

SWEDISH ECONOMIC FORUM REPORT 2010



AN INNOVATION STRATEGY
FOR SWEDEN

An innovation strategy for Sweden

POLICY SUMMARY FROM THE SWEDISH ENTREPRENEURSHIP FORUM

An innovation policy framework is needed in order to increase growth and welfare in the Swedish economy

This year's Swedish Economic Forum Report, An innovation strategy for Sweden, presents the idea of introducing an innovation policy framework in order to create trustworthy long term conditions that will serve to augment growth and raise prosperity in the Swedish economy. This proposal is inspired by the Swedish fiscal policy framework, introduced after the crisis in the early 1990s, that has strongly contributed to the country's rapid emergence from the global financial crisis and strong macroeconomic position, compared to most other countries. A similar policy commitment is required to induce a dynamic and vibrant microeconomic environment. The report contains a number of concrete policy proposals

Policies must encourage accumulation and augmentation of knowledge on one hand, and diffusion and commercialization of knowledge on the other hand.

The future path of industrial countries hinges on their ability to retain their position as major producers of new knowledge, and that efficient mechanisms are provided that enables the knowledge to be transformed into innovations. A competitive knowledge nation cannot rely on a one-sided commitment: without policies that foster commercialisation knowledge investments will not deliver expected leverage.

Swedish Economic Forum Report 2010

An innovation strategy for Sweden describes the strengths and weaknesses of the Swedish innovation environment. The report draws attention to a number

of new findings including the role of small enterprises in innovation, the change in perspective regarding the role of universities as engines of innovation, the impact of internationalisation on the acquisition of knowledge, and the apparent presence of the Swedish R&D paradox to a limited number of sectors. These new insights may be expected to be of value when formulating an innovation strategy for Sweden.

The report is organized in seven chapters, whereof six are analytical and often based on unique firm level data from which the policy conclusions are drawn. The content of the six analytical chapters is briefly presented below before getting to the policy conclusions.

Innovation brings about internationalisation and vice versa

In Chapter 2, *“Who undertake innovations and why?”* Firm and regional factors, Martin Andersson sets off with the observation that Swedish R&D expenditure amounted to just above SEK 110 billion in 2007. That is equivalent to about 3.6 per cent of GDP, making Sweden one of the absolute top R&D investors globally. Private profit-making companies accounted for more than 70 per cent of R&D expenditure. An important result, based on patent applications data, is the marked differences between Swedish innovative and non-innovative firms; the former have between three and five times as many employees, more often a post-secondary education, the firms frequently belong to a multinational concern, are usually classified as belonging to “high-tech” or medium-tech” sectors, and are more internationalised. Firms that have particularly intense trading relations with knowledge-based countries also have the greatest number of patents. In the group comprising the smallest companies (less than ten employees), internationalisation was four times greater among those that have patents. Andersson also found support in the research literature for the argument that the regional environment plays a critical role for firms’ innovation activities. Access to knowledge resources in the form of local networks was particularly important in this context. They provide flows of information and knowledge that interact to create both a regional and a firm resource base, for instance in the form of mobile human capital.

Student business activities are up to 50 per cent greater than those of academic teaching staff

In Chapter 3, Thomas Åstebro and Navid Bazzazian extend the analysis to examine *“The role of the universities in entrepreneurship and regional development”*. Previous research into the role of universities in local economic development has concentrated almost exclusively on the granting of licences by researchers to technology and spin-off companies. New data from three case studies: MIT, Chalmers, and Halmstad University indicate however that the role of students in establishing new companies, compared to university research staff is between 12 and 48 times greater. Still, both in relation to research and economic policy, it is university researchers on whom attention is focused.

The authors also illustrate in this chapter that a relatively small university with limited resources like Halmstad has had considerable success over a relatively short period of time by adopting a clear educational strategy in which innovation is the guiding force. Practical involvement of students in innovation activities seems to be the key, rather than theoretical courses about entrepreneurship and innovation. At the same time, it is evident that these “spin-offs” are of major importance for regional development and that there is a degree of “path dependence” and signalling effects where the capacity of universities to attract students is also affected by the opportunities available to start up companies. Several studies indicate that up to 80 per cent of newly started companies are in the vicinity of universities and that there are positive feedbacks between entrepreneurs and universities.

Patents owned by small and medium sized enterprises in Sweden have greater economic value than other patents

In Chapter 4, Karl Wennberg and Erik Wetter discuss the theme *“Who owns Swedish inventions? Patterns and myths related to firm size 1978 – 2007”*. A unique patent analysis based on 12 000 patents taken out by Swedish citizens indicates that 90 per cent of these patents were owned by Swedish companies and individuals, followed by owners in Switzerland and USA. The proportion of Swedish owned patents is also higher than in other comparable countries. Moreover ten major Swedish companies accounted for 35 per cent of the total number of patents at the same time as small and medium sized enterprises were the largest group of patent owners. This study also presents, probably for the first time, the interesting finding that patents owned by small and medium

sized enterprises have on average a higher economic value than other patents. The traditional image of the important role played by the lonely inventor is not verified by this chapter: they accounted for barely ten per cent of the patent owners in the study. Indeed their patents were on the contrary worth less than the other groups. Nor does the study find support for the hypothesis that valuable Swedish innovations are largely exploited by foreign owners. At the same time, the authors suggest that a greater amount of entrepreneurship and cooperation between companies could be a useful method of increasing the degree of commercialisation of Swedish innovations.

Increasing the degree of commercialisation of Swedish innovations

In Chapter 5, *“A market for ideas. Entrepreneurs, business corporations and risk capitalists”*, Lars Persson presents a theoretical framework that helps to explain the role played by venture capital in the innovation process. By examining the different ownership functions of small and large companies in the innovation process, he is able to identify the ways in which they may contribute to the commercialisation of Swedish inventions. It is not self-evident that an entrepreneur is best suited to commercialise a product and thereby increase the value of innovations for society as a whole. Large may thus be better equipped to convert an idea or innovation into a commercialized product.

This chapter points out that the entrepreneur has the opportunity to introduce his innovation into the marketplace in a number of different ways, for example via market introduction or by selling the innovation to an established firm. This discussion is central to an understanding of the way in which the innovation process operates. There is a value in entrepreneurial companies being able to sell their innovations. It is partly related to the increase in the expected rate of return on its innovation, partly to the incentive for the entrepreneurial firm to fully develop its innovation and thereby strengthen its position in relation to the competitive bidding process between the established companies. Hence entrepreneurs have the choice of either challenge existing oligopolies through market entry, or selling their idea to larger firms where the latter contribute to more sophisticated innovations by providing a “market for ideas”.

Sustainable innovation strategies are more productive

The impact of financial resources on firm innovation and productivity is examined empirically by Gustav Martinsson and Hans Lööf in Chapter 6, *“Innovations, venture capital and growth”*. The starting point of their study is the research finding that banks are not the optimal source of finance for high risk projects. Instead external risk capital is required for these projects. This will in turn need a well-functioning capital market that is able to allocate resources to the most productive and societally valuable projects (adjusted for risk). Hence there is a link between the operations of the financial markets (equity capital or borrowing), innovations and patents.

The authors find that a sustainable innovation strategy will, controlling for other factors (firm size, industry, human capital, physical capital, etc.), give rise to an approximately ten per cent higher value added per employee (equivalent to Euro 25 000 in 2005) and a two per cent higher growth of productivity. There would consequently appear to be a link between the operations of the financial markets, innovations/patents and growth. It is also argued in this chapter that access to capital (cash flow and equity capital), financial stability and skilled labour are factors that exert a decisive influence on the firm’s ability to maintain a sustainable innovation strategy.

Despite the gains in Swedish research productivity, its capacity to generate new business enterprises remains in doubt

In the concluding seventh chapter, *“Does Swedish R&D lead to innovations? The Swedish paradox”*, Olof Ejermo conducts a detailed analysis of what is known as the Swedish R&D paradox. This may be summarised in terms of Sweden’s underperformance with regard to innovation relative to the country’s major investment in R&D.

Ejermo’s study indicates that there is a positive relationship between the growth of total factor productivity in companies and their investments in R&D. A one per cent increase in the latter gives rise on average to a clear improvement in productivity of the order of 0.2-0.3 per cent. The author also argues that Swedish research productivity, defined here in terms of a quality adjusted patent in relation to R&D has also increased. It is evident that Sweden is technologically highly advanced in relation to both the business and university sectors. Still it is uncertain whether the effects of technology actually have the impact in Swe-

den that they ought to have, for instance in relation to the generation of new business enterprises. One explanation may be that Swedish R&D and technological development have a marked international dimension which makes it difficult to draw definite conclusions about where the effects of R&D actually end up. Hence it is somewhat doubtful whether a strict national perspective can be given to the Swedish paradox.

An innovation policy framework – a first attempt

Macroeconomic stability is a necessary but not a sufficient condition for continued rapid and sustainable growth. Since 1970, Sweden's GDP per capita has grown less rapidly than in the OECD and EU 15. During the past two decades however, Sweden has been able to keep up – and also exceed - with the rate of growth in these areas.

Sweden also emerges from the financial crisis with perhaps the strongest public finances in the OECD as well as a manageable rate of unemployment. These favourable developments may be partially explained with reference to the country's *fiscal policy framework* which together with a balanced monetary policy has produced substantial economic benefits. However, future growth and prosperity is contingent on ideas – innovations broadly defined – are being transformed into new companies, new products, new ways of organising production and reaching new markets. Macroeconomic stability must therefore be combined with microeconomic policies that provide the impetus and opportunities to increase market dynamics and Sweden's innovation capacity. *An innovation policy framework* could provide the tool that introduce long run stability for the promotion of innovation.

Sweden's strong economic position makes it politically feasible to focus on supply side reforms of strategic importance for innovation. A long term perspective, credibility and transparency would be the key components in policies designed to spur innovation. A first attempt at formulating such a system, i.e. *an innovation policy framework* is presented below. It is based on three pillars: i) measures to enhance and upgrade knowledge production, ii) measures to convert knowledge into innovations, and iii) measure so secure an innovative critical mass.

Measures to enhance knowledge are a necessary to obtain continued flows of sophisticated innovations. It is a question of both improving knowledge and

providing a capacity to use knowledge in a way that will benefit society. This requires education and research of the highest standards. In at least some research areas, these standards will have to be world class, while other may be qualitatively high to assure that absorption capacities remain intact. Clarity of political purposes, a long term political perspective and a comprehensive approach embracing pre-school as well as higher education and research are also required. The following proposals can be noted:

- The direction and scope of research policy should extend over a longer period, e g a decade. A greater proportion of research funding should be allocated based on qualitative criteria. This means that priority will be given to areas that already have a strong position. Whether account should also be given to innovation criteria (patents) should be investigated.
- Regional universities and university colleges play a decisive role in the provision of skills to small and medium sized enterprises. Cooperation between these institutions should be strengthened, for example by means of an R&D tax credit that would provide clear incentives for collaboration. Universities should be granted greater autonomy.
- University courses in entrepreneurship ought to pay greater attention to questions concerning practical innovation activities and business developments.
- The final barriers to a European patent must be removed at the same time as approved patents should protect the degree of innovativeness.

Commercialisation or measures to transform knowledge into innovations

Favourable conditions for business and entrepreneurship is a necessary condition if investments in knowledge are to generate new and expanding firms, increased job opportunities and investment. The design of economic policies should encourage individuals and firms to entrepreneurial endeavours and to exploit available knowledge in innovation activities, encourage the testing of new products in the marketplace and seek to counter the stigmatising of possible failure. A set of quite different economic policy

instruments will be required, compared to traditional educational and research policies:

- Level and structure of taxation must be in accordance with those prevailing in other countries since globalisation increase institutional competition and a seamless world makes factors of production more mobile. This applies particularly to capital taxation and higher bracket taxation of income (the so called “tax on education”). Stock options should be taxed as capital income to a larger extent, in particular options that are related to the development of specific technology targets (so called “milestone stock options”). R&D tax credits should provide incentives for cooperation between R&D suppliers and firms in order to promote innovation.
- Knowledge related to marketing, branding in general, and internationalisation in particular (exports, international distribution and supply chains, etc.), should be given greater prominence within the existing framework of supportive measures directed at small companies.
- Venture capital is heavily concentrated in Sweden’s urban regions. Measures should be focused on the need to mobilise regional venture capital and to encourage local networks for business angels. Public policy measures regarding access to regional risk capital should be limited to clear cases of market failure.
- Competition and regulations also determine the opportunities for innovation. Deregulation, customer choice models and competitive neutrality assumes the presence of an organisation that monitors competitive conditions and possesses credible sanctions that also apply to the public sector. Better functioning markets and intensified competition would also be facilitated by an accelerated simplification of the regulatory framework surrounding firms.

Innovative critical mass

The resource base available for innovation is dependent on the size of the region. The report illustrates how productivity, links to other companies and intra-regional mobility is most pronounced in larger regions and exert a positive influence on innovation. Some of the suggested measures are:

- Regional infrastructure should be developed in order to stimulate mobility. For the same reason, labour laws ought to be reformed to facilitate hiring and firing.
- Regions should work to facilitate contacts between universities/university colleges and companies. Possible R&D tax credits ought to be structured in such a fashion that they stimulate cooperation.
- The potential for regional development would increase if regional universities/university colleges were given greater opportunities for specialisation and improved access to regional risk capital.

Concluding words

The report has identified new actors who are important for innovative capacity and entrepreneurial activities in the Swedish economy – particularly the role played by new and small firms, as well as universities and students. Moreover it has been shown that Swedish based firms or individuals own by and large most of the patents that have been registered by Swedish citizens.

It has also been important to examine the regional conditions for innovation and growth and to place the so-called R&D paradox in a new light. The latter would appear to be concentrated in specific industrial sectors. There is also a clear relationship with major Swedish corporations and the high degree of internationalisation in the Swedish economy.

Finally it has been shown that the recovery of Swedish economic growth during the past two decades has most probably provided a further impetus for innovation. There are now opportunities available to take the next step in this process and to further strengthen the Swedish economy. These measures will be essential if Sweden is to be prepared for the intensification of international competition that may be expected to arise once the pace of globalisation again begins to accelerate. An innovation policy framework along the lines proposed would support innovation and thereby also improve Sweden's long run opportunities for economic growth.



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Lars Persson is associate professor in economics and deputy managing director at the Research Institute of Industrial Economics. He is engaged on research into industrial economics, competition policy, international investment, R&D and entrepreneurship. At present, he is working on questions related to international mergers and structural change, the interaction between entrepreneurs, risk capitalists and established companies in the innovation process and on firm taxation and business acquisition.

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Erik Wetter has a PhD in economics and is a senior lecturer at the Stockholm School of Economics. His dissertation developed quantitative measurements of innovative capacity based on human capital. In a comparative study, these measurements have shown themselves to be more accurate in being able to predict the survival of knowledge-intensive companies than financial credit risk models. Erik has also worked more “hand on” as a practitioner in the fields of innovations and intellectual property rights. He has for instance carried out some work for Vinnova into the patent processes of the inventor, Stockholm School of Economics Håkan Lans.

Tomas Åstebro is associate professor in business strategy at HEC in Paris. He was previously associate professor at the University of Toronto and has also worked at the University of Waterloo. His research is concerned with the organisation of technical change and entrepreneurship. He has also been a management consultant in the field of business development and has worked for organisations such as the Bank of Montreal, Canadian Imperial Bank of Commerce and for Volvo. He has a PhD from Carnegie Mellon University and a licentiate degree from the Chalmers Institute of Technology.



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