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Dahlstrand, Å. L., Jacob, M., Sprutacz, M.

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Contact information
Email: JRC-B7-NETWORK@ec.europa.eu

JRC Science Hub
https://ec.europa.eu/jrc

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Research and Innovation Observatory Country Report 2016 Sweden

The 2016 series of the RIO Country Report analyses and assesses the development and performance of the national research and innovation system of the EU-28 Member States and related policies.
It aims at monitoring and evaluating the EU policy implementation as well as facilitating policy learning in the Member States.

Contents

Foreword

This report offers an analysis of the R&I system in Sweden for 2016, including relevant policies and funding, with a particular focus on topics of critical importance for EU policies. The report identifies the main challenges of the Swedish research and innovation system and assesses the policy responses implemented. It was prepared according to a set of guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports and online publications. The quantitative data are, whenever possible, comparable across all EU Member State reports. Unless specifically referenced, all data used in this report are based on Eurostat statistics available in November 2016.

The report contents are partly based on the RIO Country Report 2015 (Jacob, Lindholm-Dahlstrand, Sprutacz, 2016).

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Authors' affiliation:

Åsa Lindholm Dahlstrand, Director of the Centre for Innovation, Research and Competence in the Learning Economy (CIRCLE), Lund University (Lund, Sweden)

Merle Jacob, Professor, Research Policy, Department of Business Administration, Lund University (Lund, Sweden)

Maren Sprutacz, European Commission, Directorate-General Joint Research Centre, Unit B.7, Knowledge for Finance, Growth & Innovation (Brussels, Belgium)

HIGHLIGHTS

- Real GDP growth in Sweden in 2016 is estimated at 3.3% and is expected to slow down in 2017 (EC, Winter 2017 Forecast).
- In 2015, GERD was the highest in the EU summing up to 3.26% of GDP.
- A new Research Bill was submitted in November 2016 and will be decided by Parliament in 2017. It has a ten-year perspective but focuses in particular on measures for 2017–2020,
- Swedish BERD intensity is among the highest in Europe and stood at 2.27% in 2015, corresponding to slightly above 2/3 of total R&D investments in Sweden.
- There have been substantial efforts over the past two decades focusing on an incremental industrial restructuring. The aim is to reduce economic dependence on a few large actors by supporting growth in high-tech firms and improving framework conditions for SMEs.

MAIN R&I POLICY CHALLENGES

- **Improving the links between research and innovation.** Since the late 1990s Swedish research and innovation policy has been focused on increasing the links between research and innovation. The dominant policy approach has focused on supply side measures such as funding instruments, which promote cross-sectoral collaboration. One of the more persistent subthemes in the Swedish debate on innovation policy has been the notion that Sweden has an innovation output that is somewhat lower than expected when compared with the volume of R&D investment.
- **Reducing the dependence of BERD on multinational companies**. About 80% of Swedish business R&D is performed by a few large multinational companies. Most of it is concentrated in firms with more than1000 employees. The thrust of policy efforts for promoting increased business investment in R&D by SMEs has been linked to support of high tech firms with public venture capital schemes and university-firm collaborative schemes aimed at upgrading SMEs competence and supporting knowledge-intensive innovation.
- **Sustaining the high quality of the public research base**. The 2008 and 2012 Research Bills brought significant increases in research funding to allocated to universities. However, the limited impact of these efforts suggests that institutional governance at university level is an important consideration for future policy.

MAIN R&I POLICY DEVELOPMENTS IN 2016

- Publication of the Research Bill and the Energy Research Bill, focusing in particular on measures for 2017–2020
- New Strategy for Public Procurement
- New Smart Industrialisation Strategy
- Launch of five strategic programmes intended to address societal challenges
- Submission of final report by Commission of inquiry for Entrepreneurship
- Creation of two new funds for demonstration facilities and companies in early stages

1. Main R&I policy developments in 2016

New Research Bill (11/2016)	The new Bill entitled 'Collaborating for knowledge, for society's challenges and strengthened competitiveness' to be decided by the Parliament presents the Government's view on the direction of research policy with a ten-year perspective, focusing in particular on measures for the period 2017–2020. Cornerstones of the bill include increased basic appropriations to higher education institutions, initiatives in research linked to global societal challenges and increased resources to strengthen Sweden's innovative capacity. There are indications that research on climate, health and life sciences, as well as digitalisation, will be prioritised in the future.
New Energy Research Bill	The Energy Research Bill (Research and innovation in the energy sector for ecological sustainability, competitiveness and security of supply) sets the government's views on energy and climate R&I for the period 2017-2020.
Strategy for Public Procurement (06/2016)	This strategy points to the innovative and creative potential of functional procurement when compared to specific requirements for goods or services. It does not set however any concrete target values for innovation procurement. Particular emphasis is put on ensuring that SMEs can effectively bid and secure public procurement contracts.
Smart Industrialisation Strategy (01/2016)	This new strategy prioritises four focus areas (Industry 4.0, Sustainable production, Industrial skills boost and the creation of attractive innovation environments ("Test beds").
Strategic programmes intended to address societal challenges (06/2016)	The five strategic programmes are collaborative and include the public sector, university and business actors. The programmes are intended to address societal challenges and increase the country's competitiveness. They cover clean transportation, smart cities, circular and bio-based economy, life science, and connected industry & new materials, including cloud computing, robotics and 3D printing.
Final report by Commission of inquiry for Entrepreneurship (10/2016)	The Commission of inquiry for Entrepreneurship, which has the mission to assess the conditions for starting, running, developing and owning business in Sweden, presented its final report to the government in October 2016. This report identified obstacles and opportunities for improving and developing the innovation and entrepreneurship climate in Sweden.
Two new funds for demonstration facilities and companies in early stages (01/2016)	The government announced the creation of two new funds for demonstration facilities and companies in early stages. A couple of additional initiatives have also been discussed such as the establishment of Saminvest AB. The amount of fundingremains unclear, although a first proposal mentions circa €160m for demonstration facilities and about €40m for the seed fund. In addition, the European Investment Fund (EIF), Almi Företagspartner (Almi) and Svensk Exportkredit (SEK) have signed guarantee agreements to increase lending to innovative Swedish SMEs. The agreements will allow Almi and Svensk Exportkredit to issue around €210m- worthloans to innovative companies in Sweden over the next 2 years.

1.1 Focus on National and Regional Smart Specialisation Strategies

Description and timing: Sweden has had a shift in government since the finalisation of the agreement on the use of ESIF. New strategies and programmes that affect Sweden's Smart Specialisation (RIS3) set-up have been launched. The central documents are the National Research Bill, the National Innovation Strategy (2012), regional development strategies as well as regional innovation strategies where they exist (not all regions have developed such strategies, see below for further details).

The main agency for coordinating the effort on Smart Specialisation is the Swedish Agency for Economic and Regional Growth. In addition there are at least 18 public agencies involved in various types of activities connected to regional development. A new strategy for regional development was rolled out in 2015. This 'Strategy for Sustainable Regional Growth and Attractiveness'[1], replaces the previous one: ''National strategy for regional competitiveness, entrepreneurship and employment 2007–2013'.

The new strategy takes its point of departure in four societal challenges: demographic development; globalisation; climate, environment and energy; social cohesion. Within these areas, efforts up to 2020 will focus on: innovation and business development; attractive environments and accessibility; provision of skills and international cooperation.

The government has introduced a National Innovation Council[2],which is an important reference point for the work on Smart Specialisation in Sweden. It identifies important societal challenges and provides input on the overall direction. The ideas are then implemented in programmes. The Council has indicated three important societal areas to address: digitalisation, life sciences and environment, and climate technology.

New developments: The strategy further suggests that the focal areas for the period 2015-2020 will be: multi-level and sectoral cooperation in regional growth initiatives; integration of the EU cohesion policy into regional growth policy; regional growth policy tools; roles and responsibilities in the regional growth efforts; a strategic effort to promote local development and attractiveness; a more explicit focus on results and monitoring, evaluation, analysis and learning; stronger social, economic and environmental sustainability in the regional growth efforts. Additionally, the new Research Bill has suggested allocating research funds to the Strategic Innovation Areas that converge with its strategic programmes.

Some regions (notably Dalarna, Värmland and Östergötland) have developed dedicated smart specialisation strategies following the model proposed by the European Commission. In two NUTS2 regions or programming areas: North Middle Sweden (NMS) and East Middle Sweden (EMS) the administrations of each region in that area (Värmland, Dalarna and Gävleborg in NMS; and Östergötland, Sörmland, Örebro, Västmanland and Uppland in EMS) will jointly develop RIS3s to explore common strengths and synergies. Four new Strategic Innovation Areas (SIOs) have been announced: RE:Source; Drive Sweden; SIO Medtech 4 Health; Smart Built Environment and INFRASweden2030.

The Swedish Agency for Economic and Regional Growth is also responsible for establishing a dialogue with the regions (NUTS 3) on smart specialisation. Since the Agency also has a government mandate to manage and distribute funding from the European Regional Development Fund, it also supports NUTS 2 regions (program areas) on different levels regarding smart specialisation. NUTS 2 regions have identified

[1] http://www.regeringen.se/contentassets/98919a0ca0f1427491a3eef22a7d177c/en-nationell-strategi-for-hallbar-regional-tillvaxt-och-attraktionskraft-20152020.pdf
[2] http://www.regeringen.se/regeringens-politik/nationella-innovationsradet/

regional areas of strength in the respective Regional Operational Programmes, some with a sectoral focus and others with a thematic focus.

Outstanding issues: A number of NUTS 3 regions have drafted Smart Specialisation Strategies. Although key areas of strength have yet to be identified on a national level, the regions and the regional Operational Programme Partnerships will be supported on the basis of their respective priorities. Additionally, national calls will be launched, with the aim of encouraging regions to promote regional areas of strength.

2. Economic Context

Driven by domestic demand, notably investment and private consumption, real GDP growth in Sweden is estimated at 3.3% in 2016 (EC 2017, Winter Forecast). The Commission's winter forecast expects it to slow down to 2.4% in 2017. Domestic demand is set to remain the main driver, but with net exports projected to become supportive again in 2017 and 2018. Unemployment is decreasing due to the buoyant labour market and is expected to stabilise at a relatively low level. Inflation is set to rise gradually towards the Riksbank's 2% target.

Sweden shows a productivity growth more or less in parity with expectations, given the R&D intensity. Swedish productivity growth is different from that of other OECD countries by the fact that it is driven by total factor productivity rather than by the labour force continually having access to more capital (known as capital deepening) (Swedish Government Official Report, (2015)).

In the summer of 2016, the Swedish government took policy action to improve the functioning of the housing market and reduce household indebtedness, a step that had been recommended by the European Commission several times in the context of the European Semester (Council of the European Union, 2016, 2015).

2.1 Structure of the economy

Sweden has a high-performing business sector with traditional strengths in high and medium-technology sectors. A relatively large number of innovative, export-oriented, internationalised firms operate in diverse industrial sectors ranging from automotive, aerospace, telecommunication equipment, pulp and paper, chemicals, pharmaceuticals, and electrical goods. Swedish firms also have a large and increasing presence in the services sector, which contributes to a comparatively large share of GDP. Although large firms dominate R&D in manufacturing industries, smaller firms make a larger contribution in the services sector.

In recent years the Swedish economy has been shifting toward smaller, more service-oriented and diversified firms, which employ a significant share of the creative labour force in Sweden. In particular, the value added of knowledge-intensive services as share of total value added is high, with 40.7% in 2015, close to the double of the EU average (23.6% in 2014).

2.2 Business environment

The general policy environment for doing business in Sweden is favourable. The country has performed well on the World Bank's Doing Business indicators throughout the past decade. In the 2015 ranking on the ease of doing business , Sweden ranks 9th among 189 economies, higher than the average of G7 and OECD and ahead of countries such as Germany (17th) and Finland (13th) (World Bank, 2016).

Compared to previous years, Sweden has considerably improved its rankings on Starting a business (15th in 2016, 32nd in 2014) and Protecting minority investments (19th in 2016, 32nd in 2014). However, the Ease of getting credit has worsened lately (ranking 75th 2016, 56th 2014, and 42nd 2013).

On the EC Digital Economy and Society Index (DESI) the country has consistently ranked very high in the past three years (2nd in 2014, 1st in 2015, and 3rd in 2016).

2.3 Supply of human resources

Sweden's competitive advantage lies in the size and quality of its human capital stock. The share of new doctorate graduates and researchers in the total population is very good, clearly above EU average and comparable to that of other innovation leaders.

Educational performance remains a political priority in Sweden and will continue to be so as educational performance newly arrived citizens and a number of first and second generation immigrants remains below par.

The 2015 OECD Programme for International Student Assessment (PISA) found that student performance improved significantly in mathematics and reading compared to 2012, and remained broadly stable in science. The latest results from PISA[3] show a slight improvement.

A proposal tabled by the government, if successful, will create a tighter linkage between the higher education system and the primary and secondary school levels. The government has proposed to give university staff the possibility to take pedagogic courses which would qualify them to be specialist teachers at the secondary school level. This will be limited to a five year period beginning in July 2016. In 2017 the budget for this activity will be €1.5m (Government of Sweden Budget, 2017[4]). Additional €4.6m will be invested over the period 2017-2019.

3. Main R&I actors

The national R&I system is governed through the Research Bill, the Energy research Bill (both released every four years), and the 2012 National Innovation Strategy intended to provide guidelines for innovation policy up to 2020.

Public agencies such as VINNOVA, the Swedish Energy Agency and the Swedish Research Council are key actors in the policy system. VINNOVA is the central coordinating actor for innovation policy, charged with the implementation of the National Innovation Strategy and reporting to the Ministry of Enterprise and Innovation.The Swedish Research Council is the principal actor for funding basic research, providing advice on the research system to the government and reporting to the Ministry of Education and Research. Another important actor is the Swedish Defence Research Agency, a government agency that reports to the Ministry of Defence.

There are several other public research funding agencies afor instance, the energy agency, the Research Council (FORMAS) and the Research Council for Health, Working Life and Welfare (FORTE). FORMAS is an increasingly important player with the strong emphasis put on climate in the recent government research bill. In addition, there are several hybrid public-private non-profit research foundations, such as the Knowledge Foundation and the Foundation for Strategic Research.

The bulk of the Swedish public research budget is allocated to the universities and university colleges. They are the main public research performing actors in the R&I system. There has been consistent policy focus since the 1990s on measures that would

[3] https://www.skolverket.se/om-skolverket/publikationer/visa-enskild-publikation?_xurl_=http%3A%2F%2Fwww5.skolverket.se%2Fwtpub%2Fws%2Fskolbok%2Fwpubext%2Ftrycksak%2FBlob%2Fpdf3725.pdf%3Fk%3D3725

[4] http://www.regeringen.se/rattsdokument/proposition/2016/09/prop.-2016171/

promote university collaboration with other sectors, primarily business and public sector actors. In addition, a handful of initiatives were launched to promote university collaboration with civil society.

This general trend of promoting collaboration continues and has been further strengthened in the latest R&I bill. There are a number of ongoing initiatives intended to increase the intensity of cross-sectoral mobility focusing primarily on getting university researchers to spend time in the public sector or in firms performing specific collaborative projects.

The research institute sector in Sweden has been traditionally small, as some of the tasks traditionally performed by applied institutes in other countries fall within the remit of universities in Sweden. The most important actor in the non-university research organisation sector is RISE (Research Institutes of Sweden), a network of research and technology organisations. RISE is however not a public research actor but a private consortia that is partly owned by the government.

Research in the private sector is performed primarily by a few large multinational companies. However, there are ongoing efforts focused on an incremental industrial restructuring to reduce dependence on a few large actors by supporting growth in high-tech firms and improving framework conditions for SMEs.

According to the annual report on higher education in Sweden, the Wallenberg Foundation is the most significant private non-profit funder (Swedish Higher Education Authority, 2015a).

4. R&I trends

4.1 Public allocation of R&D and R&D expenditure

The most significant developments that will affect the allocation of public R&D expenditure are the new bills on Research and Energy Research. Both are expected to entry into force in 2017. They outline the focus of funding and research priorities for the years 2017 – 2020:climate, health and life sciences, as well as digitalisation..

The current Research Bill (issued in 2012) proposed to increase the public budget for research by approx. €127m every year over the period 2013-2016. In 2015, GERD was the highest in the EU summing up to 3.26% of GDP, compared to an average of 2.04% for EU-28. However, Swedish expenditure on R&D has been in decline when expressed as share of GDP since the early 2000s (from 3.61% of GDP in 2003). GERD performed by the higher education sector has traditionally been among the highest within the EU, amounting to 0.88% of GDP in 2015 (EU-28: 0.47%).

In 2014, about 45% of the total funding to Swedish universities was allocated as institutional funding, the remaining 55% were allocated as third party funding. In 2012 the ratio was still 47% and 53% respectively, reflecting the growing importance of third party funding (Swedish Higher Education Authority Annual Report 2015).

4.2 Private R&D expenditure

Swedish BERD intensity is among the highest in Europe and stood at 2.27% in 2015, corresponding to slightly above 2/3 of total R&D investments in Sweden. One can observe, however, that BERD intensity as share of GDP was a bit higher during the second half of the past decade (still 2.45% in 2009) and has been fluctuating around 2.2% of GDP since 2010. However, BERD has not declined in nominal values and this downward trend in BERD intensity is explained by the high growth of Swedish GDP, as well as the relocation of some of the R&D units of large Swedish and foreign-owned enterprises.

The manufacturing of computers, electronic and optical products, pharmaceutical industry, manufacturing of other machinery and equipment, and vehicle manufacturing together account for an important share of Swedish business R&D expenditures. In terms of individual companies, Ericsson and Volvo are the top performers in R&D investments, both ranking among the EU's top20 in the R&D Industrial Scoreboard for 2015. The Swedish knowledge-intensive service-sector is relatively large (both as share of employment and value added), but has not grown between 2010 and 2015 (between 2014 and 2015, it even showed a slight decline).

Over the past two decades there have been substantial efforts focused on incremental industrial restructuring to reduce dependence on a few large actors by supporting growth in high-tech firms and improving framework conditions for SMEs. In 2014, the previous government introduced a limited tax incentive scheme for small businesses hiring R&D staff as part of an effort to increase BERD. Swedish governments still prefer to avoid the introduction of a broader tax credit scheme (Långtidsutredningen, 2015). Policy action has also been taken with regard to improved financing conditions for start-ups and SMEs in 2016. It remains to be seen to what extent this improvement in the supply of public venture capital will leverage private investments and business sector spending on R&D.

4.3 Public sector innovation and civil society engagement

The Swedish economy benefits overall from a favourable administrative environment. Sweden ranks 6th in the E-Government Development Index for 2016, a marked improvement from rank 14 in 2014. The share of the population interacting with public authorities over the internet is also high compared to EU standards, although some other Nordic countries perform even better on this indicator. Digital Public Services is the dimension where Sweden performs the weakest of all its DESI 2016 dimensions, still maintaining the 7th place in the EU. The scores illustrate that Sweden is performing well above the EU average with regard to the provision and uptake of eGovernment services (DESI, 2016).

VINNOVA has long had a number of programmes which are specifically aimed at fostering and supporting public sector innovation[5]. Many of these programmes contain a substantial focus on co-design and co-creation of innovative solutions. Besides the strategic innovation programmes, there are also the strategic innovation agendas (SIAs) involving collaboration on priority setting among actors from business, public sector and academia. Further, the Swedish Association of Local Authorities and Regions (SKL) in collaboration with VINNOVA has a prize-based programme which rewards public sector actors for activities that support innovation either by creating good framework conditions or in some way contributing to making a difference in the lives of citizens. The prize is approximately €5000 and additional support to disseminate the information to other actors.[6]

Given the decentralised nature of the Swedish public administration and the opportunities offered by ICT, it could be expected that Sweden would be able to easily make the step towards increased involvement of citizens in public planning and increased availability of public sector services to citizens. However, the reality has been slightly different. Sweden scores well on indicators such as ICT use and digitalisation but its performance on use of digitalisation in the public sector is quite uneven. For instance, the Swedish National Audit Office (Riksrevisionsverket) found that most public authorities were able to use social media to communicate with citizens but few involved

[5] http://www.vinnova.se/sv/Var-verksamhet/Innovationsformaga-hos-specifika-malgrupper/Innovationskraft-i-offentlig-verksamhet1/.

[6] http://skl.se/naringslivarbetedigitalisering/forskningochinnovation/innovation/innovationspriset2016.9415.html

citizens in the design of digital services intended for citizen use. Additionally, the delegation "architecture" presents a problem for the further dissemination of digital services as it is unclear which is the responsible body. Further, issues of costs, prioritisation and legal barriers have been identified as impeding the transition to common public administration platforms (Riksrevisionsverket 2016:14).

There are few citizen science initiatives which are explicitly labelled as such but there have been concerted efforts since the 1990s to involve different types of actors and constellations to participate in research. Participatory planning culture in the public sector is structured around actor groups rather than aimed at citizens at large. Urban planning and research, environmental sustainability and transport are three areas in which the bulk of initiatives of this kind are grouped (Olofsdotter, 2015).

5. Innovation challenges

5.1 Challenge 1: Improving the links between research and innovation

Description

Since the late 1990s Swedish research and innovation policy has been focused on increasing the links between research and innovation. The dominant policy approach has been focused on supply side measures such as funding instruments which promote cross-sectoral collaboration. Sweden has also privileged triple helix (knowledge triangle) constellations for promoting innovation. Programmes such as VINNVAXT, Research and Grow (now "Innovation Projects in Companies") and lately the Strategic Innovation Programmes are examples of policy efforts in this direction.

One of the more persistent subthemes in the Swedish debate on innovation policy since the end of the 1990s has been the notion that Sweden has an innovation output that is somewhat lower than expected given the level of R&D investment. The OECD innovation policy reviews for 2008, 2012 and recently 2016 mention this issue albeit with decreasing stridency. Others (Appendix 8 in Swedish Government Official Report, 2015; Från forskning till innovation, 2015) suggest a more nuanced picture, which continues to support the notion that Swedish universities ought to function as an important part of the infrastructure for innovation and that more support needs to be given to the third mission activities revolving around knowledge transfer at universities.

Many of the recommendations by e.g. the OECD and included in reports presented to the Swedish government by advisory commissions (OECD, 2016, Från forskning till innovation, 2015) converge on the importance of promoting cross-sectoral mobility, particularly when they tackle the issue of increasing the linkages between research and innovation.

Policy response

The issue of cross-sectoral mobility is addressed by several ongoing initiatives such as Strategic Mobility, etc. Suggestions related to some type of fiscal incentive are yet to be implemented. The Swedish Government Official Report (2016b) for instance suggests that more support needs to be given to the third mission activities at universities (knowledge transfer).

Policy Assessment

The policy responses to the challenges of linking innovation and research have been adequate although somewhat skewed towards supply side measures.

5.2 Challenge 2: Reducing the dependence of BERD on multinational companies

Description

About 80% of Swedish business R&D is performed by a few large multinational companies with more than 200 employees, with most of it concentrated in firms with more than 1000 employees. In 2013, 89 of the latter firms accounted for 63% of Swedish BERD. In the same year, 49% of BERD was spent by Swedish-owned multinational companies, 39% by foreign-owned companies and 12% by local Swedish companies (Tillväxtanalys, 2015).

Many of the industrial giants have Swedish roots, but globalisation has come with ownership changes that have diminished Swedish ownership and control (e.g. in the case of ABB, Scania, Volvo Cars and AstraZenaca). As a consequence of mergers and acquisitions, some production and R&D facilities have been distributed globally often placed closer to growth markets or in new headquarters, though much capacity still remains in Sweden.

Policy response

The need to achieve a more rational distribution of R&D expenditure in the business sector has long been acknowledged by the Swedish government. The thrust of policy efforts for promoting increased business investment in R&D by SMEs has been linked to support of high tech firms with public venture capital schemes and university-firm collaborative schemes aimed at upgrading SMEs competence and supporting knowledge intensive innovation.

There is a plethora of initiatives ranging from large scale programmes connected to infrastructure such as the programme for strategic vehicle research and innovation (FFI). FFI is a partnership between the Swedish government and the automotive industry for joint funding of research, innovation and development concentrating on Climate & Environment, and Safety. [7] Additionally, VINNOVA funded an innovation voucher programme that was geared exclusively to SMEs. Last but not least, there has been one small scale effort at using fiscal stimuli to promote SMEs.A preliminary evaluation[8] shows that the programme has been very popular particularly within the service sector. This result needs to be contrasted with the recommendation of the Long-term Survey Långtidsutredning, part of the Swedish Government Official Reports series), which contended that fiscal incentives have and should continue to play a very limited role in policies aimed at stimulating innovation (Swedish Government Official Report, 2015).

In addition, the government has received the results of a report on the effects of taxation on corporate use of incentive programmes for employees (Swedish Government Official Report, 2016:23). Although it has not yet been approved by Parliament contents show that SMEs generally reported that regulation and administrative barriers prevented them from considering the use of employee incentive programmes.

Policy Assessment

Sweden has been making considerable efforts to promote more R&D investment by SMEs. To the extent that these efforts remain clustered outside the area of fiscal incentives, the policy instruments applied may remain limited as opposed to those attempted in other EU and Nordic countries. The lack of experience with tax-based incentives taken together with the fact that generally the results are very difficult to

[7] http://www.vinnova.se/en/FFI---Strategic-Vehicle-Research-and-Innovation/About-FFI/
[8] http://blogg.almega.se/blog/2015/03/10/skatteavdrag-for-fou-anstallda-en-solklar-framgang/

predict even in other similar policy cultures, may be a barrier to change in policy direction.

Generally, there have been a number of initiatives intended to promote the efficiency of the existing schemes for supporting increased R&D investments by SMEs. It may also be useful to bear in mind that while it is important that SMEs increase their R&D intensity, this is not an end in itself. Further, research has shown that SMEs often prefer to (i) piggyback on the R&D investments of their larger firm partners, and (ii) in-firm resource limitations in SMEs make it difficult for them to fully benefit from schemes which require direct collaboration with universities. This implies that while increasing R&D intensity in SMEs is an important goal in itself, the importance of SME-large firm collaboration to the overall vitality of the business ecosystem should not be ignored.

5.3 Challenge 3: Sustaining the high quality of the public research base

Description

Sweden is currently losing ground compared to countries such as Denmark and the Netherlands in publications (DFiR, 2016). According to the OECD, while the overall performance of university research is above average, excellence still remains a challenge (OECD, 2016).

The 2008 and 2012 Research Bills suggested significant increases in research funding to the universities. These increases were subsequently approved by Parliament and the direct institutional funding for research amounted to about €1700m in 2014 while funding allocated to the basic science research council and other public funders amounted to additional €1000m (OECD 2016). There is an addition of €2.6m which comes from miscellaneous sources such as public non-profit foundations. The total amount of funding available to university research is therefore not the problem.

However, a large share of this funding was earmarked to specific areas of research, and the long term implications of this remain to be assessed (SUHF, 2015; OECD, 2016). Recent research converges on the finding that, other things being equal, performance-based allocation (project and institutional) combined with high levels of scientific autonomy contributes to strong publication performance (Aagaard,et al. 2015; Waltman et al. 2012; Hicks, 2012).

Reports such as that of OECD 2016 agree that it is very difficult to make any conclusive statements about the impact of performance based funding on publication. It is however clear that all parties converge on the fact that there is some connection. In the Swedish case, the ratio of institutional to project funding is connected to the issue of university governance which was highlighted in OECD 2016 as a particular concern for Sweden. According to (OECD, 2016), recent history shows that increasing the level of institutional funding does not mitigate the stress on the system as Swedish universities hiring practices are premised on faculty funding a substantial proportion of their research through project funding.

Policy response

The 2008 and the 2012 Research Bills recommended a general increase in institutional funding and a particular allocation of institutional funding which would strengthen university research in strategic areas (the Strategic Research Area Initiative). Both of these recommendations have been implemented but little change has occurred in governance, the hiring practices of universities or with respect to highly cited publications. This has been recognised by the Swedish government. In an address announcing the publication of the new Research Bill in November 2016 Minister Hellmark Knutsson admitted to an "overconfidence in political ability to identify leading research to

produce quick results." She said that "the Government instead considers that it is important to create good and long-term conditions for researchers, and research, to develop frontline research."

Policy Assessment

The OECD assessment points to the ineffectiveness of some of the recent policy initiatives. According to the OECD recent history shows that increasing the level of institutional funding does not mitigate the stress on the system. A Swedish Government Office Report (2016b) as well as the OECD also recommend the introduction of a national tenure track system to encourage early-career researchers to stay in academia and to make the academic career structure more coherent.

6. Focus on creating and stimulating markets

This section aims at describing and assessing national level efforts to introduce demand-side innovation policies to stimulate the uptake of innovation or act on their diffusion, including public procurement and regulations supporting innovation. It also analyses policy measures aimed at internationalisation of companies with the aim of increasing the innovativeness of the economy.

The Swedish public sector has longstanding experience in technology procurement (teknikupphandling) gathering a critical mass of buyers committing to first deployment of near-to-the market innovative solutions. The public sector's role as a driver for innovation as well as the importance of regulations, market conditions and norms conducive to innovation are being promoted through the "Swedish Innovation Strategy" (2012), albeit without defining any concrete national targets.

There is no longer any specific policy aimed at attracting R&D intensive FDI. Instead, export promotion and especially the internationalisation of small and medium sized enterprises came into focus. Recent evaluation reports pointed to the lack of a method to assess the impact of trade promotion services offered by Business Sweden, the entity tasked with supporting Swedish businesses in their internationalisation endeavours, (Swedish National Audit Office, 2013), the complexity of the system as well as shortcomings in goal formulation and record keeping (Tillväxtanalys, 2015).

The Government announced a new strategy for public procurement in 2016[9]. The document points to the innovative and creative potential of demanding function rather than specific requirements for goods or services but does not set any concrete target values. Particular emphasis is also placed on ensuring that SMEs can effectively bid and secure public procurement contracts. The National Agency for Public Procurement is charged with monitoring the progress. The introduction of the most recent EU directives on public procurement has been delayed until 1 January 2017. The National Agency for Public Procurement provides guidelines and support for public agencies to ensure that procurement decisions made in this interim period will be consistent with the intentions of the new law.

Following the evaluation of trade promotion services, the Swedish government has taken action to support both the governance of the support system, and the actual support given to promote internationalisation of SMEs. The initiative Team Sweden[10] was established in 2015 to create a one-stop-shop for companies that want to develop export markets. In summer 2016, a new initiative was launched to help innovative and early

[9] http://www.regeringen.se/globalassets/regeringen/dokument/finansdepartementet/pdf/2016/upphandlingsstrategin/nationella-upphandlingsstrategin.pdf

[10] http://www.regeringen.se/debattartiklar/2015/05/team-sweden-ska-samordna-det-svenska-exportstodet1/

internationalised companies (BornGlobals[11]), to more quickly develop their exports. Business Sweden will carry out the assignment in cooperation with Vinnova, Almi and the Swedish incubators, science parks and start-up environments. The contract also includes attracting foreign start-up companies. The government intends funding the venture with approximately €0.7m annually until 2019.

The new strategy for public procurement is yet to be implemented and it remains to be seen what will be its impact on the relative importance of innovation within public procurement. The effort to use public procurement as a strategic tool for innovation has yet to be accompanied by an educational effort that focuses on this profession.

The increased cooperation between actors for initiatives such as Born Globals means that the promotion of entrepreneurship, innovation and internationalisation are closer tied together. It should be noted though that these schemes are small, relatively new and rely more on a signalling effect than on significant financial resources.

[11] http://www.regeringen.se/pressmeddelanden/2016/07/ny-satsning-pa-innovativa-och-tidigt-internationaliserade-foretag---born-globals/

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Abbreviations

BERD	Business enterprise R&D expenditure
CIS	Community Innovation Survey
DESI	Digital Economy and Society Index
DG	Directorate General (of the European Commission)
EC	European Commission
ERA	European Research Area
FOKUS	Research Quality Evaluation in Sweden - Forskningskvalitetsutvärdering I Sverige
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross domestic expenditure on R&D
HES	Higher Education Sector
HEI	Higher Education Institutions
ICT	Information and Communication Technology
MNC	Multinational Company
OECD	Organisation for Economic Co-operation and Development
R&D	Research and development
R&I	Research and Innovation
RIO	Research and innovation observatory
RISE	Research Institutes of Sweden
RPO	Research Performing Organisation
RTO	Research and Technology Organisation
SMEs	Small and Medium-sized Companies
UKÄ	The Swedish Higher Education Authority
VINNOVA	The Swedish Innovation Agency
VR	Vetenskapsrådet (The Swedish Research Council)

Factsheet

	2009	2010	2011	2012	2013	2014	2015	2016
GDP per capita (euro per capita)	33300	39400	42900	44500	45400	44600	45600	46600
Value added of services as share of the total value added (% of total)	71.61	69.44	70.13	71.63	72.53	72.91	18.88	
Value added of manufacturing as share of the total value added (%)	17.31	18.59	18.26	17.19	16.8	16.5	17	
Employment in manufacturing as share of total employment (%)	13.85	13.49	13.37	13.03	12.63	12.31	12.04	
Employment in services as share of total employment (%)	76.12	76.32	76.12	76.33	76.76	76.97	7.26	
Share of Foreign controlled enterprises in the total nb of enterprises (%)	1.99	1.9	1.89	1.85	1.78			
Labour productivity (Index, 2010=100)	96.8	100	100.7	100.5	101.4	102.6	105.1	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	1.76	1.64	1.63	1.64	1.65	1.73		
Summary Innovation Index (rank)	2	2	2	2	2	2	2	
Innovative enterprises as a share of total number of enterprises (CIS data) (%)				55.9		54.2		
Innovation output indicator (Rank, Intra-EU Comparison)			2	2	1	1		
Turnover from innovation as % of total turnover (Eurostat)		8.4		6.1				
Country position in Doing Business (Ease of doing business index WB)(1=most business-friendly regulations)						9	8	9
Ease of getting credit (WB GII) (Rank)						56	63	
Venture capital investment as % of GDP (seed, start-up and later stage)	0.071	0.067	0.058	0.051	0.051	0.046	0.034	
EC Digital Economy & Society Index (DESI) (Rank)						2	1	3
E-Government Development Index Rank		12				14		6
Online availability of public services – Percentage of individuals having interactions with public authorities via Internet (last 12 months)	65	68	74	78	78	81	73	78
GERD (as % of GDP)	3.45	3.22	3.25	3.28	3.31	3.15	3.26	
GBAORD (as % of GDP)	0.86	0.84	0.79	0.85	0.84	0.84	0.8	
R&D funded by GOV (% of GDP)	0.93		0.89		0.93			
BERD (% of GDP)	2.45	2.21	2.24	2.22	2.28	2.11	2.27	
Research excellence composite indicator (Rank)				1				
Percentage of scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country		11.77	11.76	11.61	11.65			
Public-private co-publications per million population	114.3	117.44	124.79	115.05	107.16	107.83		
World Share of PCT applications	1.94	1.71	1.66	1.5	1.58	1.31		

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