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Regional Innovation Monitor Plus

Regional Innovation Report West Transdanubia

To the European Commission
Enterprise and Industry Directorate-General
Directorate B – Sustainable Growth and EU 2020

technopolis |group|

Regional Innovation Monitor Plus

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technopolis |group| in cooperation with

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PREFACE

Launched in 2010, the Regional Innovation Monitor[1] continues to be one of the flagship initiatives of DG Enterprise and Industry of the European Commission. From the outset, it aimed at supporting sharing of intelligence on innovation policies in some 200 regions across EU20 Member States.

RIM Plus aims to help regions to improve their innovation policies based on better and harmonised policy intelligence. The new contract aims to contribute to the development of more effective regional innovation policies and promote policy learning. Building upon the experience gained and results obtained during the implementation of the RIM in the period 2010-2012, the RIM Plus service evolves towards providing practical guidance to regions on how to use the collected information, establishing a network of regional experts with thematic specialisation, and organising specialised workshops taking into account the relevance and potential interest among the regional innovation policy makers.

RIM Plus covers EU-20 Member States: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the United Kingdom.

This means that RIM will not concentrate on Member States where the Nomenclature of territorial units for statistics NUTS 1 and 2 levels are identical with the entire country (Estonia, Latvia, and Lithuania), Malta which only has NUTS 3 regions, Slovenia which has a national innovation policy or Cyprus and Luxembourg which are countries without NUTS regions.

The main aim of 30 regional reports is to provide a description and analysis of contemporary developments of regional innovation policy, taking into account the specific context of the region as well as general trends. All regional innovation reports are produced in a standardised way using a common methodological and conceptual framework, in order to allow for horizontal analysis, with a view to preparing the Annual EU Regional Innovation Monitor Plus report.

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The present report was prepared by Andrea Szalavetz (aszalave@gmail.com). The contents and views expressed in this report do not necessarily reflect the opinions or policies of the Regions, Member States or the European Commission.

The Regional Innovation Access Point and Knowledge Hub presenting further details of the regional innovation measures, policy documents and regional organisations in West Transdanubia is accessible through the RIM Plus online inventory of policy measures here: http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/region/select

[1] http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/

Executive Summary

1. Main Trends and Challenges in the Regional Innovation System

West Transdanubia (WT) used to rank last among Hungarian regions in terms of all major innovation indicators. Its meagre innovation performance, especially in the light of a relatively good economic performance, used to be referred to as WT's innovation paradox. Over the past couple of years, performance improvement was spectacular, driven mainly by EU Structural Funds that have literally flooded the region's R&D sector.

Innovation input indicators increased dramatically, nevertheless performance still lags much behind the EU average, especially in terms of innovation output indicators. Despite an unprecedented volume of investment in new technology and in research infrastructure, EU resources that supported WT's innovation-driven upgrading failed to achieve breakthrough results. WT's innovation paradox still applies and regional innovation performance is still driven by foreign enterprises' activity.

Challenge 1: Eliminate WT's innovation paradox and achieve knowledge-based upgrading

This is a complex challenge with components that target all potential innovative actors in a tailored manner and actions that cover all possible policy targets, including R&D, technology transfer, technology-based entrepreneurship and innovation collaboration.

WT's RIS3 addresses each of these elements, which demonstrates that the complex challenge of reducing/eliminating the innovation paradox can be met only with a coherent policy mix.

Challenge 2: Ensure the availability of skilled human resources for the innovation-driven renewal of the region's key industries

The main obstacle of innovation-driven renewal is the scarcity of highly skilled human resources. Aligning the supply of graduates with the demand of the regional labour market necessitates actions that target the improvement of the curricula, the services and the research capacities of the relevant higher education institutions.

Challenge 3: Improve the commercialisation of research results

Meeting this challenge necessitates the restructuring of the mix of innovation policy measures that are currently excessively supply-oriented. More policy measures ought to target demand (market for technology) and entrepreneurship (start-up and spin-off formation). WT's RIS3 strategy explicitly addresses this challenge through voucher-based, demand-side measures and through the identification of creative industries and eco-industries as sectoral priorities. These two industries are characterised by high-level inter-industry innovation collaboration, thereby, they enhance not only the collaborating parties' competitiveness but also reinforce the regional market for technology.

2. Innovation Policy Governance

The governance of regional innovation has undergone radical changes since 2010. The system marks a return to a hierarchical, paternalistic redistribution and subsidy allocation that characterised both the socialist era and the early transition years (till 2004-2005). It represents formal renouncing the previous half-hearted attempts to switch to partnership-based regionalisation, and marks a return to the traditional public administration system with counties (NUTS3 regions) as basic units.

Following the redistribution and dispersion of authorities; the dissolution of existing institutions and the creation of new ones – the allocation of funding for territorial development and innovation support, co-financed by EU Structural Funds has become unprecedentedly centralised. With the establishment of the National Development Steering Committee (NDSC) and the subordination of the Managing Authorities of Operational Programmes to the ministries that are represented in NDSC, a 'single-actor' governance system has been established and state capture completed.

At the same time regional innovation strategy development has remained an example of textbook-type decentralisation: a bottom-up, participatory exercise, carried out by the regional innovation agencies. Consequently, the system is characterised by a kind of 'façade regionalism': strategy drafting takes place at the regional level, but policy implementation is entirely isolated from strategy design.

3. Innovation Policy Instruments

Innovation policy instruments are diversified addressing all possible policy objectives in an incoherent, often overlapping manner. The measures are incorporated in two Operational Programmes of the New Széchenyi Plan: in the Enterprise Development Programme and in the Science and Innovation Programme. They address innovation supply, try to foster demand; promote collaboration; stimulate market-oriented R&D and support to business enterprises' investment in new technology. A couple of measures addressed public and social innovation.

The content of the measures is uniform across Hungary, reflecting a 'one size fits all' approach. Nevertheless, the measures are formulated so broadly, that regional specifics can be incorporated in any project application.

4. Conclusions: future actions and opportunities for innovation policy

The policy measures seem to have broadly addressed the main challenges of the region. They have effectively intensified regional stakeholders' innovation activities, raised awareness for innovation and enhanced innovation collaboration. Policy support contributed to higher education institutions' capacity upgrading and has intensified their linkage building with industrial companies. Research infrastructure has been developed: expensive and sophisticated research instruments have been bought. The non-deniable positive impact of EU co-financed support programmes notwithstanding, it should be noted that the use of Structural Fund resources has been far from being smart and effective. The amount of support Structural Funds have made available for regional stakeholders in the 2010s, was orders of magnitude higher than in the previous decade. However, policy effectiveness was low, and implementation was characterised by enormous waste of resources.

Future orientations include new-old priorities, such as enhancement of regional economic actors' R&D-based upgrading and improvement of the supply of skilled human resources. They also include new sectors and new horizontal priorities, such as

1. E-mobility and logistics

Neither of them are brand new: drawing on past projects and achievements, more systematic policy emphasis will be laid on these technological and scientific fields.

2. Creative industries; design for innovation; energy efficiency

These items constitute par excellence new orientations.

3. Focus on demand side instruments and on the commercialisation of scientific and technological results.

The importance of commercialisation is increasingly recognised and more and more demand side policy instruments are included in RIS3.

1. Main Trends and Challenges in the Regional Innovation System

1.1 Recent Trends in Economic Performance

West Transdanubia (WT) is a developed, industrialised region at Hungary's western border. Development level is a relative term. Its GDP per capita is 2.8% higher than the national average (2012) ranking the region distant second after Central Hungary (source: CSO), but it was only 40.1% of the EU-average in 2011 (source: UNU MERIT). Beneficial geographical location (a border region with four neighbours: Austria, Slovenia, Croatia, Slovakia) and good accessibility by highways granted WT an advantageous competitive position. The region experienced rapid, FDI-driven growth after the change of the regime. In 2012, WT accounted for 18.1% of total FDI stock in Hungary, which ranks it second after Central Hungary (source: CSO[2]). WT is specialised in automotive industry, electronics, and machinery & equipment. FDI led to excessive concentration of these industries, which was hardly mitigated by interventions to mobilise the region's endogenous assets (thermal tourism, wood and furniture industries). Given its strong specialisation in global value chain specific industries, the global crisis hit the region particularly hard: from 112.9% of the national average in 2000, GDP per capita declined to 93.5% (of the national average) in 2009 and recovered to 102.8% by 2012.

As a matter of fact, WT's higher than the national average development level was lost already by the mid 2000s, which reflects the lack of a knowledge-based upgrading and the fact that FDI, the key engine of growth has lost its momentum. One reason why the quantitative expansion of output gradually abated after having been driven by foreign investors' new greenfield investment decisions and by the relocation of additional production to existing foreign subsidiaries for more than a decade, was the increasing scarcity of adequately skilled workforce. Unemployment rate is much lower than the national average (7.8% versus 10.2% in 2013) and the activity rate is higher: 59.4%. Note that there are several micro-regions with high unemployment, explained by a fragmented settlement system[3] and by a number of poorly accessible, peripheral areas.

Regional GDP is however bound to grow at a higher rate than the national average, substantiated by a relatively strong investment activity. In contrast to a gradually diminishing investment-intensity at the national level, in WT, the indicator of regional investment over regional GDP kept growing over the period between 2010 and 2012: from 13.5% in 2010, to 19.6% in 2011 and 23.4% in 2012 (the respective national indicator was 13.6% in 2012, down from 14.4% in 2010.

WT is an industrialised region and accounted for 16.4% of national industrial output in 2012. Machinery and equipment is dominant within manufacturing: 76.8%. Labour productivity is slightly higher than the national average, though lower than what the outstanding share of foreign direct investment would suggest. WT ranks only fourth among the seven Hungarian regions in terms of apparent labour productivity in industry. The employment share of agriculture was somewhat higher than the national or the EU average 5.7%. Labour productivity is however much lower than in the neighbouring Burgenland, mainly because of the lack of farmers' agricultural production-specific knowledge and low willingness to form cooperatives or carry out jointly the necessary support activities. According to a recent comparative survey published by the Hungarian Central Statistical Office (Nyugat-Dunántúl, 2014) the value of agricultural output per farmer family in Burgenland was more than ten times higher than in WT, in 2010.[4] Services accounted for 45.8% of GDP in 2011. The public sector was an important employment provider in WT with nearly 19% of total employment in 2011, albeit its share was lower in WT than both the national and the EU average.

[2] The source of all data in this section is the Hungarian Central Statistical Office, unless otherwise indicated.

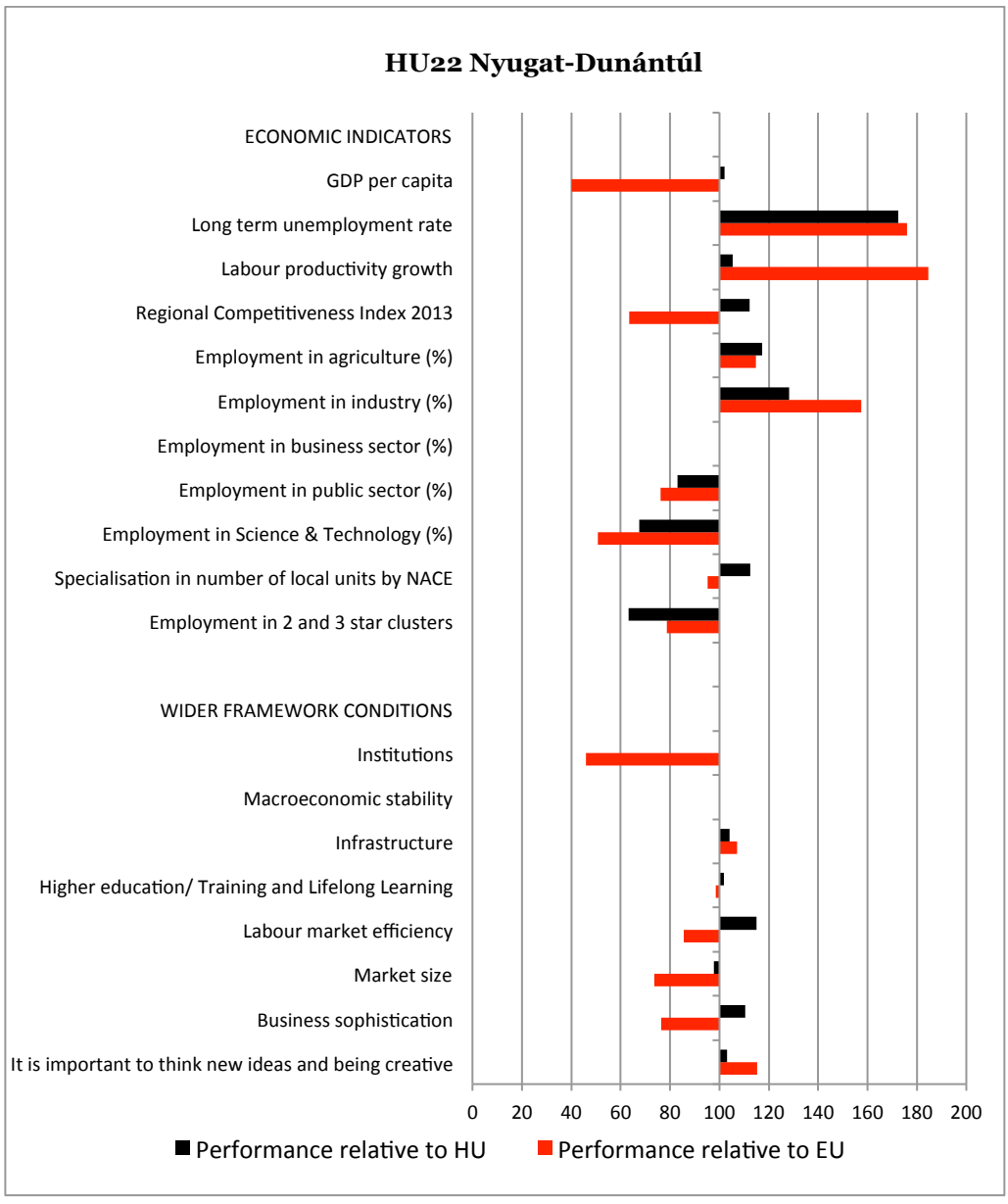
[3] In 2011, there were 142 settlements in WT with a population number below 200.

[4] The overall productivity gap in agriculture is however not high because agricultural firms feature a relatively high productivity in WT.

The key driver of growth in the region is the export-oriented production of foreign subsidiaries. This explained a higher-than-the-national-average growth in 2012 (2.1% versus 1.5%). WT's industrial production is the most export-intensive among the Hungarian regions. In 2012, 84.5% of total industrial sales were designated for export markets (much higher than the national average of 64.4%).

Tourism is one of the most important sectors within services. Although the number of tourists decreased in 2012, income from hotel services ranks the region second in Hungary, trailing only the Central Hungarian region. It is by no surprise that the region's development programme devotes high attention to this sector.

Figure 1 Economic Performance Indicators



Source: Eurostat.

1.2 Recent Trends in Regional Innovation Performance

Among the Hungarian convergence regions, West Transdanubia features the most spectacular development in terms of innovation performance, albeit starting from a low basis in the mid-2000s. WT used to rank last among Hungarian regions in terms of all major innovation indicators. Its meagre innovation performance, especially in the light of a relatively good economic performance, used to be referred to as WT's innovation paradox: i.e. innovation performance was much inferior to what the region's relatively good economic performance would suggest. Performance improvement began already in the second half of the 2000s but it considerably accelerated in the 2010s.

The number of research centres increased by 27% between 2005 and 2012, to 239: in this respect WT still ranks fourth among the seven Hungarian regions.[5] The increase in the number of researchers (FTE) is even more spectacular: 61% over the same period: currently it is 1085. Although most of the research centres (and of the researchers) are in the public sector or in public universities, the number of business enterprise-based centres/researchers also started to grow, especially in the automotive industry. Nevertheless, the share of business enterprises in total outlays was 50.4% in 2012: higher than the national average (46.9%). The volume of R&D outlays is another indicator that has grown rapidly: by 2012 it was 2.6 times higher (€57.65m) than in 2005, the base year. Note that the lion's share of R&D investment concerned investment in R&D infrastructure (new laboratories and research facilities, testing equipment, expensive research instruments) and only a relatively minor share of the resources financed par excellence R&D activities.

Despite a dramatic increase in innovation input indicators, WT's innovation performance lags behind the EU average in a number of respects. Moreover, it is also inferior to the Hungarian average – as illustrated by the subsequent figures. GERD/GDP has barely surpassed the threshold of moderate innovator regions (0.60% in 2012: which is about half of the Hungarian average). Business R&D accounts for 0.37% of regional GDP, which is less than the half of its national share (0.76%). R&D personnel as % of active population (0.74%) is 44.6% of the EU average, and only slightly above the half of the Hungarian national average.

Innovation output indicators are even more disappointing in a comparative perspective: the share of SMEs innovating in-house is a mere 2.8% of total SMEs (only 12% of the EU-average). WT compares poorly to the European average also in terms of economic actors' engagement in both technological and non-technological innovations. One exception (i.e. where WT's performance exceeds the EU average) is the share of employment in medium high and high-tech manufacturing. Here, the value of the indicator is 259% of the EU-average, which demonstrates that growth and modernisation have been driven by efficiency-seeking foreign direct investment in this region.

The outstanding value of the indicator of 'Structural Funds on business innovations' benchmarked against EU average suggests a thought-provoking conclusion. It reflects that business innovation is a policy objective of utmost importance. The amount of support dedicated to promote this objective is nearly four times as much as in Europe (per million of population). However, if WT's meagre overall innovation performance is considered and in particular, the low share of SMEs innovating in-house is taken into account, it is fair to conclude that policy effectiveness is very low.

The two key drivers of improved regional innovation performance are EU Structural Funds and foreign direct investment. EU resources have literally flooded the region's R&D sector: R&D-intensive MNC subsidiaries, indigenous enterprises and R&D performers and services providers (the region's universities) could all benefit from an unprecedented volume of support. Foreign investors' commitment to engage in local R&D activities, and collaborate with universities received generous support, which definitely intensified these activities. Universities' research infrastructure was renewed and extended: expensive research

[5] The source of all data in this section is the Hungarian Central Statistical Office, unless otherwise indicated.

instruments have been purchased to serve local companies' research and testing necessities and ensure thereby a predictable source of income to universities and provide at the same time opportunities for them to engage in innovation collaboration with industry actors.

Automotive industry is of an outstanding importance from the point of view of R&D activities. There are a number of corporate research departments in this industry that collaborate with the Széchenyi University-based centres of excellence. Indeed, this industry features the most intensive industry–university collaborations. Another notable industry in the region is the wood industry. The key related actor in WT's innovation ecosystem is the Natural Resources Research Centre of the University of West Hungary, with institutes engaged in materials technology and nanotechnology research, energetics, robotics, polymer technology, geophysics, genetics, soil sciences, geo-informatics, air and plant chemistry and so forth. The Centre has more than 80 well-equipped laboratories (having been beneficiary of several Operational Programmes' tenders) and can thereby offer R&D services: in particular, advanced manufacturing-specific services to a wide range of industries within and outside the region.

Structural Funds related support has prompted the emergence and the capacity improvement of a number of innovation intermediary and bridging institutions. The number of clusters mushroomed due to support to cluster-based collaboration.[6] Similarly, several new innovation centres and technology centres were created; technology transfer offices, incubators, competence centres and centres of excellence have been added to WT's innovation ecosystem to provide services to the region's innovative actors. At risk of some exaggeration, it seems fair to remark that due to the dedicated support available, the number of well-equipped innovation services providers has increased at a higher pace over the past five years than the number of innovative companies.

As documented in WT's RIS3, R&D activities show an excessive concentration within the region, which suggests that above and beyond selected high performers, actors' engagement in innovation activities is not widespread.

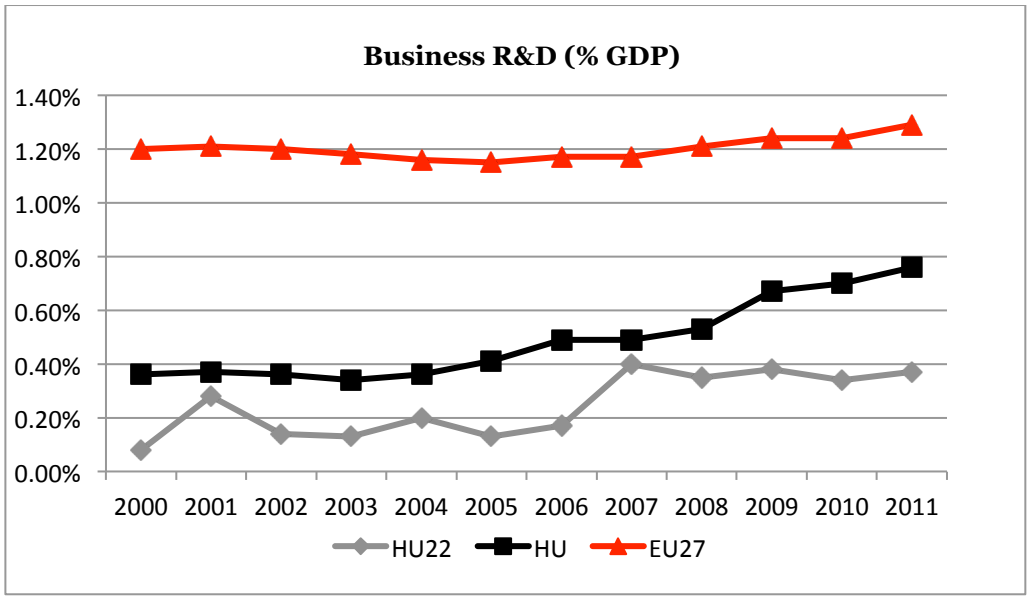
In summary, despite non-negligible convergence to the Hungarian average in terms of the key innovation performance indicators, and despite an unprecedented volume of investment in new technology and in research infrastructure, EU resources that supported WT's innovation-driven upgrading failed to achieve breakthrough results. WT's innovation paradox still applies and innovation is still driven by foreign enterprises' activity.

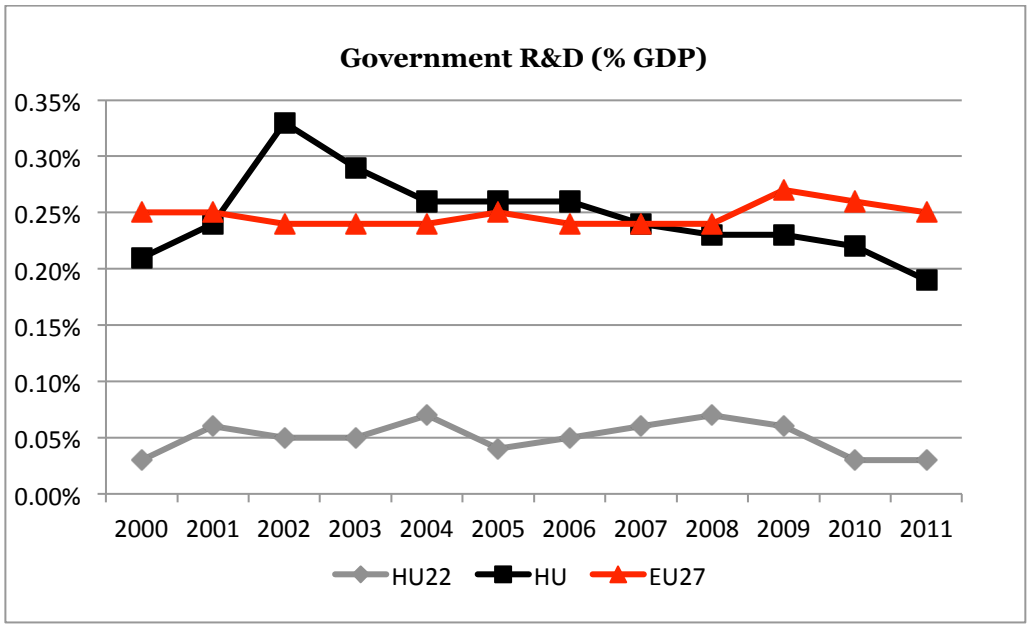
[6] Note that WT has only one accredited innovation cluster: PANFA, operating in the wood and furniture industry (In Hungary there are altogether 22 accredited innovation clusters, so WT lags much behind the Hungarian average).

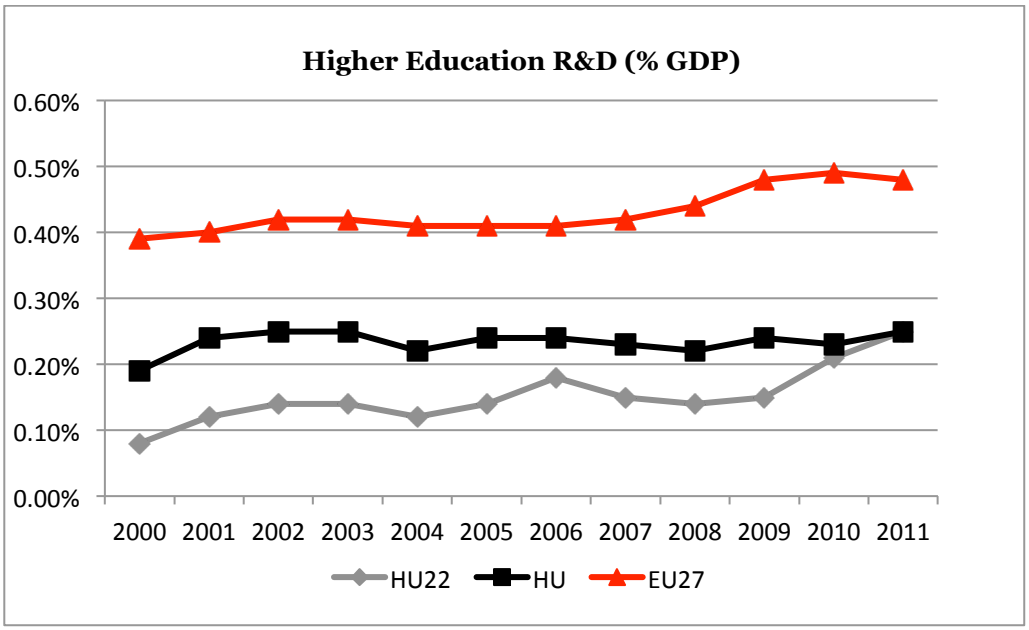
Figure 2 Innovation Performance Indicators

Source: Eurostat.

Figure 3 R&D Expenditure per Sector of Performance

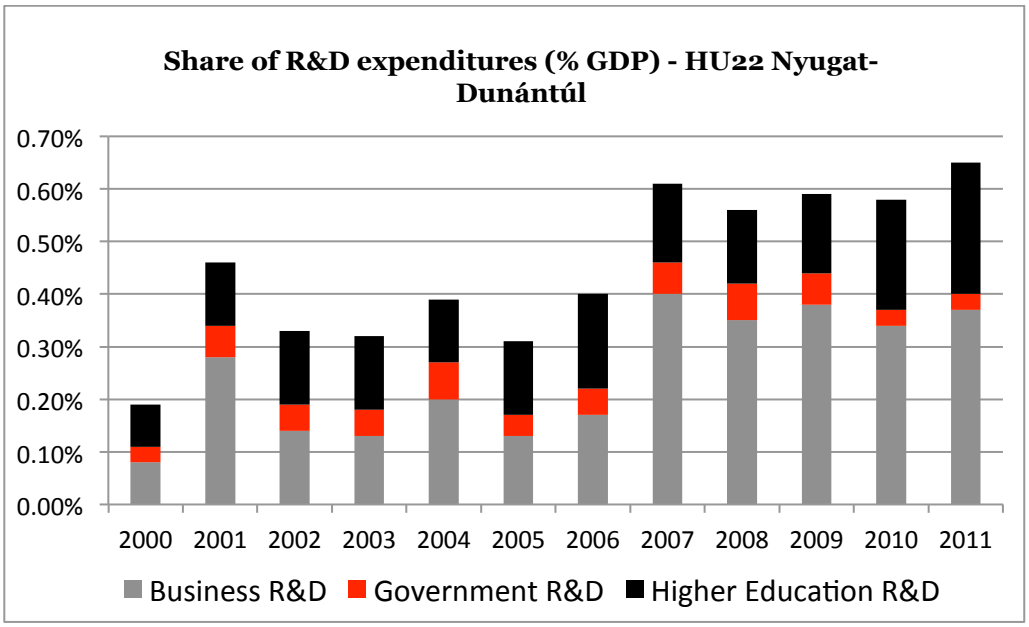






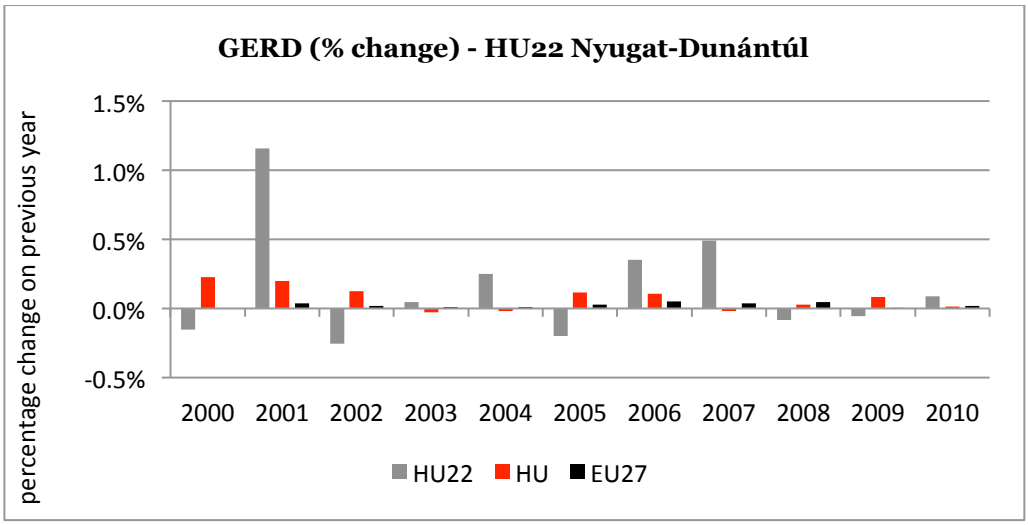
Source: Eurostat.

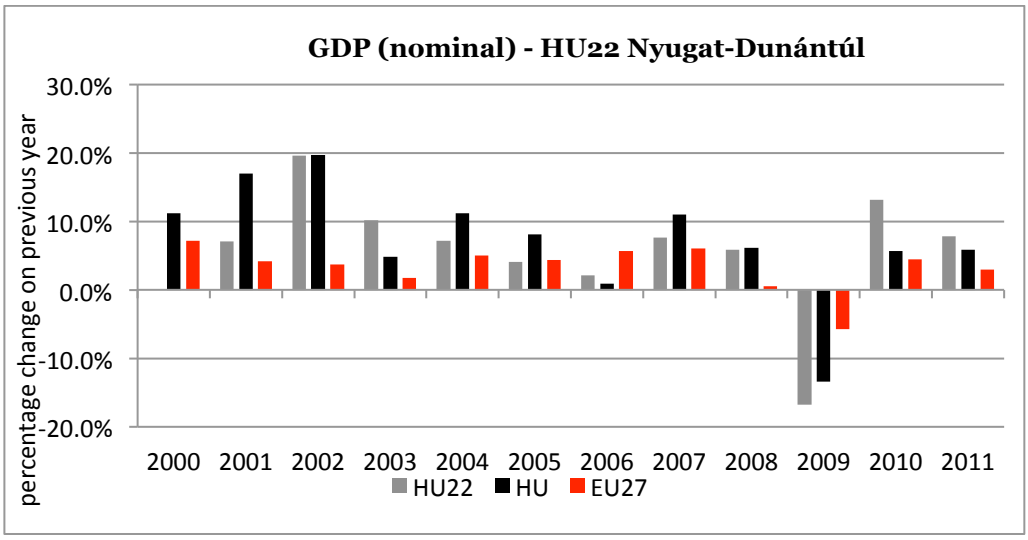
Figure 4 Share of R&D Expenditure per Sector of Performance



Source: Eurostat.

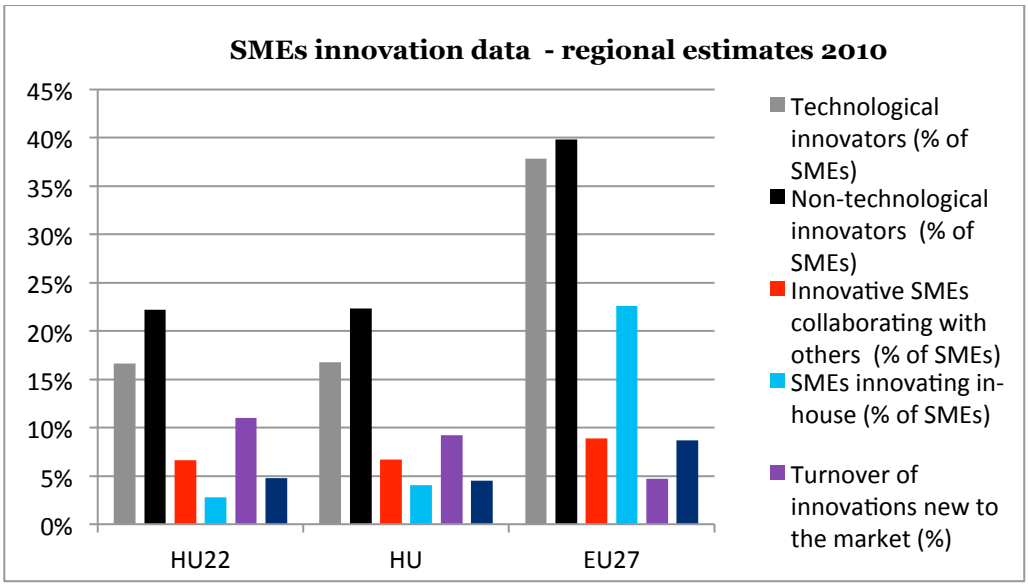
Figure 5 GERD and GDP Trends





Source: Eurostat.

Figure 6 Technological & Non-technological Innovators



Source: Eurostat.

1.3 Identified Challenges

The primary challenge regional innovation policy has been trying to address for the past decade and [as reflected by the region's RIS3 document] will continue to do so in the 2014 - 2020 programming period, is to eliminate the phenomenon, referred to as West Transdanubia's innovation paradox. Hence, the challenge is to achieve the knowledge-based upgrading of the region's economic actors. Knowledge-based upgrading would at the same time ensure the sustainability of past economic results, driven by efficiency-seeking investors' quantitative expansion of their activities in the region.

Knowledge-based upgrading is a complex challenge with components as follows:

- Enhance the commitment of the foreign owners of subsidiaries to locate R&D-activities to their subsidiaries in the region, and/or to outsource R&D activities to regional services providers;
- Stimulate indigenous companies' technological upgrading so that they become capable to produce high-technology products or products/services that require knowledge-intensive activities;
- Foster indigenous companies' more intensive engagement in R&D activities and/or in non-technological innovation;
- Intensify regional universities' market-oriented R&D activities, including R&D services provision, collaborative R&D with industry; and transfer of research results, e.g. in the form of spin-off creation;
- Enhance new technology-based entrepreneurship in the region, e.g. through strengthening the start-up ecosystem;
- Dynamise cluster-based collaboration and facilitate the shift of existing clusters towards more innovation-oriented activities;
- Promote the diversification of the regional industry mix by strengthening new, innovative industries such as creative industries and eco-industries.

WT's RIS3 addresses all the above elements, incorporated among the horizontal and the sector-specific priorities. The structure of RIS3 demonstrates that the complex challenge of reducing/eliminating the innovation paradox cannot be completed if isolated, stand-alone

priorities are set and related policy measures drafted: only a coherent policy mix will be capable to bring about tangible results.

The second major challenge is to ensure the availability of skilled human resources for the innovation-driven renewal of the region's key industries. One of the most important obstacles of an innovation-driven renewal is the scarcity of highly skilled human resources, especially of graduates in engineering, mathematics and natural sciences. It is indispensable to align the supply of graduates with the demand of the regional labour market, which necessitates the continuous improvement of the relevant higher education institutions' curricula as well as their student services. Higher education institutions' research capacities needs to be further improved and research undertakings should be better incorporated in institutions' educational curricula. At the same time, well-devised incentives should be elaborated to channel additional students to these faculties.

The third challenge is to improve the commercialisation of research results in the region, and enhance the market-oriented character of research undertakings. Consequently the reluctance of industry representatives to engage in collaborative innovation undertakings with university-based research performers needs to be overcome by well-targeted incentives. Universities' technology transfer offices should be strengthened and better integrated in universities' research ecosystems.

Meeting this challenge also necessitates the restructuring of the mix of innovation policy measures that are currently excessively supply-oriented. More policy measures ought to target demand (market for technology), and entrepreneurship (start-up and spin-off formation). WT's RIS3 strategy and some of the additional strategies in place (see section 3 for details) explicitly address this challenge by arguing that Innocheck, a past, already phased out voucher-based, demand-side measure should be re-introduced in the region. Moreover, the identification of creative industries and eco-industries as sectoral priorities that complement the region's traditional strengths (automotive, machinery and wood industries) and require increased policy attention also contributes to meeting this challenge. These two industries are characterised by high-level inter-industry innovation collaboration. Thereby, they enhance not only the collaborating parties' competitiveness but also reinforce the regional market for technology.

2. Innovation Policy Governance

In the wake of EU accession, the Europeanization of territorial governance (regionalisation) became a politically salient issue in Hungary. Administrative reforms have been implemented within a relatively short period of time. In an effort of top-down regionalisation, territorial statistical regions were established and new institutions created: regional development councils and their agencies became responsible for territorial development, i.e. for designing, administering, implementing and monitoring the regional operational programmes. These reform steps ensured compliance to the structural and institutional conditions of access to EU Structural and Cohesion Funds. Despite the creation of the necessary territorial governance structures and institutions, the Hungarian 'regionalisation', is a typical example of 'compliance on paper': 'regionalism without regions', marked by weak regional structures with little legitimacy and powerless regional actors (lack of subsidiarity); vested interests of both regional, local and national actors; and parallelisms, i.e. double structures which ensure that counties, i.e. NUTS3 regions preserve their traditional important role (Bruszt, 2008; Buzogány–Korkut, 2013; Pálné Kovács, 2009; 2013).

Driven partly by the recognition of anomalies in the system, but also by distrust between the national and the regional-level institutions, and by successive governments' contradictory ideologies and norms, repeated centralisation steps deprived regional actors of their authorities, and have finally confined them to strategy drafting institutions whose representatives participate in formal consultancy events but their role is basically limited to the administration of regional operational programmes related tenders. The primary ideology of the new government that acquired constitutional majority in parliament in 2010 (and also in 2014) was the necessity of a return to the traditional public administration system with counties (NUTS3 regions) as basic units (in contrast to the previous system, where, in line with the European public administration and territorial development principles, NUTS2 regions were the basic units).

As of 2011, government offices were established in each county. Subordinated to the central government (to the Prime Minister's Office as of 2014), county-level government offices are powerful new actors in sub-national public administration: they are the main bodies of control, and the implementers of central decisions. According to the presentation of the deputy state secretary of the Ministry of Public Administration and Justice, this restructuring has brought about the "abolition of regional competence" (i.e. regional empowerment was over – Zöld-Nagy, 2011). At the same time county-level municipalities have been delegated authority and responsibility with respect to territorial development (Act CLXXXIX/2011 – as of January 2012).

In the 2014–2020 programming period, counties and urban counties (i.e. 23 towns with county rights) will become important actors of the territorial development system. Counties and urban counties prepare their own development plans. This exercise will be coordinated by the regional authorities and by the Office for National Economic Planning: this latter organisation prepares guidelines for county officials to facilitate their planning and programming exercises, and organises consultancy events where county-level operational programmes will be fine-tuned.[7]

According to the current plans as reflected by the official documents (Strategic Agreement, 2014), counties will be entrusted with the coordination of implementation. Development funding from the Territorial and Settlement Development Operational Programme (TSDOP) will be allocated in a decentralised manner at county-level in the coming programming period. Each county will be provided ~€83m to finance selected development projects incorporated in county-level operational programmes (altogether 40% of the funding available from TSDOP). Urban counties will be provided approximately half of this amount

[7] According to an interviewed stakeholder, county-level municipalities neither possess any experts (huge capacity gap) nor have any experience in such a planning-programming exercise.

(over the coming programming period) to be allocated in a decentralised way for the financing of their own programmes. The rest of the funding available from TSDOP (which accounts for 16.15% of total funding available from EU Structural Funds over the period between 2014 and 2020) will also be decentralised to be allocated by the NUTS4 regions and by local action groups (Tripold, 2013). Whether the allocation of the 'decentralised funding' will really be under counties' and urban counties' authority, remains to be seen.

The regionalisation of the innovation system has followed a similar trajectory.[8] National innovation policies started to take the regional / spatial dimension into account following the 2003 XC. Act on the Research and Technological Innovation Fund. The act prescribed that 25% of the Fund's yearly income should be designated to regional innovation purposes. Regional innovation agencies (RIAs) were founded in the mid-2000s, and were entrusted with the design of regional innovation strategies, linkage building, development and provision of regional innovation related services.

By the end of the 2000s, RIAs have undergone substantial capacity development: they have accumulated region-specific (or rather regional innovation system-specific) knowledge and relational capital. However, their institutional autonomy and capacity to influence regional innovation strategy implementation kept diminishing as a result of policy-makers' repeated re-centralisation moves.

The first milestone in RIAs' roll-back was the gradual hollowing out of the regionally decentralised innovation programmes. While RIAs could initially influence the content of regionally decentralised innovation support programmes and include regional specifics, later the content of the calls were decided upon centrally, by the National Innovation Office (NIO). According to a NIO-official's comment to the author's interview questions, decentralisation in the mid 2000s resulted in a multitude of highly diversified programmes which were very difficult to administer and monitor. Therefore, RIAs' role was restricted to determining the range of strategic sectors that would receive targeted support in the framework of the regionally decentralised programmes. Otherwise, the support programmes have become practically identical in all regions. "*This made the process of regional innovation policy implementation more efficient and easier to manage and administer*." (Interview with NIO-official, Szalavetz, 2012).

The next milestone in the process of suppressing the regional decentralisation of innovation was the government's effort to channel regional applications away from regionally decentralised programmes[9] towards centrally managed Operational Programmes (OPs), by prescribing ever stricter conditions to gain support from the former type of programmes. The national government gradually withdrew from funding regional innovation undertakings from regionally decentralised sources. The last time calls for proposals were launched under innovation support programmes funded from regionally decentralised sources, was in 2009. Subsequently, regionally earmarked grants from EU Structural Funds channelled through Operational Programmes have become the only region-specific source of funding innovation activities. Regional Operational Programmes can however not be considered *regionally decentralised* sources of funding, since programme design, project selection, financial management, monitoring and evaluation are all under the authority of the central/national level.

Parliamentary elections in 2010 brought about changes in the structure of Operational Programmes, which was a further step in the reversal of the regionalisation of both innovation and development. Regional Operational Programmes were merged into the newly established functional OPs, such as the Transport Development Programme; the Green

[8] The following paragraphs draw on the author's forthcoming paper (Szalavetz, 2014).

[9] Initially, regionally decentralised programmes were more popular than EU co-financed, centrally announced operational programmes targeting innovation, mainly because the former programmes required relatively little co-financing by recipients and advance payment was available. In contrast, the required level of beneficiaries' co-financing in the case of operational programmes is often above 50 %. Moreover, regionally decentralised programmes were much simpler to administer, whereas OP-support constitutes hardly bearable administrative burden for beneficiaries.

Economy Programme; the Health Industry Programme. The innovation related initiatives that used to be incorporated in the regional operational programmes were merged in the centrally managed Science and Innovation Programme.

As of 2010, RIAs received no more budgetary funding to cover the costs of their public benefit activities (in the 2000s, their activity was funded from national sources). The traditional institutional instability that characterises the Hungarian innovation and public administration systems was exacerbated following the parliamentary elections in 2010. The governance of regional innovation has undergone radical changes. The stated objective of these changes was to speed up the absorption of EU Structural Funds. Obviously, the real aim of the adopted institutional changes: to further centralise the decision-making on the allocation of funding, was not communicated.

It has soon become evident that these changes reflect the complete reversal of past regionalisation moves (Pálné, 2013). Centralisation was preceded by a complete subversion of the system: no institution could retain its status and/or autonomy.

Past key actors of the regional innovation system included:

- Pannon Novum Regional Innovation Agency;
- Regional Development Agency of West Transdanubia (Westpa);
- National Development Agency (implementation of the Operational Programmes co-funded from EU Structural Funds);
- Hungarian Economic Development Centre (MAG Zrt) (administering and implementing Operational Programmes);
- VÁTI Hungarian Public Nonprofit Company for Regional Development and Town Planning (implementing the human resources related part of WT's Regional Development Programme), and
- National Innovation Office (implementing programmes financed from national funding, i.e. from the Research and Technological Innovation Fund).

The National Innovation Office was hollowed out in 2010, with the transfer of the authority on the Research and Technological Innovation Fund to the National Development Agency. The majority of NIO's experts were fired. Currently the government is planning to create a new institution, the National Research Development and Innovation Office which will exercise authority over NIO.

The National Development Agency, originally under the authority of the Ministry of National Development, was transferred under the authority of the Prime Minister's Office in 2013 (government decree 273/2013). In turn, the National Development Agency was dissolved as of 2014 (government decree 475/2013), and responsibility for the management and implementation of individual innovation-related operational programmes has been transferred to various ministries (to the Prime Minister's Office, to the Ministry for National Economy, Ministry of National Development, and Ministry of Human Resources.

VÁTI was dissolved and merged into the Hungarian Economic Development Centre (MAG Zrt). In turn, MAG Zrt. was dissolved in April, 2014 and its tasks and responsibilities have been delegated to the Ministry for National Economy.

Responsibility for the administration and management of the human resources development projects of WT's regional operational programme, which had been managed by VÁTI was transferred to the West Transdanubian Regional Development Agency.

Originally in regional ownership (owned by the West Transdanubian Regional Development Council), Westpa became state-owned under the authority of the Ministry of National Development as of January, 2012 when the Regional Development Councils were dissolved. Westpa changed its status again in January 2014, when the three (NUTS3) counties of the region became the owners of the Agency. Nevertheless, Westpa continued to administer and manage the projects related to WT's Regional Operational Programme.

These institutional changes coupled with the firing of experts, dispersion and redistribution of authorities and responsibilities have necessarily slowed down the absorption of EU Structural Funds. In order to remedy this situation, the National Development Steering Committee (NDSC) was created to supervise and decide on large-scale development projects and most of the innovation related projects. NDSC has four members: it is led by the Prime Minister and its members are the minister for national development, the minister of the economy and the minister of the state (Prime Minister's Office). Note that the Managing Authorities of the Operational Programmes have also become subordinated mainly to these ministries.

As a consequence of these changes it is fair to claim that a 'single-actor' governance system has been established in Hungary. Although seemingly fragmented and chaotic as a result of 1) the frequent redistribution of authorities; 2) dissolution of existing institutions and creation of new ones; 3) establishment of parallel institutions with no clear delineation of authorities and responsibilities; 4) dispersion of authorities and responsibilities with respect to innovation policy among a large number of institutions (Gál, 2013); 5) the firing of the lion's share of past experts – the allocation of funding from EU Structural Funds (that accounted on the average for 57% of annual government budget outlays on R&D in Hungary over the period between 2007–2013[10]) has become unprecedentedly centralised.

In summary, the new innovation governance system marks a return to a hierarchical, paternalistic redistribution and subsidy allocation that characterised both the socialist era and the early transition years (till 2004-2005). It represents a formal break with the half-hearted attempts that characterised the second half of the 2000s, to switch to partnership-based regionalisation.

Note that up till the end of 2013, regional innovation strategy development has remained an example of textbook-type decentralisation: a bottom-up, participatory exercise, carried out by the regional innovation agencies. A wide range of regional stakeholders have been involved in strategy drafting, consequently both the regional innovation strategy of WT (RIS Navigator, 2011) and WT's RIS3 strategy accurately focuses on the specific challenges of the regional innovation system. On the other hand, counties' empowerment became manifest also in the field of strategy drafting: since, the national-level strategy for smart specialisation that was completed in 2013 will be drafted anew in 2014: the new S3 strategy will draw on county-level inputs (see section 3.1 for details). Nevertheless, the territorial scale of inputs can be considered practically irrelevant, considering the fact that policy implementation is isolated from strategy design.

The table below gives an overview of innovation policy governance.

[10] Source: Veugelers, 2014. The average of 57% has significantly increased over the programming period. Although no data are available about the share of Structural Funds in GBAORD in the 2011-2013 period, the official statement that 95% (!) of total publicly financed investment is financed from EU resources (http://ec.europa.eu/budget/mycountry/HU/index_en.cfm) justifies much higher estimated figures with respect to GBAORD as well.

Table 1 Innovation Policy Governance

	Description	**Comment**
Degree of general regional autonomy	From low to none at NUTS2 level and from none to low at NUTS3 level. In the 2014 – 2020 programming period each county will be allocated development funding of HUF 25b, ~€83m to finance selected development projects incorporated in county-level operational programmes	In the 2014-2020 programming period development related funding within the (Territorial and Settlement Development OP) will be subject to partial decentralisation. The share of this OP is 16.15% of total funding available, and 40% of this amount will be allocated in a decentralised way.
Degree of autonomy with regard to innovation policy	Low autonomy: restricted to strategy drafting	Innovation policy is implemented centrally
Set-up of regional governance system (centralised/de-centralised/fragmented)	Centralised, with county government offices as main bodies of control and implementers of central decisions	Double structures, parallelisms, no clear delineation of authorities and responsibilities
Nature of the process of strategy development (top-down/bottom-up/participatory	Bottom-up, participatory strategy development	Territorial strategies are considered neither in national strategies, nor in central decision-making
	Description	**Comment**
Intra- and inter-regional co-operation	Used to be strong in the 2000s, much less intensive in the 2010s, albeit still present	Actors' commitment to collaboration gradually lost momentum due to lack of financing, frequent organisational restructuring steps that resulted in fluctuations in staff, and broken network linkages

3. Innovation Policy Instruments and Orientations

3.1 The Regional Innovation Policy Mix

Compared to the 2000s, regional innovation strategy drafting activities significantly intensified in the early 2010s. Previously, a comprehensive regional innovation strategy (RIS) was prepared in 2001 that covered a period of a decade and was used as a point of reference by regional policy-makers, even at the end of the 2000s. Although some complementary strategies were also prepared over the past decade, such as the Regional Development Programme of the region (2000-2006), the Pole Programme (AUTOPOLIS West Transdanubian Development Pole), WT's Information Society Strategy, there were only two clear overarching strategies that guided innovation and development policy implementation: the 2001 RIS and the West Transdanubian Regional Operational Programme of 2007-2013.

A new round of strategy drafting activities began at the end of the 2000s. The second comprehensive regional innovation strategy (RIS Navigator, 2011) was prepared by 2011. Some new priorities were set, and selected traditional priorities were sustained. RIS Navigator described the strategic orientation of the regional innovation policy over the period between 2012 and 2020, and provided specific details for the short term, i.e. for the period between 2012 and 2015. Although this strategy has not become outdated, a couple of months following its acceptance, compliance to the reform of the EU Cohesion Programme necessitated the drafting of a new regional innovation strategy that is in line with the concept of smart specialisation. West Transdanubia's RIS3 was submitted in April 2013. Meanwhile the orientation of the new government with respect to territorial development was radically transformed (as detailed in section 2 of this report) and regions were not considered any more the basic units of territorial development. Authorities and responsibilities shifted to the NUTS3 level (to counties). This ideological turn coincided with the rejection of the national level S3 strategy by the European Commission. The reason of the rejection was that national S3 strategy was expected to draw on regional inputs (on RIS3s), but in reality RIS3s and the national S3 were world apart. EC required a major revision, and a new round of strategy drafting began in 2014. This time, policy-makers explicitly asserted that the national level document intends to draw on county-level inputs. Hence, three county-level strategies have been prepared in West Transdanubian counties.

This lengthy enumeration was necessary to demonstrate that there are at least five strategies in place for regional innovation: the RIS Navigator, WT's RIS3 and the three county-level strategies.

This will however not cause any disarray, because, as detailed in section 2, the content of support measures is unrelated to any of these strategies: support measures are drafted at the national level, and selection among the applicants is decided upon centrally.

This is why the changes in the orientation of regional innovation policy, however interesting they are, because they reflect regional innovation policy-makers' recognition of the changing framework conditions and orientations during the 2014–2020 period, are more or less irrelevant. It is the national level that shapes the features and determines the content of the new policy mix. Nevertheless, the following paragraphs provide some details about the changing orientations as reflected by the new regional innovation strategies.

As a matter of fact, the current orientation of regional innovation policy-makers – as reflected by the new regional-level documents – is characterised by both continuity and change. Continuity, i.e. the continuation of some previous policy measures is required in terms of support to innovation capacity building. The competitiveness improvement of the region's innovative companies; of the region's higher education and research facilities; and of innovation services providers still figure high among the policy objectives. At the same time new elements in regional innovation policy-makers' orientation necessitate some new components within the mix of policy measures.

New orientations include new sectors and industries innovation policy should focus on, such as creative industries and green (eco-) industries and design for innovation. These new orientations can be addressed through some of the previously adopted policy measures, such as support to cluster-based or industry-university-specific collaborative innovation, support

to the development of incubation and innovation management services, support to start-up and spin-off formation, support to investment in new technology, etc. but the mix of these policy measures will have to undergo some restructuring. More emphasis should be laid on collaborative initiatives, networking, joint innovation and technology transfer and innovation vouchers at the expense of direct cash transfers that support companies' investment in new technology. New innovative policy measures should be introduced that effectively address the competitiveness of the business ecosystem, particularly in the field of creative industries ('creative vouchers' to be used for design-specific services, and/or for marketing).

Another new element in the orientation of regional innovation policy documents is the increased recognition of the importance of demand-side instruments. WT's RIS3 lists some results in terms of awareness increase (e.g. the establishment of two interactive exhibition centres etc.) and contends that increased resources should be allocated to other demand side instruments as well, for example 1) to innovation vouchers – to be used for R&D services; or IPR consultancy; 2) to the establishment of new technology oriented start-ups, e.g. in creative industries; 3) to the promotion of technology transfer, e.g. through rapid prototyping; 4) to the promotion of companies' foreign market access, through training, employment of foreign trade, marketing and innovation management experts.

Instead of direct cash transfers to companies, innovation services ought to be developed and diversified. New requirements include the expansion of business angels' networks, enhancement of regional business incubation services; improvement of regional innovative stakeholders' access to financing e.g. to risk capital, or to micro-credit.

Before discussing the innovation support measures that are currently in place, it should be noted that EU Structural Funds (and other programmes such as FPs, CENTROPE, SEE, CIP etc.) constitute practically the only funding sources of innovation support: national funding (from the Research and Technological Innovation Fund) is minimal, especially in the convergence regions.

Previously, in the 2000s, 25% of the Research and Technological Innovation Fund was regionally decentralised. The Research and Technological Innovation Fund used to be financed from two sources: 1) from medium size and large companies' mandatory innovation contributions (0.3% of turnover) and 2) from the state's contribution (the yearly amount allocated from the state budget used to be equal to the one paid by business enterprises). Regional decentralisation ended in 2009 and by the early 2010s the state has also withdrawn from financing the Fund. In the early 2010s practically no support measures (financed from the Fund) were announced (except for some support to international bilateral R&D collaborations). As of 2012, most of the new support measures financed from the Fund targeted the Central Hungarian Region. Policy-makers' decision to restrict the allocation of the Fund's resources to Central Hungary was explained with the fact that innovative stakeholders in convergence regions were entitled to more diversified sources of support from EU Structural Funds than stakeholders in Central Hungary. Nevertheless, this biased distribution of the Fund's resources was mentioned as a serious problem by practically all policy-makers (and corporate actors) in all convergence regions, especially in West Transdanubia that hosts a large number of medium-sized and large enterprises that are net contributors to the Fund.

Partly as a result of extensive lobbying by the regional stakeholders, in 2013, government policy-makers decided to launch some new support programmes financed from the Research and Technological Innovation Fund, and make national innovation support available also for stakeholders in convergence regions.[11] The aim of the new initiatives was to compensate large companies that are net contributors to the Fund. A significant share of this support was earmarked to the government's strategic partners. The system of strategic partnership was introduced in 2012: the government signed strategic partnership agreements with the key

[11] In 2013, HUF 20.57b was planned to be allocated from the Research and Technological Innovation Fund (government decree 1036/2013).

foreign-owned companies (up till 2014 with more than 40 companies[12]). According to government decree 1126/2013 HUF 8.8b (~€29.3m) was earmarked from the Research and Technological Innovation Fund for the strategic partners of the government in 2013. Two programmes have been announced: the 'R&D Competitiveness and Excellence Programme'[13] and 'Support to building a start-up ecosystem'[14]. In the framework of the former programme, earmarked for strategic partners, large-scale integrated R&D programmes could gain support. Two companies were supported in WT: an agricultural company (~€5.4m for the project agricultural climate[15], with an aid intensity of 95%) and Opel Szentgotthárd Hungary (~€5.3m for R&D capacity enhancement, with an aid intensity of 91%). [16]

Otherwise the lion's share of total innovation support was allocated from two Operational Programmes of the New Széchenyi Plan: the Science and Innovation Programme and the Enterprise Development Programme. The four most important objectives the policy measures funded from these programmes targeted, were beneficiaries' 1) investment in new technology; 2) R&D activities; 3) development of higher education institutions' infrastructural, organisational and R&D capacities; 4) innovation collaboration.

A large number of beneficiaries (251)[17] received support from a measure that facilitated business enterprises' investment in new technology: 'Support to SMEs' use of innovative results'. Another measure directly addressed dental companies' investment in up-to-date technology: 'Support to innovation in dentistry' (number of regional beneficiaries: 40).[18]

Other measures supported stakeholders' R&D-undertakings (though they included elements that supported investment in new technology and/or research infrastructure): 'Support to market-oriented research and development' (number of regional beneficiaries: 26); 'Support to enterprises' complex technological innovation' (number of regional beneficiaries: 31); Support to R&D at accredited innovation cluster member companies '(number of regional beneficiaries: 4); 'Support to R&D umbrella projects' (number of regional beneficiaries: 2); 'Support to basic research activities carried out in the framework of international collaboration' (number of regional beneficiaries: 7); 'Support to ICT-based research and higher education' (number of regional beneficiaries: 2).

Some policy measures targeted human resources development: 'Support to cross-border collaboration in the field of vocational and adult education' (number of regional beneficiaries: 5); 'Support to regional and sectoral collaboration of higher education institutions' (number of regional beneficiaries: 3); 'Support to the development of higher education institutions' curricula in mathematics, engineering, natural sciences and information technology' (number of regional beneficiaries: 3).

Several other innovation-specific support measures were incorporated in the Enterprise Development Programme of the New Széchenyi Plan. In fact, there were non-negligible overlaps between the two programmes from innovation policy point of view: investment in new technology was equally supported by this latter programme ('Facility Development and Industry Location for Territorial Cohesion' number of regional beneficiaries: 28); R&D activities gained support e.g. 'Complex technology development for micro enterprises and SMEs' (number of regional beneficiaries: 323 in two rounds). Moreover, the Enterprise

[12] Source: http://2010-2014.kormany.hu/hu/nemzetgazdasagi-miniszterium/strategiai-partnersegi-megallapodasok

[13] Source: http://palyazat.gov.hu/doc/3943

[14] All the beneficiaries of this project were Central Hungarian Stakeholders.

[15] No other information is available on this project.

[16] Source: Opten Ltd. http://www.opten.hu/1758-2013-x-24-korm-hatarozat-j238613.html

[17] Data for the number of beneficiaries and the volume of the allocated support reflect the state-of-the-art of June, 2014.

[18] This is a strange and a highly unorthodox policy measure: only in this region ~€4m has been distributed to dentists' purchase of new technology, which cannot be considered as a real innovation even in the broadest sense of the term.

Development Programme addressed other phases in the innovation cycle: support was allocated to micro enterprises' and SMEs' market access; to companies' investment in integrated enterprise information systems and in e-commerce (the number of regional beneficiaries was 147), to cluster-based collaboration (the number of regional beneficiaries was 19) and to the creation of start-ups and spinoffs (the number of regional beneficiaries was 20). Some measures combined investment in new technology and employment increase (Support to complex technology development and employment': the number of regional beneficiaries was 37).

In addition to the above-enumerated measures, several others were announced that supported innovation but there were no winners in the surveyed region. Examples include 'Support to pan-European innovation collaboration'; Support to gaining the title of an Accredited Innovation Cluster'; 'Support to Accredited Innovation Clusters' joint innovation activities'; 'Support to innovation and technology parks and to development centres'; Supplier programme (within the Science and Innovation programme).

In summary, a wide range of support measures was available for regional stakeholders that were incorporated in two programmes of the New Széchenyi Plan: in the Enterprise Development Programme and in the Science and Innovation Programme. Some of the measures addressed demand for innovation, such as 'Support to micro enterprises' and SMEs' market access'; 'Support to companies' investment in integrated enterprise information systems', 'Support to cluster-based collaboration'; 'Support to the creation of start-ups and spinoffs'.

A couple of measures addressed public and social innovation. 'Support to cultural institutions' participation in extracurricular education' was an interesting measure that supported innovation in education provision (the number of regional beneficiaries was 57). Another measure: 'Support to public education institutions' services provision aiming to develop creative industries-related basic competencies' triggered creative responses from local stakeholders, who developed new types of courses for different generations (children, students, young adults etc.) (the number of regional beneficiaries was 15). The 'Constructive Communities' programme (22 regional beneficiaries) fostered the development and introduction of new forms of learning. Lifelong learning and digital education were promoted by the measure 'Knowledge Depo Express' that fostered services development to enhance the digital competencies of the underprivileged.

One comprehensive evaluation report was prepared by Expanzió Ltd. for the National Development Agency (Expanzió, 2011) that assessed the efficiency of interventions. According to the report (that scrutinised programme implementation at the national and not at the regional level) implementation can be characterised by poor efficiency, low absorption level, which is due to the excessive complexity of the calls for tenders. Resources have been fragmented, the critical mass necessary for breakthrough improvement was lacking. No attention was paid on the measurement of competences and project implementation was lacking the necessary quality control. Action plans were frequently rewritten nevertheless there was no demand for some components of the programme while other components were so popular that they quickly became short of the necessary resources. There were significant delays in contracting and transfer of resources. Sustainability aspects were ignored, which will cause huge problems for beneficiaries.

There is a chance that future policy measures will address the requirements stemming from the new policy orientation of the regional development documents. At the current state of the affairs, only some draft documents can be analysed: 1) Hungary's development programme for the period between 2014 and 2020, based on the final draft of Hungary's Partnership Agreement submitted to the European Union in July 2013; the draft versions of the Economic Development and Innovation Operational Programme (GINOP); the Territorial and Settlement Development Operational Programme; and the Human Resources Development Operational Programme. GINOP contains all the innovation related priorities elaborated for the 2014 – 2020 programming period. The draft Partnership Agreement analyses the alignment between national development priorities and EU-level thematic objectives and suggests that the above-detailed policy priorities of the regional documents (that had interiorised EU thematic objectives) will all be addressed by national policy

measures. As for the two draft operational Programmes, they are necessarily broad-based and comprehensive (GINOP contains all possible innovation-related objectives and the Human Resources Development OP contains the priority of investment in higher education institutions' infrastructure and human resources development). At this stage of planning and programming the documents suggest that they will address each region's requirements. The Territorial and Settlement Development Operational Programme does not include any par excellence innovation-specific objectives, though, according to one of the interviewed stakeholders, some minor local innovation projects may get support from this programme, provided they contribute to job creation as well. Otherwise, innovation support can be accessed to only from the Economic Development and Innovation Operational Programme. Some other Operational Programmes may also address innovation-specific objectives and allocate support funding to their implementation, in particular the Environment and Energy Efficiency OP that explicitly states the necessity of support to environment and energy efficiency related R&D projects among its planned actions. Moreover, demonstration projects, and projects that improve the adoption and use of innovative solutions that improve energy efficiency or diminish environmental harm are also planned to be supported in the coming programming period.

Table 2 Existing Regional Innovation Support Measures

Title	Duration	Policy priorities	Budget	Organisation responsible	More information
Development of the region's innovation potential through support to innovative start-ups	2012	4.3. Fostering start-ups and gazelles 4.1. Direct funding to business R&D and innovation	€583k	National Development Agency	http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/support-measure/development-regions-innovation-potential-through-support-innovative-start-ups-0
Support to market-oriented R&D	2011 - 2012	4.1. Direct funding to business R&D and innovation 4.2. Organisational, process and other non-R&D innovation	€ 20m	National Development Agency	http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/support-measure/support-market-oriented-rd-activity-2
Support to the use of innovation results for SMEs	2011 - 2012	4.1. Direct funding to business R&D and innovation 4.2. Organisational, process and other non-R&D innovation	n.a.	National Development Agency	http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/support-measure/support-use-and-application-innovation-results-smes-0
Support to enterprises' complex technological innovation	2011 -2012	4.1. Direct funding to business R&D and innovation	€11m	National Development Agency	http://palyazat.gov.hu/doc/2690
Support to complex technological innovation of enterprises in AICs	2011 -2012	2.1. R&D cooperation projects between academy and industry 4.1. Direct funding to business R&D and innovation	€1.1m	National Development Agency	http://ec.opa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/support-measure/support-complex-technological-innovation-enterprises-aics
Dental Innovation	2012 - 2013	4.1. Direct funding to business R&D and innovation	€4m	National Development Agency	http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/support-measure/dental-innovation-innovation-dentist-services

Title	Duration	Policy priorities	Budget	Organisation responsible	More information
Support to R&D umbrella projects	2012	4.1. Direct funding to business R&D and innovation	€ 600k	National Development Agency	http://palyazat.gov.hu/doc/3555
Support to research of future-oriented ICT technologies and to ensuring the supply of IT-experts	2012	1.1. Institutional R&D funding 1.3. Research infrastructures 3.2. Training and life-long learning of researchers and any other personnel involved in innovation	€5.5m	National Development Agency	http://ec.europa.eu/enterprise/policies/innovation/policy/regional-innovation/monitor/support-measure/support-research-future-oriented-ict-technologies-and-ensuring-supply-it-experts

Source: RIM Plus repository West Transdanubia, Hungary.

Note: Duration means the period during which applications can be submitted. Budgetary allocations can exceed this period.

3.2 Regional Policies and Initiatives in Support of Advanced Manufacturing

WT, a moderate R&D-intensive region[19] is strongly specialised in manufacturing and features higher-than-the average concentration foreign direct investment.[20] Over the first decade of economic transformation foreign investment was dominantly efficiency-seeking. Investors' motivations have later diversified: efficiency-seeking investors in the automotive industry were followed by others whose aim was to supply the region's large foreign companies. Others established local production facilities to benefit from the gradually emerging clustering tendencies and from the availability of skilled workforce. The presence of higher education institutions and the substantial development of their research infrastructure; the intensifying industry-university linkages and the availability of dedicated support to innovation collaboration have led to the emergence of foreign investors' strategic asset seeking motivations in the 2000s. These new motivations have prompted several investors to increase their local commitment and upgrade their existing facilities.

In addition to automotive manufacturing and automotive supplier industries such as metal processing, metal injection moulding, plastic moulding, and automotive electronics, the region is also specialised in wood industry. The region's first Accredited Innovation Cluster is in wood industry: Pannon Wood and Furniture Cluster.

A number of national and regional organisations are involved in supporting advanced manufacturing (AM) related activities, including technology development, education and training and industrial R&D and innovation. The key national organisations are the ones involved in EU co-financed territorial development, i.e. the Managing Authorities of Operational Programmes, particularly the Science and Innovation Programme of the New Széchenyi Plan. Regional actors include Pannon Novum Regional Innovation Agency, the West Transdanubian Regional Development Agency; Nyugat-Pannon Zrt (Regional Development Holding) engaged in innovation financing; several entrepreneurship development organisations, such as the West Pannon Regional and Economic Development Public Nonprofit Ltd., the Nyugat-Pannon Entrepreneurship Development Ltd.

With the ongoing restructuring of the institutional system of territorial development, county-level (NUTS3 level) actors have emerged as new, powerful organisations that play an increasingly important role also in the support of AM related activities. New actors include county level municipalities (Gyor-Moson-Sopron, Zala, and Vas): they prepare the counties' mid-term development plans and suggest projects to be incorporated into the Operational Programmes. Furthermore, county-level foundations for enterprise promotion are also important services providers (consultancy, fundraising) to actors (among others) in AM.

As this list makes it clear, there are no public (national, regional or county level) organisations dedicated specifically to the promotion of AM. There is however a private, for profit organisation, Technológiai Centrum Ltd. that has an important role: it is a research and development services provider for industry in Zala (and neighbourhood). Technológiai Centrum is at the same time engaged in practice-oriented education and training provision to engineers. In collaboration with its industry partners, it organises R&D-projects based education and training for the region's engineering students. Projects are carried out at the partners' sites. Companies can thereby get an impression about students' abilities and these students may later find a job at the given companies. This initiative received support from the Social Renewal Operational Programme in 2013 under the programme (Support to regional and sectoral collaboration involving higher education).

[19] Over the past years, the R&D-intensity of the region evolved from a position at the top of 'modest R&D-intensive regions' towards the one of a 'moderate R&D-intensive region'. In 2010, regional GERD accounted for 0.58 of regional GDP; in 2011 it passed the threshold with an indicator of 0.65%, whereas in 2012, the respective indicator was 0.60.

[20] According to the most recent statistics published by the Hungarian Central Statistical Office, WT's industrial output accounted for 17 % of the total national industrial output in 2013. Industry accounted for 44% of the region's total output in 2011.

Regional higher education institutions are important actors from the point of view of AM. Actively participating in innovation collaboration projects with industrial partners, hosting an automotive research and competence centre and being beneficiary of several supported projects that fostered investment in AM-specific research infrastructure and collaborative innovation projects, Széchenyi University in Gyor is a key stakeholder in AM-specific policy implementation.

AM-related priorities are present both in the regional smart specialisation strategy and in county-level strategies. Since the new national level smart specialisation strategy that constitutes the basis of EU-Hungary partnership Agreement will draw heavily on county-level inputs, it is necessary to analyse these latter strategies as well.

As for WT's RIS3, AM-specific priorities have been incorporated among the horizontal priorities under the headline 'Competitiveness improvement of innovative companies' in the region'. The proposed implementation measures included the development of innovative enterprises' access to consultancy services with respect to intellectual property right protection and management and support to R&D activities related to the region's key industries. Furthermore, the objective of the improvement of innovative enterprises' commercialisation performance through services that facilitate their market access, figures high among the proposed policy measures of WT'S RIS3. Other policy instruments, enumerated in RIS3 were also strongly related to AM-specific activities: the development of innovative clusters; the promotion of key enabling technologies; support to industry-university collaboration; the establishment/development of technology centres / competence centres, and science parks; the fostering of green innovation, and of industries that support the region's key industries, such as logistics, ICT and creative industries.

County-level strategies have detailed these broad objectives by listing specific projects to be submitted for support from Operational Programmes in the 2014-2020 programming period. One of the suggested projects is the development of ELTE Gothard Astrophysical Observatory. The Observatory is a modern multidisciplinary research and education base in Szombathely with up-to-date research infrastructure. Research at this centre of excellence will be increasingly linked to the region's electronics and machinery companies and it will facilitate their innovation-driven upgrading.

Additionally, the establishment of an Environmental Impact Analysis Centre and a Health Products Centre of Excellence is planned. The former will provide knowledge-intensive business services for companies in the green industry and in agriculture. The latter will be related to the regions thermal water based tourism facilities and to industries producing herbal health products.

As for the current initiatives supporting Advanced Manufacturing in the region, policy measures are integrated in the 1) Enterprise Development Programme and 2) Science and Innovation Programme of the New Széchenyi Plan. The former programme contains measures such as 'Collaboration among companies and support to clusters' (the programme supported regional enterprises' joint investment in machinery and equipment), and 'Facility Development and Industry Location for Territorial Cohesion'. In the framework of this latter measure support was provided among others to manufacturing enterprises' investment in energy efficiency and investment in new technology.

Earlier (in 2011-2012) this latter measure of the Enterprise Development Programme was announced separately: 'Facility development' and 'Industry Location'. Since they were considered effective, new rounds of calls for tenders have been announced, but in 2013 the two measures were consolidated into one complex measure.

The second AM-related programme is the Science and Innovation Programme with policy measures supporting enterprises' research, innovation and technology development activities. Two measures are directly related to investment in new technology: 'Support to enterprises' complex innovation'; and 'Support to SMEs' use of innovative results'.

A third measure targeted industry–university innovation collaboration (Support to regional and sectoral collaboration involving higher education). Although none of these measures explicitly mentioned advanced manufacturing, neither did they indicate any of the region's

key industries as specific priorities (since all measures are announced at the national level), several initiatives related to the region's key industries have gained support. In 2013 for example, support was allocated within the framework of this latter measure (Support to regional and sectoral collaboration involving higher education) among others to a machinery and mechatronics-oriented consortium (with several regional higher education institutions) and to Széchenyi University that formed a consortium with its automotive partners.

In addition to the above-detailed measures many others have also supported AM-specific activities in WT. For example, there were several companies among the beneficiaries of the measure 'Support to market-oriented research and development' whose activity can be considered par excellence AM-related. Nevertheless, the measure did not directly address AM, and there were beneficiaries from all sectors. Similarly, the measures that supported accredited innovation cluster members' complex technology development and innovation efforts are highly important from the point of view of development of AM, without explicitly mentioning AM. These measures were however not relevant in WT, since the region hosted no accredited innovation clusters up till mid-2013.[21]

In summary, although significant policy support is dedicated to AM-related activities in West Transdanubia, calls for tenders do not explicitly mention advanced manufacturing or 'technology-oriented renewal of manufacturing' as an objective. Terms such as 'competitiveness', 'modern equipment', 'technology', 'infrastructure', 'reconstruction and development of production facilities' 'collaboration, networking and clustering' are used. As for sectors: 'production' or 'services' activities are mentioned. In practice however, advanced manufacturing related activities have acquired support (among others).

As for policy learning, the evaluation report prepared by KPMG in 2013 (Evaluation of the programme: 'Complex technology development' (dedicated specifically to SMEs)) suggested that an important barrier of successful project implementation was that most of the calls for tenders prescribed 'job creation' in addition to technology development, research and/or innovation (creation of new jobs was an important selection criterion). KPMG suggested that employment-oriented programmes should be separated from technology development oriented ones.

Another finding of the evaluation report was that SMEs received substantial share of total support, which can have a negative side-effect: they may become overly dependent on support.

Content-wise, one of the deficiencies mentioned by the report was that the calls did not have a clear industrial focus. They were formulated excessively broadly hence traditional industries (metal processing, wood industry, food industry) and mature industries (automotive, machinery, chemicals) received quite a large share of total support (at a national level). Additional research is necessary to find out, whether the investment projects that have upgraded manufacturing companies' technology and improved energy efficiency would have been implemented anyway (without support), or whether support intensified companies' upgrading efforts, i.e. whether it provoked additionality.

Advanced manufacturing related initiatives have been explicitly linked to other policy fields such as training and education or sustainability – at least in the strategic documents. As for the structure of the Operational Programmes, individual policy objectives were separated and incorporated in different programmes, administered and managed by different Managing Authorities. One exception is the previously detailed call (Support to regional and sectoral collaboration involving higher education) which combined several objectives such as research, innovation, technology development, networking and collaboration and human resources development.

[21] Earlier cluster promotion measures targeted only clustering and the development of the services portfolio of the newly formulated clusters. In 2011, several stakeholders in WT gained support from these measures that simply promoted cluster-based innovation collaboration.

Integration of policy objectives was however accomplished by the beneficiaries who submitted applications to a number of calls, each of which envisaged different policy objectives.

As for international initiatives, regional actors are not involved in any AM-specific European platform projects such as MANUFUTURE or MANU-NET, SPIRE, etc. A cross-border (CENTROPE) initiative is however relevant for the region's AM-stakeholders. Centrope_tt (the former CENTRIS) is an international experts community for technology transfer and innovation support.[22] Several regional actors are members of this community, including the Regional Development Agency, Pannon Business Network Association, Chamber of Commerce and Industry of Gyor-Moson-Sopron County, three regional universities (Széchenyi University, University of West Hungary, Pannon University (a Keszthely-faculty).

When asked about good practice cases, regional stakeholders usually mentioned the PRACTING initiative that combines AM-specific objectives with another policy field that is highly relevant for the region's knowledge-based upgrading: the practice-oriented education of the region's undergraduate students in engineering and also in other disciplines. PRACTING is a long-standing initiative: it was established in 1996 with PHARE support. In the framework of this scheme, students in Széchenyi University spend a praxis semester at a company. Companies that participate in the scheme offer tutorial services for the students' thesis work (the topic is proposed by the company) and/or they guide and sponsor doctoral themes. Additionally, company representatives deliver courses at the university and finance investments in the university's research infrastructure. By 2011, PRACTING has had 163 corporate participants (134 domestic and 29 foreign companies) that offered practice oriented education to altogether 1450 students (Kardos, 2011). The majority of the corporate partners operate in the automotive industry and in electronics (key partners include Audi, Opel Hungary, and Rába, Magna Steyer, Nokia, Nemak and Philips). Examined however from the point of view of good *policy* practice this case is not relevant, since the programme received no public funding after the completion of the initial PHARE project: the participating companies finance the operation of the PRACTING Foundation and they are the ones that sponsor the initiative.

An AM-specific, policy supported initiative that can be considered a good practice case is the Mobility and Environment Programme of Széchenyi University and Pannon University, funded from the Social Renewal Operational Programme (amount of support is ~€10m). This project represents a research-driven approach to new technology-based upgrading of the region's manufacturing (mainly automotive) sector. The project included among others work packages aiming to develop technology for advanced manufacturing processes in the automotive industry. A good example is the integration of digital technologies in production processes, more specifically, the application of digital factory methods such as simulation, for the improvement of production scheduling at Audi. Other work packages included product-related basic research (internal combustion engines); and research on the integration of digital technologies in products (intelligent vehicles).

Since the completion of this programme in 2012, Széchenyi University has gained support for several other collaborative research initiatives the implementation of which may partially draw on the results and, particularly, on the capacity built in the framework of the Mobility and Environment Programme. New projects include research on hybrid vehicles, alternative fuels and drive systems (sponsored also by the Social Renewal Operational Programme (incorporated in New Széchenyi Plan's Science and Innovation Programme) and a collaboration project among automotive industry related higher education institutions (Széchenyi University, University of Miskolc, University of Óbuda, Pannon University and Kecskemét College). This latter project supports the development of consortium members' domestic (with industrial partners) and international linkages, members' collaboration in the field of research and innovation, members' capacity development and the development of automotive industry related education.

[22] Centrope_tt established a voucher scheme to facilitate SMEs' access to R&D services.

In summary, the main AM-specific challenges have apparently been well-recognised both by the region's key stakeholders and by policy-makers. In order to achieve an increased contribution of AM to the future of the region's industry, economic actors' innovation-based upgrading is indispensable. This requirement has been successfully addressed in the region through the above-enumerated programmes and initiatives, although a lot more needs to be done to achieve significant improvement of the indicators. Another recognised challenge is the necessity of the transfer (commercialisation) of advanced manufacturing related research results. Given Széchenyi University's outstanding linkage building efforts and results, i.e. its large and diversified portfolio of industrial companies that have over time become strategic partners of the university, endeavours related to meeting this challenge can also be considered successful.

3.3 Appraisal of Regional Innovation Policies

In a Hungarian context, any appraisal of regional innovation policies should start with the assertion that there is no *regional* innovation policy implementation. The system is characterised by a kind of 'façade regionalism': strategy drafting takes place at the regional level but implementation is centralised. National-level territorial development policies (i.e. the content of the policy measures) do not take regional strategic documents into consideration: innovation policy measures are uniform across Hungary, reflecting a 'one size fits all' approach. Nevertheless, the measures are formulated so broadly, that regional specifics can be incorporated in any project application.

The strong centralisation that characterises the system is manifest not only in the 'single-actor' decision-making character of the allocation of funding (see section 2). The *lack of a territorial approach* is reflected also by the composition of policy measures, classified according to their policy targets. These measures clearly demonstrate that innovation policy is considered a *functional policy field* in Hungary. The share of policy measures that promote innovation through direct support to research performers (in particular to business enterprises) is dominant, whereas the share of measures fostering the emergence or the strengthening of innovative regional milieus or measures that support the activity of local (regional) innovation intermediaries, or that of innovation services providers is minimal.[23]

Above and beyond

1. 'Façade regionalism' and excessive centralisation regional innovation policies are characterised by the following features:
2. The inclination of the government to substitute EU Structural Funds for national funding sources (for the Research and Technological Innovation Fund);
3. A prohibitively high level of institutional instability that from time to time destroys previously established linkages and reduces thereby both policy effectiveness and social capital;
4. The prioritisation of absorption over policy effectiveness and consequently a prohibitively high degree of waste of resources;
5. The inclination of the government to allocate funding in the framework of discretionary decisions characterised by lack of transparency (see details in some preceding sections);
6. The dominance of direct cash transfers in the form of non-refundable grants;
7. The neglect of the sustainability of supported projects (sustainability is simply prescribed as a conditionality of support, but existing policy measures do not facilitate this issue);

[23] Cluster promotion measures can in principle be labelled as measures targeting the local innovative millieu. However, measures that promoted clustering and the improvement of clusters' services portfolio, were last announced in 2012 in WT. Cluster promotion has shifted towards support to innovative companies within accredited innovation clusters, hence, cluster promotion has also become an instrument of allocating grants directly to business enterprises.

8. The dominance of supply-oriented measures at the expense of demand- and commercialisation-oriented ones;
9. The prioritisation of business enterprises over public research performers (see also Izsák et al., 2013);
10. The bias for Central Hungary in the allocation of innovation funding.

Moreover,

11. Project selection is based nearly exclusively on the appraisal of business enterprises' 'creditworthiness' rather than on *technology appraisal* i.e. the appraisal of indicators such as innovativeness of the undertakings (degree of technological extension or technological superiority); marketability and business prospects of the outcome; enterprises' R&D and technology management ability; related risks, etc.

Indeed, dominant part of the resources was allocated in the form of direct cash transfers to companies, despite the fact that over time, increasingly sophisticated innovation promotion measures have been incorporated into the policy mix. New, sophisticated measures, such as the promotion of cluster-based collaboration, industry-university innovation collaboration, promotion of start-ups and spin-offs, etc. complemented the traditional supply-oriented ones, but their share in total innovation promotion is still unimportant.

Policy learning is reflected by some changes in the composition of the measures, for example, the conditions of the cluster-based promotion opportunities were soon made much stricter than initially, since a plethora of new 'clusters' emerged and applied for funding. Current cluster promotion is restricted to accredited innovation clusters. This title is quite difficult to acquire and given that a significant volume of dedicated funding has been earmarked for accredited innovation cluster member companies, the severed conditions represented serious disadvantage for WT that hosted no accredited innovation clusters before mid-2013.

Moreover, the Hungarian system of accredited innovation clusters is not compatible with the European Cluster Excellence labels, which represents a waste of resources for internationalising local cluster members and for accredited innovation clusters themselves.

Despite some policy learning, the current OP-based innovation promotion system has a number of deficiencies. A major deficiency is the outstanding share of direct non-refundable cash transfers allocated to business enterprises in a non-transparent manner. Other deficiencies include the little coherence within the policy mix and the unpredictability of future calls, the large delays in decision-taking, contracting and in the transfer of support payment.

Nevertheless, the policy measures listed in the preceding sections seem to have broadly addressed the main challenges of the region. They have effectively intensified regional stakeholders' innovation activities, raised awareness for innovation and enhanced innovation collaboration. Policy support contributed to regional higher education institutions' significant capacity upgrading and has intensified their linkage building with industrial companies. Due to policy support, regional research infrastructure has been greatly developed, and expensive and sophisticated research instruments have been bought. Nevertheless, in most cases and not only in WT, the new infrastructure has been designated to serve selected industrial companies' specific needs hence these companies' investment in research infrastructure has been financed, indirectly, from EU funds. If universities' investment had thereby ensured long-term research collaboration with industrial partners and guaranteed a sustained source of income to fund the new equipment related research undertakings of both students and professors/researchers this would have been a logical decision. However, the contracts related to these projects (that were signed between universities and the Intermediate Bodies of the National Development Agency) were incomplete[24]. Return on investment was not considered, pricing issues (of the use of the new

[24] There is a huge academic literature about the economics of incomplete contracts that leave contracting parties rights and obligations vague and unspecified, see among others Hart&Moore, 1999; Hart, 2003; Seabright, 1996.

equipment) was not regulated, sustainability was not taken into account (universities had no funding to employ a person who operates the research equipment and another who develops business related to the equipment, etc. Sooner or later new investments were necessary with respect to the newly purchased equipment (upgrading of the related software, maintenance, purchase of low-cost items necessary for research based on the use of this equipment) and sustainability has this become hot issue for the university owners.

In summary, the non-deniable positive impact of EU co-financed support programmes notwithstanding, it should be noted that the use of Structural Fund resources has been far from being smart and effective. The amount of support Structural Funds have made available for regional stakeholders in the 2010s, was orders of magnitude higher than in the previous decade. Although innovation capacity accumulation is a hard-to-measure phenomenon, the opinion of both the regional correspondent and of some of the interviewed stakeholders is that enormous waste of resources occurred.

As for the results of external evaluations, it needs to be mentioned at the outset that most of the evaluation exercises focussed on output and process-type indicators, rather than on impact and outcome. Evaluations have been prepared at the national, not at the regional level (though regional innovation agencies do monitor the outcome of selected supported innovation initiatives). This monitoring results however in tacit knowledge rather than in formal reports. At the national level, only aggregate evaluations are available that investigated the 'impact' of policy interventions along broad thematic priorities (e.g. evaluation of programmes that supported higher education; evaluation of programmes that supported SMEs' innovation, evaluation of programmes that supported R&D and innovation). Individual policy measures were not evaluated.

The main findings of the evaluation of R&D-specific policy interventions were as follows (National Development Agency, 2013: 31-36).

Project selection was based on the evaluation of the potential beneficiaries rather than on the assessment of the innovativeness of the proposed undertakings. Supported projects feature high territorial and industrial concentration. Beneficiaries are located either in convergence regions' large 'university cities' or in Central Hungary and operate in the machinery industry (25% of the total in February 2013), metal processing (18%); chemical industry (16%) or transport equipment manufacturing (10%). Commercialisation should be laid more emphasis on, and support to start-ups should be enhanced at the expense of established companies with good growth potential. Support to start-ups should be complemented by innovation services, such as mentoring, consultancy. Venture capital funds need to be involved more intensively in the implementation of start-ups' support programmes. As for policy measures that support innovation collaboration, they should be diversified to include the specific focus of large company SME collaboration (emphasis should not be laid exclusively on accredited innovation clusters).

The report also analyses the impact of the supported projects. It underlines that the high risks that characterise R&D projects were not effectively mitigated for SMEs: aid intensity was considered too low to generate effective incentives to implement R&D-projects. The mechanism of support allocation was also criticised, claiming that project selection neglected the issue of return on investment. The measures that supported 'university/public research organisation and industry'-collaboration were considered effective. Some of the conditions of eligibility for support were considered superfluous by the experts who drafted the evaluation report, for example, sales increase as a result of project implementation is an overly risky requirement to be taken on. Similarly, job creation as a postulate of support to R&D projects is also burdensome for beneficiaries. Evaluators suggested these two requirements should not be included in future support projects.

The evaluation of the programmes that supported SMEs' complex innovation undertakings (National Development Agency, 2013: 37-44) revealed that more than half of the supported projects targeted companies' investment in technology development. In the convergence regions, 45% of the supported projects belonged to manufacturing industry. West Transdanubia benefitted from ~HUF30b (€100m). The evaluation suggested that project selection process should incorporate a (compulsory) mechanism of risk assessment. Publicly

available data about the applicant companies should be checked, including the number of their employees and the volume of applicants' net sales. As for the impact of the measures, the report found that it contributed to some extent to territorial cohesion, since a much larger number of small-scale projects were supported in underprivileged NUTS5 regions than in the relatively developed ones. (This does not apply to large-scale projects). The report prepared also an impact analysis based on a random sample of beneficiaries and analysis of control groups. A thought-provoking finding of this exercise was as follows. On the one hand, policy measures have definitely and significantly contributed to the increase of employment at beneficiaries. Beneficiaries' total assets also increased significantly. On the other hand, performance indicators such as sales, productivity or profit before tax have not improved. Another interesting finding was that more than 50% of beneficiaries have applied again for other calls for tenders (this high share applies to one specific component of the Economic Development Operational Programme that targeted SMEs) and 30% of total beneficiaries have gained support more than once.

Another evaluation report (Mike et al., 2013) addressed support programmes that targeted higher education, including measures that supported the enhancement of these institutions' services; investment in research infrastructure; and investment in higher education institutions-based R&D. The key messages of the report were as follows. Between 2007 and August, 2012, the total amount of support allocated to higher education institutions was HUF250b (~€0.9b). The number of professors and lecturers who received training was 2,400 until 2011; the number of implemented R&D projects was 180. The number of new, Bologna-conform curricula was 1,000. Additional indicators include 40 patents; 1,900 publications; 110,000 sq meters of new education-research facility space. In summary, the Hungarian higher education could benefit from complex infrastructural renewal. The impact of organisational capacity building is reflected by the diffusion of strategic planning practices, and by the intensification of research activities. Most of the resources have been spent on tangible investment in infrastructural and research facilities, which can be explained by the fact that these activities produce easy-to-measure indicators. Conversely, the development of curricular content or of student services is hard to measure and evaluate: long term strategic agreements between the government and the higher education institutions can provide better incentives for and control of these activities than contracts between these institutions and the National Development Agency.

The report formulated recommendations that are in line with the position paper drafted by EU officials in 2012. According to an important statement of the position paper, industry-university innovation collaboration has to be enhanced and more emphasis should be laid on the commercialisation of research results. The evaluation report contended that existing collaborative projects do not represent real collaboration, just 'side by side' work. The position of newly established technology transfer offices is usually weak within their universities. Evaluation experts recommended that universities' basic research projects should be addressed separately from applied and collaborative (industry-university) undertakings and funded from different sources. Regional knowledge centres should not be expected to meet the same criteria as science universities: the primary task of the former group is to ensure alignment between the supply of graduates and the demand of the regional labour market, and participate actively in collaborative applied research undertakings with regional industry actors.

A third evaluation report (Horváth et al., 2013) investigated the processes and the outcomes of cluster development in Hungary. According to the key messages of the report, policy-makers have to identify the key industries that have the potential to stimulate the regional economy and specific support measures need to be drafted that provide incentives to specialisation. Innovative clusters are more likely to concentrate in innovative areas (e.g. in urban, metropolitan regions and near universities), which territorial characteristics should be taken into account when drafting accredited innovation cluster-based programmes. In the 2010s, emerging and developing clusters were promoted by the regional operational programmes, while established and innovative clusters were targeted by the Economic Development Programme and later by the New Széchenyi Plan's Science and Innovation Programme. The report recommended that future cluster policies should focus on established successful and innovative clusters (in particular, on members' joint investment projects and

on other collaborative projects), rather than on emerging clusters. The monitoring of cluster-based development should be enhanced. The development of existing clusters' mentoring services and the diffusion of national and international best practices (including benchmarking, virtual platform, trainings for cluster managers) should also receive support in the next programming period. The evaluation of the Hungarian accredited innovation clusters should be harmonised with the evaluation systems of the European Cluster Observatory.

3.4 Good Practice Case

This section will analyse two cases of policy practice. The first one is a case of bad practice, demonstrating that new programmes, new policy measures are announced in an ad hoc way. Given the lack of national policy attention to the regional innovation strategies, the newly announced programmes do not necessarily complement each other. Regional stakeholders cannot see any coherent strategy that would influence the new calls for tenders. Nevertheless the case study below is included under the headline of good practice case, since it demonstrates that some of the best innovative actors managed to solve the problems arising from this deficiency of policy formulation. Nevertheless, this section includes also another good practice case, which is considered a promising one by the interviewed regional stakeholders. However, since this programme is relatively new, no tangible outcome can be identified yet.

The case described first is related to the implementation of the objective of innovation capacity upgrading. Several seemingly unrelated programmes and measures announced in the framework of the New Széchenyi Plan envisaged this policy objective. Their complementarity was however recognised by innovative actors, who submitted applications to a variety of projects. Several beneficiaries of past tenders participated in new rounds (new calls for proposals) of the given scheme and also in other programmes that addressed seemingly different policy objectives. The phenomenon that successful applicants were beneficiaries of several, more or less interrelated schemes all of which envisaged innovation capacity upgrading ensured a greater effectiveness of policy interventions.

This phenomenon can be explained by two factors. One is that gaining support from Operational Programmes has strict conditions that can be met by relatively few companies. This explains the fact that MNCs' well-capitalised local subsidiaries were more successful in tendering than indigenous SMEs, although these latter were specifically addressed by some of the calls. The other factor is referred to as the Matthew effect of public subsidy allocation. According to Merton (1968), initial advantage (in our case: public subsidy allocation to support specific firms' R&D and technology development activities) begets further advantage, i.e. there is an observed persistence in the allocation of support to past recipients. Participation in tenders necessitates and involves the accumulation of project application competences, which can later be used again in the case of subsequent tenders. Successful project completion improves the credibility of support recipients who have greater chance to become supported again.

This phenomenon led to a positive outcome which may have not even been foreseen by Hungarian policy-makers: the fact that individual calls addressing specific policy objectives could build on each other and could provoke thereby a virtuous circle at support recipients. Since innovation capacity building is a long process necessitating the accumulation of both tangible and intangible assets, it is indispensable that selected policy measures complement each other.

Several components (policy measures) of the New Széchenyi Plan's programmes (in particular the Enterprise Development Programme and the Science and Innovation Programme) contained measures that complemented each other, all envisaging innovation capacity development. Accumulation of tangible assets to further this objective was facilitated both by the policy measures 1) 'Complex technology development for micro enterprises and SMEs' (previously labelled as 'Technology development at micro enterprises and SMEs'); 2) 'Support to investment in integrated enterprise system and e-commerce'. Both measures were part of the Enterprise Development Programme, whereas the measure 'Support to the use of innovative results at SMEs' was part of the Science and Innovation Programme.

Complementary to tangible investment in new technology, another measure ('Support to companies' complex technological innovation' within the Science and Innovation Programme) supported research and innovation activities, the implementation of which necessitated the new technology. A further stage in the innovation cycle was supported by the measure 'Support to micro enterprises' and SMEs' market access'.

Taking the list of the companies supported by the measure 'Support to the use of innovative results' as a point of departure, the author of this report selected one company: an indigenous automotive supplier with 128 employees and sales of ~€4.9m in 2013 among the 251 beneficiaries. The selected company received support of ~€80k in 2012 (support intensity was 65%) for the purchase of specific production equipment. Searches have been conducted at the website of the New Széchenyi Plan to check, whether the company in question had been beneficiary of other supported actions as well. In the same year the company gained support (of ~€470k) from the programme 'Support to companies' complex technological innovation'. The detailed description of the project revealed that the development of new (contract manufacturing) services necessitated the newly acquired production equipment (i.e. the two calls complemented each other). A year earlier, the company was beneficiary of support (of ~€55k) to purchase and install an integrated enterprise system (which is often a precondition of supplier contracts). Over a period of three years (between 2011 and 2013) the company gained support from three additional calls facilitating investment in new technology, development of human resources and development of new services based on new technology. The question, whether public support had been used smartly, can be partially answered by analysing the company's performance indicators. Sales increased by 16 % over the surveyed period and employment by 23%. Analysis of additional documents (newspaper articles, cluster documents, documents of industry–university collaboration, the company's website, etc.) demonstrates, this company's case is a good example of new technology and innovation-driven expansion.

Although this mini case study covers the example of one single company, the message of this good practice case can be generalised (there are a lot of similar cases of repeated winners of public support): policy measures should build on each other and accompany thereby recipients to further stages of the innovation cycle. As a matter of fact, the case study also demonstrates that the Hungarian science, technology and innovation policy should improve the structure of its programmes, since currently the coherence and the continuity of policy interventions are ensured by 'integrator beneficiaries' that submit application for support to various interrelated programmes, rather than by smartly drafted and scheduled programmes.

Another policy measure that can in fact be considered a good practice case in the region was the recently announced call for the establishment of innovative start-ups. This policy measure was incorporated in the regional operational programme of WT. Total funding earmarked for this programme was HUF 200m (~€700k) which was significantly smaller than the funding earmarked for the identical programmes in other convergence regions (HUF 500m, €1.7m). According to the interviewed regional innovation policy stakeholder, this biased allocation of funding is neither fair, nor logical. WT was allocated a relatively smaller amount of total support because the development level of this region is higher than the one of other convergence regions. Nevertheless, according to the interviewed expert, it would have been more reasonable to consider a region's innovation potential when deciding about the distribution of funding earmarked for individual innovation support programmes. In WT for example more start-up initiatives could have received support. In 2013, 20 project proposals were selected for funding (the total amount of support was ~€560k). As expounded by the interviewed stakeholder, this policy measure was a good example of support to par excellence innovation-related activities, since most of the support allocated in the framework of other programmes targeted either R&D activities or companies' investment in new technology. This was one of the few programmes that targeted commercialisation. The services that accompanied beneficiaries' direct financing included project mentoring and consultancy with respect to the preparation of a business plan; access to venture capital services; and linkages building with potential business partners.

3.5 Possible Future Orientations and Opportunities

The strategic documents that were recently prepared by regional stakeholders (such as RIS3 and county-level strategies) have reiterated some of the past challenges and opportunities, claiming that innovation policy should keep focusing on them. These include

Enhancement of regional economic actors' R&D-based upgrading.

This objective remains to a key priority in the future, since the region's innovation performance is still – all policy efforts and non-negligible support notwithstanding – far below its potential: it is below the level suggested by its economic performance. In addition to the traditional policy instruments, such as direct support to enterprises' R&D and technology development initiatives, to universities' investment in research infrastructure, to collaborative projects etc. more emphasis is going to be laid on the establishment of competence centres

Improvement of the supply of skilled human resources.

Despite a range of policy instruments and programmes targeting the improvement of the infrastructural conditions of higher education, especially in engineering and natural sciences, an important barrier that hinders further economic upgrading is the prevailing insufficient supply of highly skilled engineers. Several programmes have been implemented to channel students to engineering studies, rather than to humanities or social sciences. Nevertheless the supply of engineering graduates could not keep up with increasing demand for them. A catch 22 situation: the more programmes targeted knowledge-based upgrading (in terms of FDI attraction to high-technology sectors; in terms of promoting existing investors' and subsidiaries' climbing the technological ladder; in terms of enhancing investors' local embeddedness and innovation collaboration with local stakeholders), the more the demand for highly skilled workforce increased.

Fostering the regional embeddedness of multinational companies' local subsidiaries.

Past policy instruments including clustering; supplier development (support to indigenous companies' investment in new technology to make them capable to become multinational subsidiaries' suppliers) and promotion of industry-university collaboration were considered more or less successful (by the interviewed stakeholders). Nevertheless, multinational companies' regional embeddedness is still to be improved, which necessitates further policy efforts. Focus should be placed on innovation collaboration, on the increase of companies' regional supplier basis and on the upgrading of existing suppliers.

Clustering and the establishment of new competence centres

Although the region was among the first ones where bottom-up clustering tendencies were identified by regional economics researchers, it was only in 2013, when one of its clusters first received the title of an Accredited Innovation Cluster. Since Operational Programmes laid much emphasis on cluster-based innovation promotion and several specifically dedicated programmes have been announced for accredited innovation clusters, policy-makers consider it important to enhance regional clustering tendencies (intensify collaboration among stakeholders) and facilitate existing clusters' accreditation process. At the same time stakeholders' innovation collaboration can be enhanced also through the establishment of competence centres that provide R&D-intensive services to them. A whole range of new competence centres are planned (besides the further development of the existing ones in automotive industry and mechatronics). New ones are related to green industry and sustainability, health industry, physics and big data analysis.

As for the sectoral opportunities, both the strategic documents and the interviewed stakeholders emphasised that policy attention needs to be sustained with respect to the region's traditional sectoral strengths, such as the wood and furniture industries, the automotive industry and mechatronics-related industries that constitute the supplier basis of the automotive companies.

At the same time new sectoral orientations were also mentioned:

- Within the automotive sector: e-mobility

Strategic documents lay increased emphasis on e-mobility, the development of electric vehicles and the related infrastructure is bound to benefit from increased policy support in the 2014 – 2020 programming period. As a matter of fact, e-mobility cannot be regarded a brand new orientation of innovation policy: it draws on past projects and important past achievements. Past projects include ELMO (FP7), aiming at developing transnational electromobility solutions, and REZIPE (Renewable Energies for Zero Emission Transport in Europe) – regional stakeholders were partners in both projects. A recent achievement is the development of an electric car (prototype) at Széchenyi University Gyor and its successful testing in urban traffic.[25] In the future, more systematic emphasis will be laid on e-mobility, including the development of an e-mobility strategy and support to the development of zero emission transportation solutions.

- Logistics

Logistics can also be considered an old–new orientation of innovation policy, mentioned in practically all regional documents. In order to benefit from the region's geopolitical assets, i.e. from the fact that it is a border region neighbouring four countries, non-negligible innovation-driven logistics development is indispensable. Hence, logistics (e.g. drafting of logistics action plans, implementing pilot projects, creating logistics competence centres, developing logistics-oriented evaluation methods) figures high among future priorities and policy orientations.

- Focus on creative industries and on design for innovation

Creative industries and design for innovation constitute a par excellence new orientation in innovation strategy. They received strong emphasis partly because the authors of RIS3 documents are aware of their trendy character; partly because they have recognised the opportunities stemming from these industries, and partly because they consider that sustained policy attention could contribute to the further development of recent 'tangible achievements'. These achievements include the establishment of a creative industries cluster (Pannon Innovation and Creative Industry Cluster) and the funding Zala County Foundation for Enterprise Promotion gained and the activity it has carried out in the framework of SEE IDWood programme (Clustering, knowledge, innovation and design in SEE wood sector).

- Focus on thermal tourism and health industry

A new-old orientation of regional innovation policy. Strategic documents mention the necessity of innovation-driven development in this sector, based on the region's thermal assets.

- Focus on green innovations and on energy efficiency projects

In addition to the green mobility related opportunities detailed above, the surveyed documents mentioned broader-based 'green' objectives related to improvement of energy efficiency and development of innovative waste management solutions.

- Focus on demand side instruments and on the commercialisation of scientific and technological results

Although policy documents keep reiterating that the innovation paradox that characterised the region (that innovation performance is much inferior to economic performance) is still present (despite non-negligible improvement in the main indicators), the new documents focus not only on policy instruments that influence the input indicators of innovation. New policy orientation is best reflected by the fact that the importance of commercialisation is increasingly recognised and more and more demand side policy instruments are included among the suggested ones. It is not only SMEs' market access that is planned to be fostered

[25] Several other R&D achievements in the field of electric mobility are listed in Angster et al., 2012

by dedicated resources: documents include more innovative demand-side instruments such as awareness increase (for creative industries, design, green solutions etc.); pilot demonstration projects; promotion of technology transfer, e.g. through rapid prototyping; promotion of the establishment of new technology oriented spin-offs and start-ups; support to inter-firm collaboration so that indigenous SMEs achieve the status of a strategic supplier, improvement of regional innovative stakeholders' access to financing e.g. to risk capital, or to micro-credit, introduction of the U.S. 'Small Business Innovation Research'-type programmes, etc.

The interviewed innovation policy stakeholders were not optimistic with respect to future opportunities. On the one hand, the institutional instability that characterises the regional and the national innovation systems effectively curtails long-term investments in linkages building. It destroys the gradually emerging positive socio-cultural tendencies: in particular the past incremental institutional change and institutional capacity accumulation, but also the moderately strengthening innovation-oriented culture, for example the increased recognition of the value of networking and collaboration. The political legitimacy and hence, the credibility of past important regional innovation stakeholders has vanished with institutional transformations and due to the lack of financing.

On the other hand, regional aid intensity will radically diminish in the new programming period. Over the 2007–2013 programming period, EU Structural Funds provided non-negligible incentives that effectively stimulated the implementation of some relatively disadvantaged stakeholders' (small, undercapitalised enterprises') innovative ideas. These incentives will vanish for the majority of innovative stakeholders. Only relatively large and well-capitalised actors will be able to apply for support of their innovative ideas or investments in new technology and take on the related administrative burden and the strict requirements of support. For the majority of the regional actors the share of non-refundable support in total costs will be too small to provide real incentives. Consequently the extent of policy outreach will diminish; the objectives of 'inclusive development' and of 'promotion of place-based cohesion' will not be met, since fewer underprivileged SMEs in lagging micro-regions will be able to submit applications for support. Moreover, there will be a higher chance that public support crowds out private investment, since only actors who would have implemented the planned investment in technology upgrading or in R&D even without support, would submit applications for support.

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Appendix B Stakeholders Consulted

1. Tibor ALPÁR, Dean, University of West Hungary, Simonyi Károly Faculty, Natural Resources Innovation Centre (Sopron, 01.07.2014).
2. Zoltán FARSANG, innovation manager, Pannon Novum, Regional Innovation Agency (Szombathely, 02.07.2014).
3. András HÁRY, managing director, Technology Centre, Pannon Development Foundation (Zalaegerszeg, 02.07.2014).
4. Dániel MAGYAR, managing director, Pannon Novum, Regional Innovation Agency (Szombathely, 02.07.2014).
5. János RECHNITZER, Professor, Széchenyi University Győr, Institute for Regional Studies, MTA KRTK, Hungarian Academy of Sciences (Győr, 01.07.2014).

Appendix C Statistical Data

	HU22 Nyugat-Dunántúl	Country	EU27	Year	Source	Performance relative to	Performance relative to
	HU22	HU	EU27			EU27	HU
ECONOMIC INDICATORS							
GDP per capita (Euros)	10100	9900	25200	2011	Eurostat	40,1	102,0
Long term unemployment rate	2,90	5,00	5,10	2013	Eurostat	175,9	172,4
Labour productivity growth (%)	4,05	3,85	2,19	2001-2011	Eurostat	184,7	105,2
RCI 2013	-0,54	-0,64	0,00	2013	JRC	63,5	112,2
Share of employment in agriculture	0,06	0,05	0,05	2011	Eurostat	114,6	117,4
Share of employment in industry (including construction)	0,39	0,31	0,25	2011	Eurostat	157,3	128,1
Share of employment in business		0,31	0,30	2011	Eurostat	100,0	100,0
Share of employment in public sector	0,19	0,23	0,25	2011	Eurostat	76,2	82,9
Share of employment in S&T	0,05	0,07	0,09	2011	Eurostat	50,8	67,5
Specialisation in number of local units by NACE	0,34	0,30	0,36	2012	ISI-Eurostat	95,1	112,5
Employment in 2 and 3 star clusters (strong clusters)	24,70	39,16	31,39	2010	MERIT-CO	78,7	63,1
WIDER FRAMEWORK CONDITIONS							
Institutions	20,00	20,00	43,55	2010	RCI	45,9	100,0
Macroeconomic stability			58,20	2010	RCI	100,0	100,0
Infrastructure	80,00	76,86	74,64	2010	RCI	107,2	104,1
Higher education/ Training and Lifelong Learning	69,00	67,86	70,07	2010	RCI	98,5	101,7
Labour market efficiency	47,00	40,86	55,03	2010	RCI	85,4	115,0
Market size	37,00	37,86	50,27	2010	RCI	73,6	97,7
Business sophistication	33,00	29,86	43,16	2010	RCI	76,5	110,5
It is important to think new ideas and being creative	0,62	0,60	0,54	2010	MERIT-ESS	115,2	103,1

	HU22 Nyugat-Dunántúl	Country	EU27	Year	Source	Performance relative to	Performance relative to
RESEARCH & TECHNOLOGY INDICATORS							
Employees with ISCED 5-8 (% all employees, ISCED 2011)	20,3	27,2	33,5	2013	Eurostat	60,7	74,8
Business R&D (% GDP)	0,37	0,76	1,29	2011	Eurostat	28,7	48,7
Government R&D (% GDP)	0,03	0,19	0,25	2011	Eurostat	12,0	15,8
Higher Education R&D (% GDP)	0,25	0,25	0,48	2011	Eurostat	52,1	100,0
EPO patent applications (per mln population)	16,83	17,90	110,48	2009	Eurostat	15,2	94,0
Employment in medium-high & high-tech manufacturing (% total employment)	14,50	8,30	5,60	2012	Eurostat	258,9	174,7
Employment in knowledge-intensive services (% total employment)	25,10	35,00	39,00	2012	Eurostat	64,4	71,7
Total R&D personnel (% active population) - all sectors	0,74	1,29	1,66	2011	Eurostat	44,6	57,4
Structural funds on business innovations (Euros per mln population)	303,63	301,63	77,74	2007-2013	Eurostat	390,6	100,7
Structural funds on core RTDI (Euros per mln population)	155,58	155,83	63,01	2007-2013	Eurostat	246,9	99,8
Change in Employment in medium-high & high-tech manufacturing (%-point)	0,70	-0,28	-0,38	2008-2012	Eurostat	125,1	122,2
Share of innovators receiving public financial support (SMEs, CIS 2010)	5,55	5,83	9,95	2010	MERIT-CIS	55,7	95,1
BUSINESS INNOVATION INDICATORS							
Technological (product or process) innovators (% of all SMEs)	16,63	16,76	37,85	2010	MERIT-CIS	43,9	99,2
Non-technological (marketing or organisational) innovators (% of all SMEs)	22,18	22,36	39,83	2010	MERIT-CIS	55,7	99,2
Innovative SMEs collaborating with others (% of all SMEs)	6,63	6,68	8,89	2010	MERIT-CIS	74,6	99,2
SMEs innovating in-house (% of all SMEs)	2,80	4,06	22,63	2010	MERIT-CIS	12,4	69,1
Share of turnover of newly introduced innovations new to the market	10,98	9,21	4,67	2010	MERIT-CIS	234,8	119,2
Share of turnover of newly introduced innovations new to the firm	4,79	4,47	8,71	2010	MERIT-CIS	55,0	107,1

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