing local firms' competitive advantage, this would also create opportunities for addressing the region's societal challenges, directly.

Ideally, future policy efforts should pave the way for initiatives in which various types of organisations can work, jointly rather than in isolation, on improving the Upper Austrian socio-economic system. A promising strategy is the approach in which different competent stakeholders gather around (preferably) a topic of societal relevance, and together start to develop novel service systems in real life conditions. Even when starting with a regional challenge, it is essential to explore solutions by the smart use of existing specialisations. Also, it is only by continually learning from each other and involving users that this type of large-scale experimentation can eventually become a success story. This report reflects on Upper Austria's approach to transforming itself into a region that can demonstrate how to undertake industrial modernisation. Of key importance is that the policy support on offer is adequately aligned with the region's specific strengths and challenges. From the assessment presented in Chapter 3, six policy considerations may be deduced that merit further attention.

1. *Establishing a 'Service Factory' as a flagship initiative*

   Launch a cross-disciplinary Service or Servitisation Factory where leading edge research, education and entrepreneurs meet and work together, facilitated (partly) by government. Such a factory would need to be financed by the triple helix. It is also essential to develop a strong identity and clear strategic programme, alongside an incubator and intelligence function on servitisation.

2. *Refocusing of existing policies*

   An attractive option for unlocking the transformative power of services and service innovation is to refocus existing policies. Most current policies largely neglect the relevance of services. The effect, efficiency and transparency of a transformative policy are likely to benefit from a coherent and focused service-inclusive strategy, rather than a multitude of small measures.

3. *Securing the supply of skilled labour*

   Work on the well-known brain drain of young people especially by developing new curricula in which in-depth engineering knowledge is combined with courses in business, strategy, design and environment or a policy to create a new generation of engineers.

4. *Creating synergies between manufacturing and KIBS*

   Foster productive links between knowledge intensive business services and manufacturing firms in an ecosystem setting by looking into the role of design, by developing a systemic approach to the development of highly specialised creative services, as well as other KIBS, and continuing to address the theme of servitisation in existing cluster organisations' activities.

5. *Combining 'local buzz' and 'global pipelines'*

   Support processes of internationalisation in order to combine local buzz with international linkages. This can be achieved by tapping into international knowledge on servitisation, by making Upper Austria success stories in servitisation more visible (*"if it's good tell others!"),* by actively opening up to international experts and by targeted FDI.

6. *Using product-service combinations in various domains*

   Identify promising product-service combinations in the areas of health/ageing society, mobility and logistics, food and nutrition and energy, based on local strengths in manufacturing, in order to further progess the transformation through service innovation in Upper Austria.

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Appendix B - Stakeholders consulted

a) Mr. Dr. Gerhard Stürmer. Director Ramsauer und Stürmer Consulting (24-06-2013).

b) Mr. Christian Stadlmann. Faculty of Management FH-Steyr, University of Applied Sciences Upper Austria (24-06-2013).

c) Mr. Prof. Dr. Gerhard Wührer. Head of Institute for retailing, sales and marketing. Johannes Kepler University Linz (25-06-2013).

d) Mr. Dr. Joachim Haindl-Grutsch, Managing Director Federation of Upper Austrian Industrialists (25-06-2013).

e) Mr. Prof. Dr. Kurt Gaubinger, Vice-Dean, Head of Degree Programme Mechatronics and Business Management. University of Applied Sciences Upper Austria (25-06-2013).

f) Mr. Werner Pamminger. CEO Clusterland Upper Austria (26-06-2013).

g) Mr. Bruno Lindorfer. Managing Director, TMG (26-06-2013).

h) Mr. Christian Altmann. Cluster Manager Mechatronics and Plastics (26-06-2013).

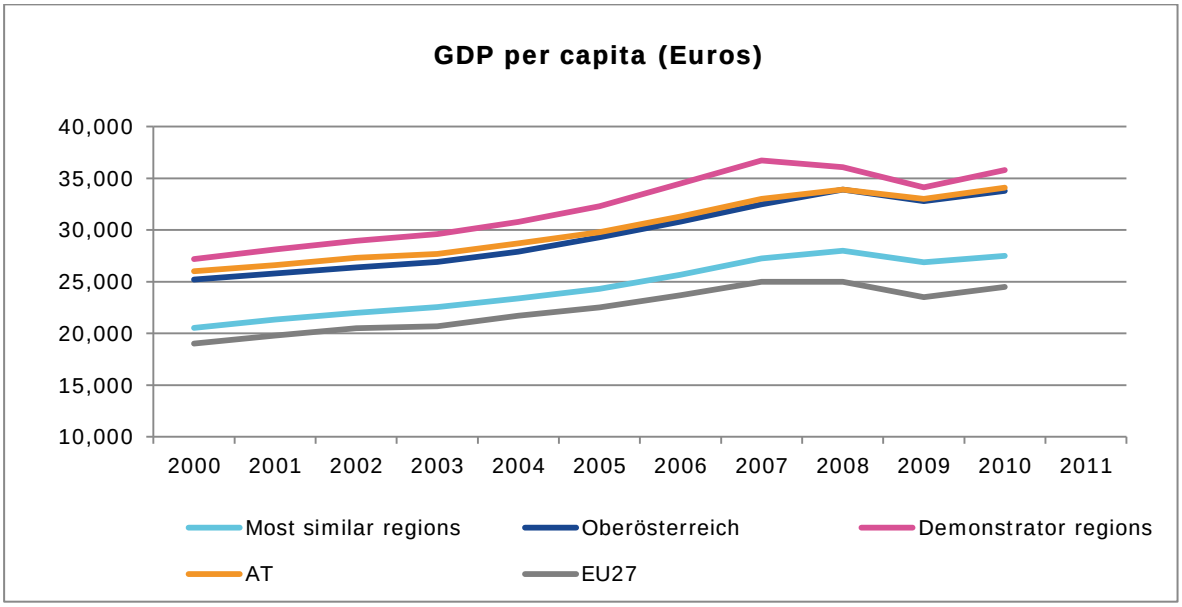
i) Mr. Dr. Norbert Schrüfer. CEO New Technologies Group, MIBA (26-06-2013).

j) Mrs. Bettina Gladysz-Haller. Head of Department Technologie.Programme.Strategie, TMG (27-06-2013).

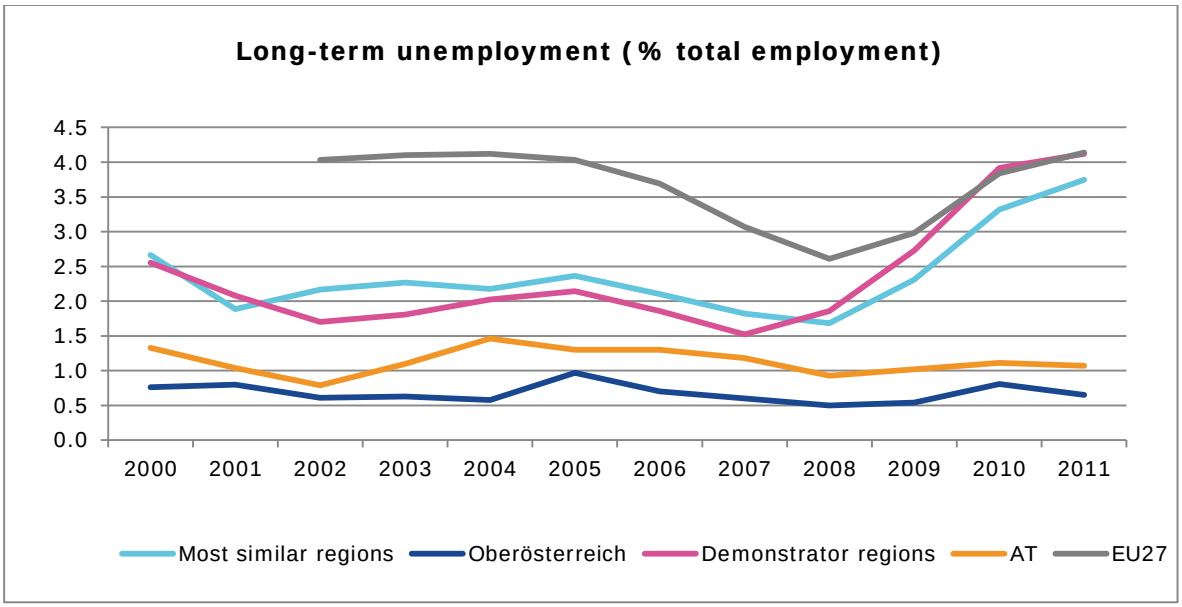
k) Mrs. Elfriede Kober. Head of Department for EU Affairs, Austria Wirtschaftsservice AWS (27-06-2013).

Appendix C - Regional benchmarking analysis

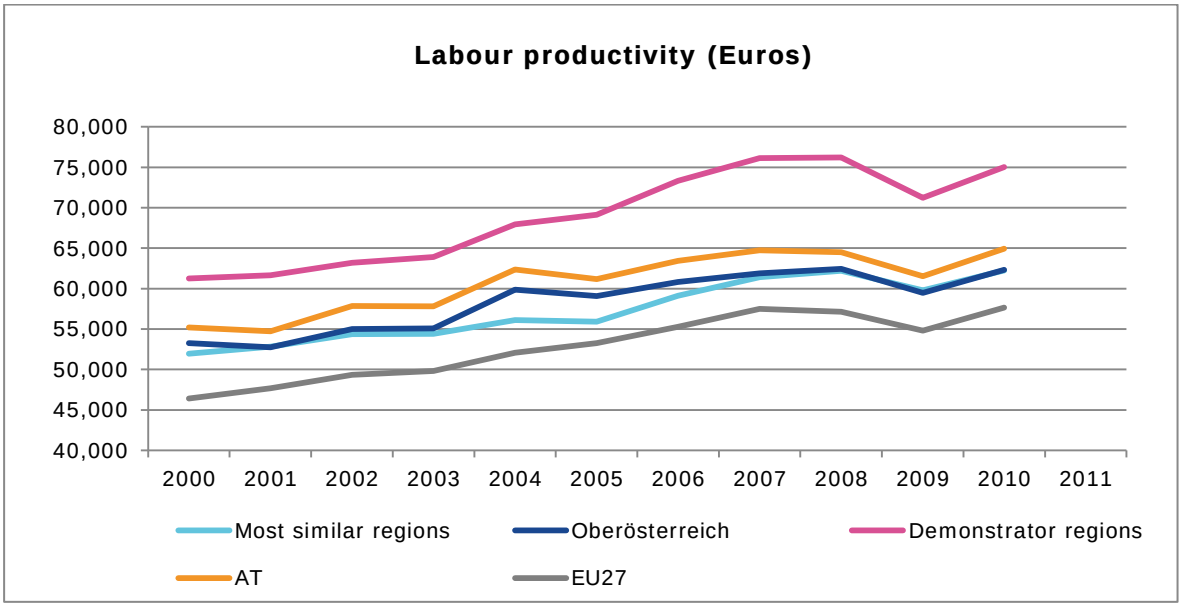
Evolutions over time



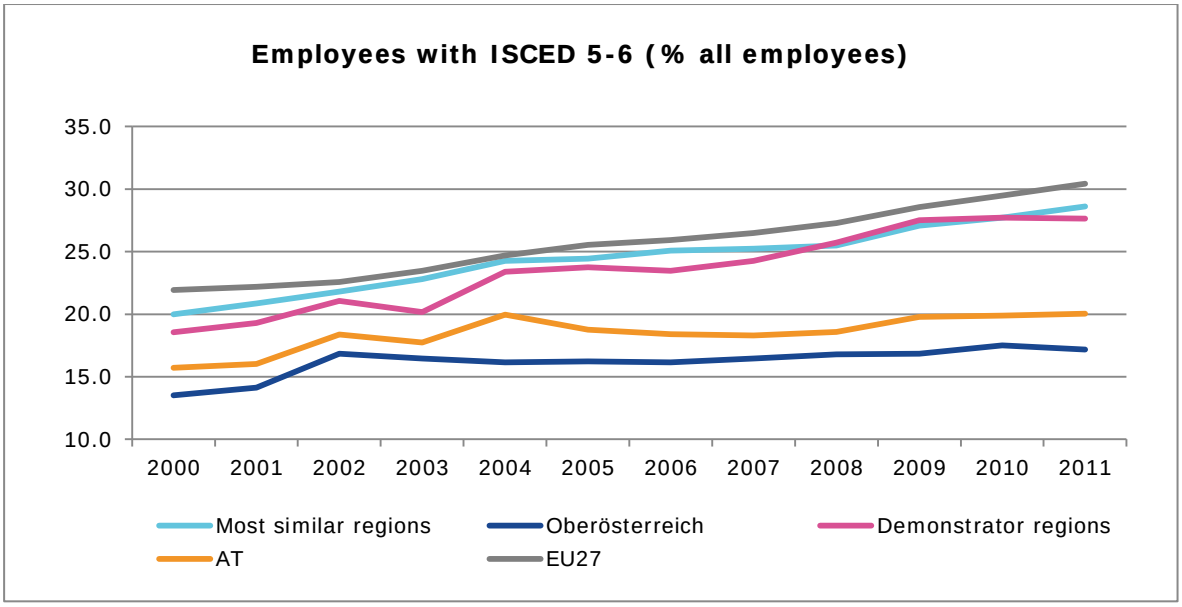
Between 2000 and 2008, per capita GDP steadily increased in Upper Austria, before a slight decrease could be observed. However, in 2010, an upward development is visible, leading to a figure that nearly reached the level of 2008. During the whole period, Upper Austria's figures are similar to the Austrian ones. The general developmental trend is also visible in the most similar regions and the EU, but at a lower level. GDP/capita in the demonstrator regions is somewhat higher, but the downward trend started earlier than in Upper Austria and the most similar regions.



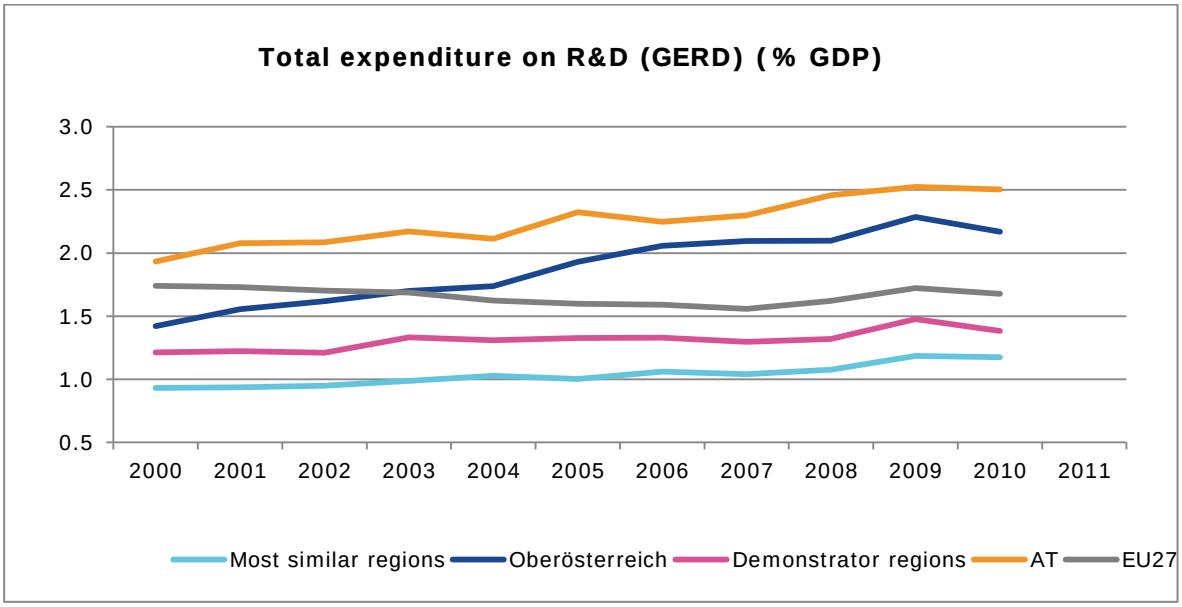
Compared to the demonstrator and the most similar regions, the national level and the EU, Upper Austria has had a comparatively low long-term unemployment rate during the whole period considered. While long-term unemployment has increased since 2007/08 in the most similar and the demonstrator regions, as well as in the EU, the low level remained constant both in Austria and in Upper Austria.



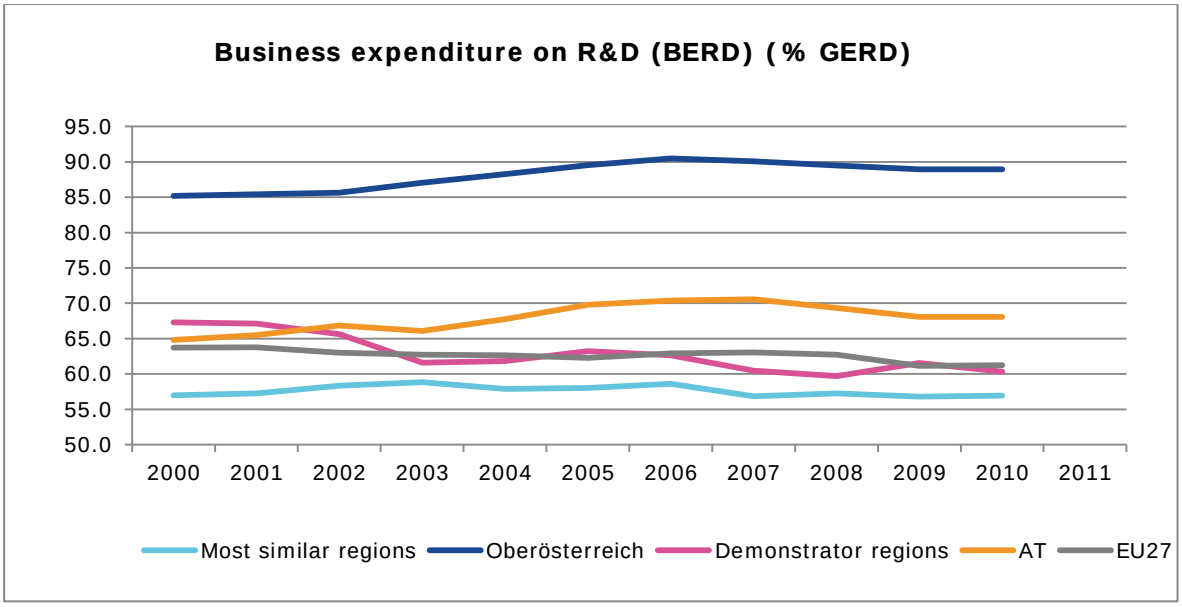
Labour productivity follows a general upward trend in the period considered, but includes some variations and a stronger decrease in 2009, as can be observed in the GDP/capita. Upper Austria's labour productivity in 2010 is about € 9,000 higher than in 2000. The regional figures are slightly below the national average and above the EU level, and below the average of the demonstrator regions.



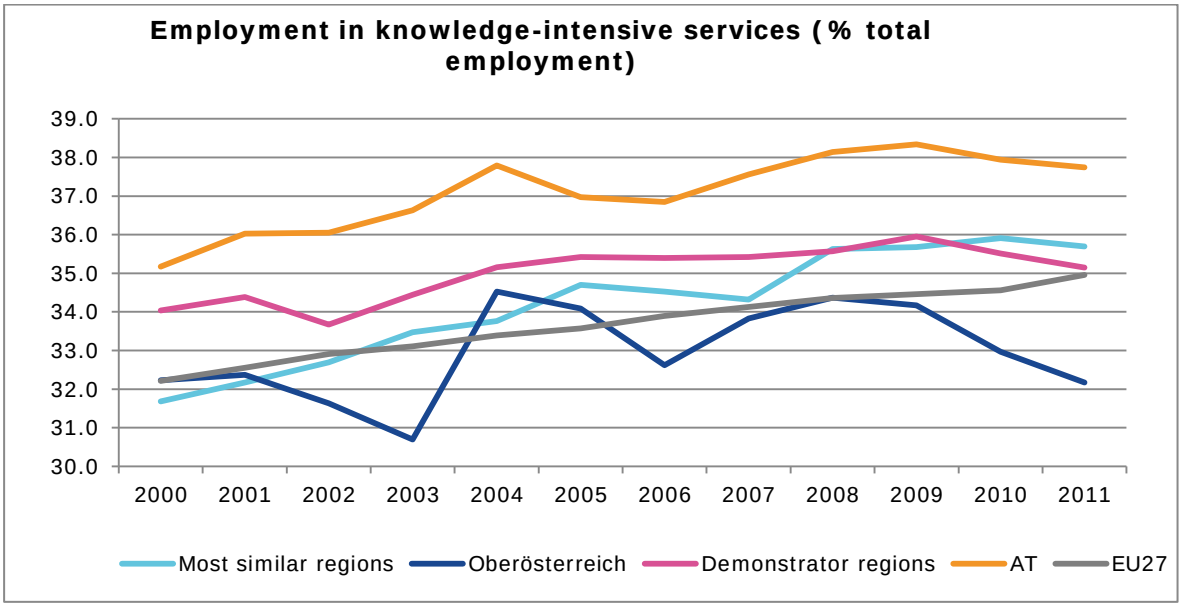
Since 2002, the share of employees with a completed tertiary education remained relatively stable between 16.1 and 17.5% of all employees. Before, this share had increased from 13.5% in 2000 to 16.8% in 2002. Both Upper Austria and Austria, as a whole, show ISCED shares that are below the shares of the demonstrator and the most similar regions, as well as the EU.



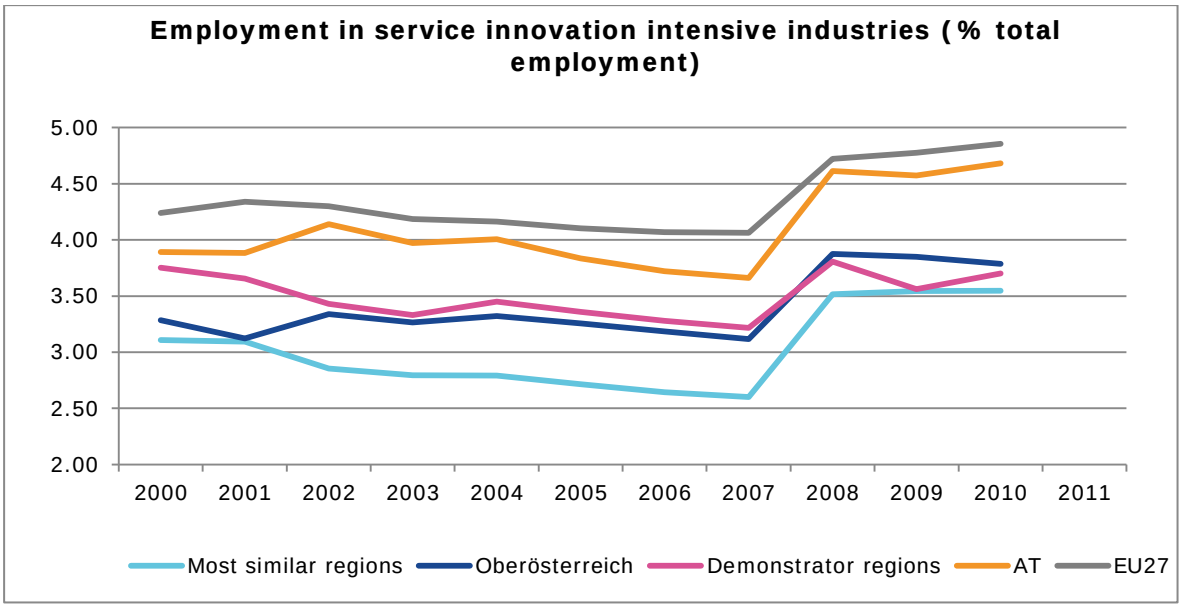
Total R & D expenditures in the region increased steadily between 2000 (1.42% of GDP) and 2009 (2.29% of GDP) before dropping to 2.17%, in 2010. These figures are higher than in the benchmark regions, but below the national Austrian results. In all the regions considered, the GERD shares remain below the "*3% goal*" defined in the Lisbon process.



Statistics on business expenditure on R&D, measured as a share of the total R&D expenditure, show the high level of regional business engagement in research and development activities. Upper Austria has not only above-average figures compared to the benchmark regions, but also to the Austrian context. The regional share of business R&D reaches a peak in the mid-2000s (90.5% in 2006) and then decreases slightly to a rate of 88.9% in 2010.



The regional employment share in knowledge-intensive services was between 30 and 35% in the period between 2000 and 2010. Between 2004 and 2009, it remained relatively stable at around 34% with a decrease in 2006 to 32.6%. Since 2009, the share of employees working in knowledge-intensive services seems to follow a downward trend. This increases the deviation from the benchmark regions and the national Austrian level which in 2011 was about five percentage points higher than the Upper Austrian share.



Employment in service innovation intensive industries showed a strong upward trend in 2008 of 0.75 percentage points, after being relatively constant between 2002 and 2007. Since 2008, there has been a general higher level of the employment share in service innovation intensive industries compared to the first half of the decade. Comparing Upper Austria to the benchmark regions, the EU and the national level places the region in a middle position with Austria and the EU showing higher, and the most similar and the demonstrator regions witnessing slightly lower shares since 2008.

Note:

Demonstrator regions: AT31 Oberösterreich (Upper Austria), ES7 Canarias (Canary Islands), ITD5 Emilia-Romagna, LU Luxembourg, NL42 Limburg, UKN Northern Ireland, NL42 Limburg (NL).

Most similar regions37: AT22 Steiermark, AT34 Vorarlberg, DE94 Weser-Ems, ES22 Comunidad Foral de Navarra, ES23 La Rioja, ES24 Aragón, ITE2 Umbria, ITF1 Abruzzo, SI02 Zahodna Slovenija.

Appendix D - Institutional fabric relevant for service innovation

Service innovation actors at regional level					
Name of organisation	**Type of organisation**	**Principal activity related to SI**	**Annual budget (in euro)**	**Number of employees (FTE) and of which SI specialists**	**Web-link for organisation**
TMG		Agency responsible for execution of innovation policy	No SI budget	No SI specialists	*www.tmg.at*
Service innovation actors at national level with an influence on the regional action					
FFG	Austrian Research Promotion Agency	Has a research programme for services: 'Services initiative'	N/A		*www.ffg.at*

Appendix E - Policy measures for service innovation

The following table provides overview of relevant regional, national and European policy measures.

- Respective descriptions of each measure are included in the main text of this report (section 2.2).
- For the most important regional measures, the budgets of 2011 are provided (by approximation). Older overview (2009) for wider range of measures is available in Regional Innovation Monitor.
- The corresponding URLs are embedded in the clickable name of each policy measure.

	Budget (2011)
REGIONAL	
Entrepreneurial activities	
Economic stimulus programme	€ 5 m
Founder Funds (Upper Austria Gruenderfonds)	N/A
Business establishments and successions (tourism & transport)	N/A
Education account for young entrepreneurs & Promoting young entrepreneurs	N/A
Welcome2Upper Austria Service Center	N/A
Knowledge development and transfer	
Innovation assistants / counselorscounsellors for SMEs (by CATT)	€ 0.4 m
Upper Austrian Research and Technology Council	N/A
Upper Austrian Research GmbH	N/A
Upper Austria research funding (OÖ. Forschungsförderung)	N/A
Innovation and business model generation	
TMG	€ 2.8 m
TMG Impulse Centers / Technology Centers	
CATT Innovation Management Technology Transfer & Promotion Advice	€ 1.1 m
TIM - Technologie- und Innovations- Management	N/A
High Tech Incubator: http://www.tech2b.at/	N/A
Upper Austrian Innovation researchers-Award 2013	N/A
Financing innovation and growth	

easy2innovate - Upper Austria Small Projects Funding (by CATT)	€ 0.4 m
Energy technology programme	€ 0.75 m
Energy contracting programme, Green Energy & Environmental Technology	N/A
Research promotion (OÖ Anbahnungsförderung)	N/A
Loan guarantees of the Upper Austrian Kreditgarantie (KGG)	N/A
Investment capital (Standardbeteiligungen)	N/A
Collaboration and networking	
Clusterland (Clusters + Networks)	€ 3.3 m
Innovation Network (incl. Logistics Network)	N/A

SUPRA-REGIONAL (national + Europe)
Strategic Programme (national)
Dienstleistungsinitiative: Services initiative (with Basic Programme for Service Innovation) by FFG
Research (national)
FFG
AWS
National Research and Innovation Plan (Austrian Council)
Innovation voucher (FFG)
Tax landscape (national)
Taxes
R&D Tax Credit
Cluster policy (national)
Competence Centre programme COMET
Cluster platform Austria: Knowledge-intensive services and cluster
EU Programmes
Regio 13
EU programmes