

ISLANDS AND SMALL STATES INSTITUTE

Occasional Papers on Islands and Small States

INNOVATION AS AN ENGINE OF ECONOMIC GROWTH

Marisa Xuereb

No: 1/2004

ISSN 1024-6282

This is a discussion paper which the author/s submitted for feedback from interested persons. The author/s are free to submit revised version of this paper for inclusion in other publications. An electronic version of this paper is available at www.um.edu.mt/islands. More information about the series of occasional papers can be obtained from the Islands and Small States Institute, University of Malta. Tel/Fax: 356-21344879, email: islands@um.edu.mt .

Introduction

The concept of innovation and its economic implications have never attracted as much research interest as over the past few years, precisely since 2000, when the European Union's (EU) Lisbon Strategy was launched.

The Lisbon Strategy

The contribution of the European Commission to the Lisbon European Council in 2000 recognised that, notwithstanding the economic and political achievements of the European Union during the 1990s, the EU of the new millennium faced a paradigm shift driven by globalisation and the new knowledge economy. It noted that "the EU's growth rates have consistently been less than the US, unemployment remains unacceptably high and too many people are excluded from society. The European economy is simply not as dynamic as some of our major competitors" (European Commission, 2000). This realisation led to the formulation of the Lisbon Strategy, which is a ten-year plan to make the EU the world's most dynamic and competitive economy, and which is the frame of reference of present European economic and social policy.

The Spring Report of March 2003 affirmed that innovation is the "one of the key factors to opening up new opportunities for growth, stimulating competition, and delivering new, more effective ways of approaching common problems" (European Commission, 2003a). This followed the Commission's Communication entitled 'Innovation policy: Updating the Union's approach in the context of the Lisbon strategy', which asserted that "innovation is a cornerstone of the Lisbon Strategy" (European Commission, 2003b), highlighting "entrepreneurial innovation" and those forms of innovation that are based on organisational change and technology diffusion, rather than major new discoveries. Innovation has thus come to the forefront of European economic research, both in EU Member States as well as in candidate countries.

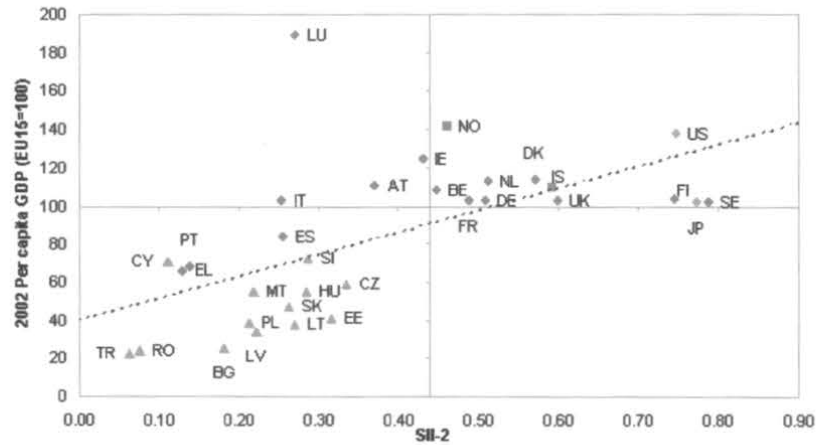
The European Innovation Scoreboard

At the request of the Lisbon Council of 2000, a framework that enables the comparative assessment of innovation performance was developed. This is the European Innovation Scoreboard, which essentially provides indicators for tracking progress towards the EU's strategic goal of becoming the most competitive and dynamic knowledge-based economy in the world.

The chart below, reproduced from the Innovation Scoreboard 2003, suggests a positive, albeit weak, correlation between innovation, as measured by a summary innovation index (SII-2), and per capita GDP in Purchasing Power Standards. Interestingly, there are countries like Luxembourg and Norway that enjoy high per capita income levels even though they do not score highly in innovation. But it is important to note that these countries have a strong comparative advantage in specific areas. Luxembourg is able to

exploit its niche specialisation in financial services and Norway benefits greatly from its natural resource endowments. Conversely, there are countries that perform as well as the US in terms of innovation and yet have a lower per capita income level than the US and some of the European countries. These are Finland, Sweden and Japan, countries whose leading industries are actually based on innovative technologies.

Fig. 1: Innovation vs. GDP



Source: *European Innovation Scoreboard, 2003*

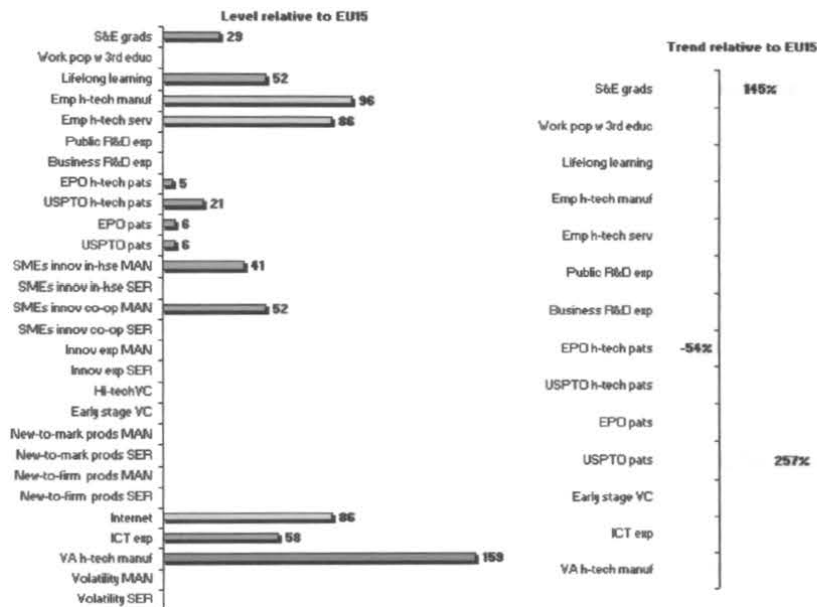
On the other hand, the three EU-15 countries with the lowest per capita GDP level also have the lowest innovation scores among this group of countries (in green), and all the accession and candidate countries (in red) have an innovation score, as well as a per capita GDP level, that is well below the EU-15 average.

What underlies these observations? Is innovation a necessary prerequisite to higher per capita GDP levels, in the absence of natural resource endowments like Norway's or niche specialisations like Luxembourg's in financial services?

Malta's Innovation Performance

Malta, as well as Bulgaria and to a lesser extent Italy, is among the weaker performers in terms of innovation, as measured by the summary innovation index. Out of a total of twenty-eight innovation indicators featured in the Innovation Scoreboard of 2003, data for Malta is available for just thirteen of them. The only indicator for which Malta's performance surpasses the EU-15 average is that of value added in high-tech manufacturing, largely due to the strong presence of a major semiconductor multinational in the manufacturing sector. Malta's score is comparable to the EU-15 average with respect to employment in high-tech manufacturing, for the same reason, and not far below the EU-15 average with respect to employment in high-tech services and Internet penetration. Yet, on all the other innovation indicators for which data is available, Malta's performance is well below the EU-15 average. These include expenditure on information and communications technology (ICT), life-long learning, SMEs co-operative as well as in-house innovation, the number of science and engineering graduates, and patent applications. Encouragingly, Malta seems to be gradually catching up with the EU-15 in terms of the number of science and engineering graduates, since this indicator displays a positive growth trend.

Fig. 2: Malta's Innovation Scoreboard performance

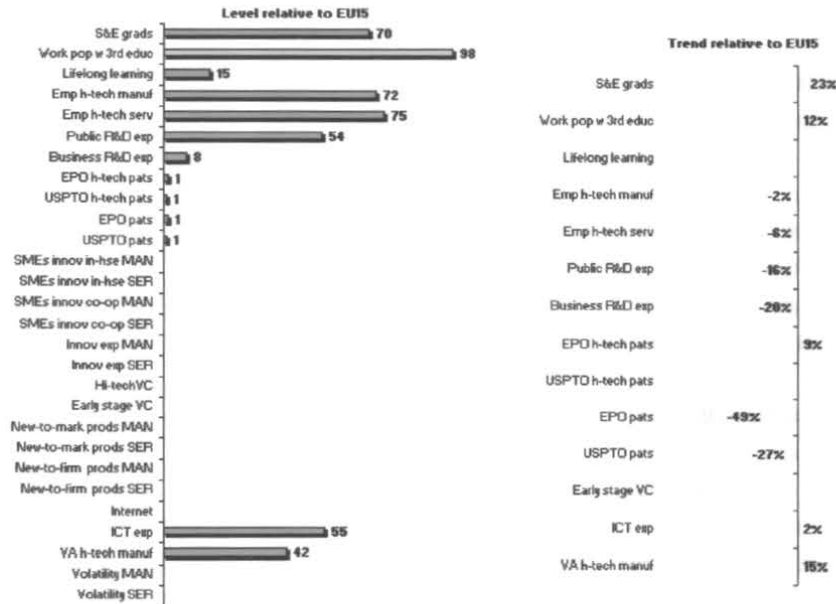


Source: European Innovation Scoreboard, 2003

Bulgaria's Innovation Performance

As in the case of Malta, an assessment of Bulgaria's innovation performance is hampered by lack of data. From the indicators for which data is available, it emerges that Bulgaria's share of the working population with tertiary education is very close to the EU-15 average. With respect to other indicators, Bulgaria still has substantial catching up to do, particularly on lifelong learning, business R&D expenditure and patents. Yet, it is well ahead of Malta in terms of the number of science and engineering graduates.

Fig. 3: Bulgaria's Innovation Scoreboard performance

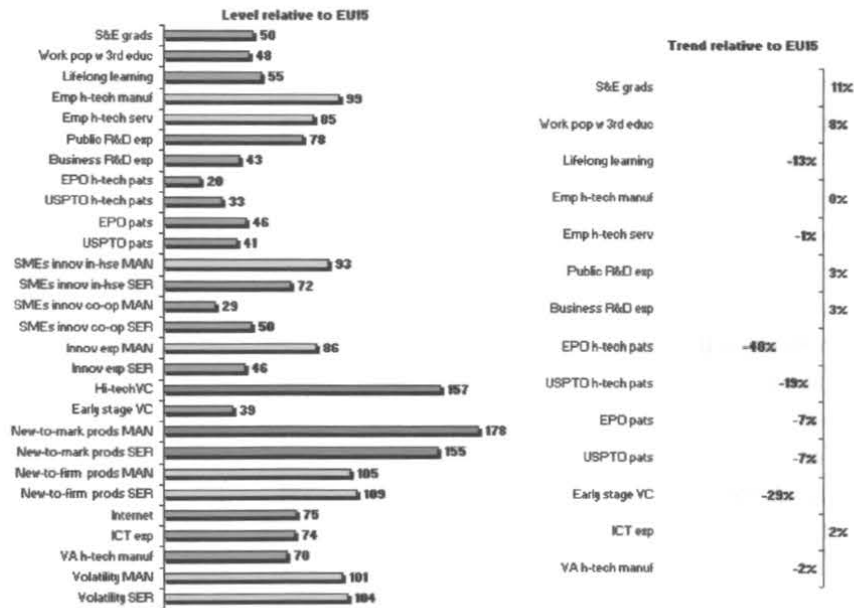


Source: European Innovation Scoreboard 2003

Italy's Innovation Scoreboard performance

Italy is one of the weaker innovation performers among the EU-15 countries, as well as one of the countries with the lowest per capita GDP. Its relative innovation weaknesses range from tertiary education attainment and lifelong learning to public and especially business R&D expenditures to Internet penetration and expenditure on ICT. Its lowest relative scores are in the number of patent applications, SME co-operative innovation and early stage value creation. Yet, it stands out in the field of new-to-market product and services and in high-tech value creation, suggesting that Italy may have a number of rather large enterprises that are industry leaders in their own right and are constantly engaged in high value creation innovation, while many of its SMEs lag behind at least partly due to the lack of adequately trained human resources. Italy's case points at the importance of investment in human resources and of fostering an innovation culture at the SME-level, to enable SMEs to contribute towards value creation and ultimately economic growth. Clearly, SMEs have a key role to play in the economy, even in an industrialised country like Italy.

Fig. 4: Italy's Innovation Scoreboard performance



Source: European Innovation Scoreboard, 2003

Interestingly, the European Innovation Scoreboard and the 2003 edition of the European Competitiveness Report, which analyses the competitiveness of the EU, came to similar conclusions in two major areas. Firstly, the extent to which Europe can reap the benefits of the positive trend in ICT investment depends on the ability to accelerate and deepen organisational innovation. Secondly, adjustment strategies in acceding countries should rely on innovation and not on current cost advantages. The first of these conclusions is of particular pertinence to Malta, given its current bid to become an ICT hub in the Mediterranean region, which is being fuelled by a drive to accelerate the proliferation of ICTs. The potential, positive spillovers of this drive on all other sectors of the Maltese economy depend on the ability of local SMEs to take up these technologies and innovate their products and processes accordingly. With regards to reliance on cost advantages, the experience of Malta is a torchbearer for countries like Bulgaria. Malta has witnessed the gradual decline of industries that relied on cost advantages that we have lost to cheap labour countries in North Africa and Asia. Those companies that have continued to thrive and prosper are largely those that have invested in people and fostered an innovation culture.

The World Economic Forum's Lisbon Review

In the World Economic Forum's Lisbon Review for 2004, entitled 'An assessment of policies and reforms in Europe', the Lisbon Strategy is broken down into eight distinct dimensions considered to be critical for national competitiveness, one of which is innovation and R&D. The outstanding performers in the innovation and R&D sub-index of this assessment are again Finland and Sweden, who are also among the top three overall. Moreover, the ranking in innovation performance mirrors the overall ranking for most countries, with the notable exceptions being Luxembourg, whose asynchrony has already been noted, and, to a lesser extent, Denmark.

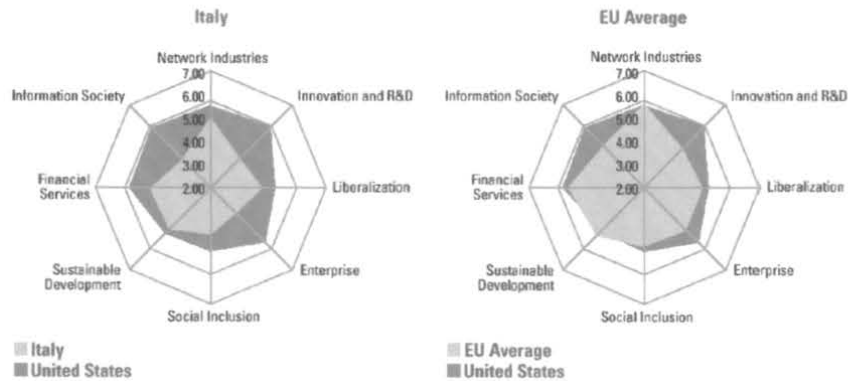
Tab. 1: World Economic Forum ranking and scores of the EU-15

Country/Group	Final Index		Subindexes							
	Rank	Score	Information Society	Innovation and R&D	Liberalization	Network Industries	Financial Services	Enterprise	Social Inclusion	Sustainable Development
EU 15										
Finland	1	5.80	5.78	5.87	5.36	6.33	6.13	5.48	5.46	5.97
Denmark	2	5.63	5.68	4.87	5.14	6.51	5.96	5.80	5.52	5.78
Sweden	3	5.62	5.71	5.57	4.91	6.37	5.80	5.29	5.46	5.89
United Kingdom	4	5.30	4.96	4.67	5.11	5.78	6.10	5.82	4.86	5.30
Netherlands	5	5.21	4.99	4.46	4.94	6.04	5.67	4.71	5.29	5.57
Germany	6	5.18	4.96	4.90	4.64	6.36	5.62	4.64	4.37	5.96
Luxembourg	7	5.14	4.98	3.57	4.96	6.22	5.72	5.17	5.19	5.28
France	8	5.03	4.52	4.88	4.65	6.10	5.68	4.68	4.72	5.20
Austria	9	4.94	4.69	4.27	4.54	5.76	5.48	4.26	4.88	5.64
Belgium	10	4.88	4.08	4.45	4.63	5.74	5.39	4.69	5.12	4.91
Ireland	11	4.89	4.14	4.18	4.47	4.89	5.59	5.30	4.62	4.35
Spain	12	4.47	3.71	3.93	4.50	5.34	5.14	4.32	4.38	4.48
Italy	13	4.36	3.94	3.87	4.40	5.30	4.92	3.64	4.24	4.74
Portugal	14	4.25	3.88	3.44	4.10	5.35	4.90	3.88	4.15	4.29
Greece	15	4.00	3.16	3.44	3.96	4.99	4.74	3.78	3.90	4.00
United States		5.55	5.66	6.08	5.11	5.85	5.82	5.71	5.04	4.96

Source: World Economic Forum, 2004

Strikingly, the EU-15 countries display a general weakness in innovation and R&D, particularly when compared to the US. This explains why innovation has become a matter of special concern for Europe. Italy again emerges to be one of the weaker countries in the EU-15 group, with its innovation performance being one of its major setbacks.

Fig. 4: Italy's World Economic Forum performance



Source: *World Economic Forum, 2004*

The same general weakness in innovation and R&D is exhibited by the sub-indices for the acceding countries, which are now the new Member States, and the candidate countries, with all countries scoring low in the innovation sub-index. But Malta's innovation score sticks out. Malta occupies the fourth position in the overall ranking, but has an innovation sub-index score that is only marginally better than that of the candidate countries, Bulgaria, Romania and Turkey, tailing at the lower end of the overall rank, and much lower than that of the other new Member States. This is a clear red light for Malta, whose performance in all the other sub-indices, except for that of sustainable development where the other red light flashes, is among the best in the league of the new Member States.

Tab. 2: World Economic Forum ranking and scores of the accession and candidate countries

Country	Final Index		Subindexes							
	Rank	Score	Information Society	Innovation and R&D	Liberalization	Network Industries	Financial Services	Enterprise	Social Inclusion	Sustainable Development
Estonia	1	4.64	4.92	3.82	4.40	4.98	5.43	4.90	4.20	4.44
Slovenia	2	4.36	4.38	3.92	4.06	5.21	4.69	3.76	4.24	4.60
Latvia	3	4.34	3.62	3.86	4.44	4.35	4.84	4.87	4.47	4.29
Malta	4	4.20	4.42	2.99	4.03	4.81	5.27	4.00	4.83	3.24
Czech Republic	5	4.16	3.62	3.34	4.01	5.19	4.03	4.18	4.40	4.48
Hungary	6	4.12	3.24	3.47	4.10	4.57	4.87	4.41	4.19	4.09
Lithuania	7	4.05	3.36	3.57	4.10	4.51	4.67	4.38	3.69	4.17
Slovak Republic	8	3.89	3.29	3.34	3.84	4.50	4.39	3.43	3.83	4.53
Poland	9	3.68	2.95	3.53	3.75	4.00	4.26	3.56	3.42	3.99
Turkey	10	3.45	2.61	2.72	3.68	4.01	3.99	3.84	3.45	3.33
Romania	11	3.35	2.91	2.88	3.04	3.48	3.77	3.65	3.74	3.33
Bulgaria	12	3.25	2.66	2.94	3.26	3.54	3.64	3.81	3.07	3.08
EU Average		4.97	4.61	4.41	4.69	5.81	5.52	4.74	4.81	5.16

Source: *World Economic Forum, 2004*

A report published by the Community Research and Development Information Service (CORDIS) in 2003, outlining the challenges for innovation policy in seven of the then candidate countries, among which Malta, states that innovation policy is not yet a focus of decision-makers' attention in Malta. The key conclusions of the study's innovation policy profile for Malta are that:

- The support framework for innovation in Malta, encompassing Government, society, business, institutions and NGOs requires further development in order to be effective
- Innovation efforts require better research community industry co-operation and improved local and international networking
- Lacunae in human resources are a major constraint to R&D and innovation activities in Malta (Briguglio & Cordina, 2003)

The Challenge of Innovation

The distinction between "innovation" and "invention" is a pertinent one. The Oxford English Dictionary defines innovation as "making changes to something established". Invention, by contrast, is the act of "coming upon or finding: discovery". Hence, whereas inventors stumble across or create new things, innovators try to change the status quo, thereby disrupting the way organisations do things, and may have been doing them for years. This is precisely why innovation is often resisted, not only within organisations but also at the industry and market levels, and why it poses a challenge to all organisations, whether large or small. Innovation is not a matter of natural course; it will not happen unless there is a conscious and concerted effort to make it happen. Enterprises need to be aware of the benefits of innovation, as well as the cost of lack of it, and of the challenge that it poses. Policymakers have to actively seek to promote it. This is essentially what is referred to as the fostering of an innovation culture.

Innovation and Research Capability

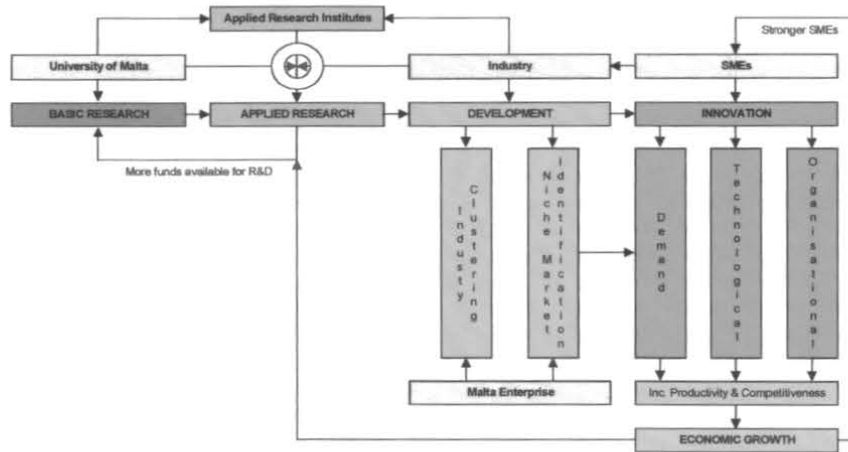
Innovation does not happen in isolation or accidentally either. It is part of a complex process that starts off with basic research, which may be completely detached from the ultimate objective of economic growth, and gradually refines itself by systematically narrowing its focus onto the target objective, to evolve into innovation, which generates economic activity and ultimately growth.

Fig. 5: R&D, innovation and economic growth



The forerunner of innovation is hence research, and its prerequisite is an adequate research capability, at each stage of research, namely basic research, applied research, and development, which follows from applied research and leads on to innovation. This innovation process involves a number of interdependent actors, all of which play a key role at particular stages of the process.

Fig. 6: The innovation engine



At the basic research stage, the key player is the academia, the University of Malta, which has the crucial role of starting off the innovation process. The next stage towards innovation is applied research, which requires the involvement of industry in collaboration with the academia as well as applied research institutes, which are badly lacking in Malta. Indeed, the “European paradox” of a relatively good basic research capability but weak indigenous innovation does apply to Malta, and this is partly due to the weak links between the research community and the business community, which are generally limited to the provision of human resources rather than focused on producing research aimed at promoting innovation. Collaborative efforts between the University and industry are critical to the innovation process, but the mechanisms to bring the two sides together are few and rather weak. Applied research institutes could be a way of formalising and strengthening links between the University and specific industrial sectors.

It is pertinent to note that the Maltese business sector can be split into two distinct sub-sectors: the export-oriented sub-sector and the domestically-oriented sub-sector. The export-oriented sub-sector, which is largely foreign-owned, is highly innovative but tends to import its innovation from abroad or conduct it in-house rather than by direct involvement of the local research community. The domestically-oriented sub-sector, on the other hand, could greatly benefit from research input that can lead to innovation, but generally at a less sophisticated level than that which is produced by academic research. More specifically, domestic industry has restructuring and innovation priorities that are not typically matched by the research work being undertaken.

Collaboration between the research community and domestic industry may also be thwarted by the fact that, owing to the small size of the Maltese economy, research bears more fruit when undertaken in an international context rather than to serve the small scale of domestic industry. It may be as an effect of these factors, and perhaps

also partly as a cause, that there exist no formal research community and business community co-operation programmes to disseminate and promote the application of research findings. There also exists a perception that, given the small size of the Maltese economy that restricts the potential benefits of interactions between the University and local businesses, the present state of affairs may be optimal for both parties. It would be more beneficial for the University and local businesses to tap into supranational, especially European, research and innovation networks that are more suited to their specific capabilities and needs.

There are some notable exceptions to these general observations. For instance, the Department of Manufacturing Engineering within the University of Malta is occasionally commissioned to design tools and other equipment for major industrial firms operating in export markets and the Department of Electrical Power and Control is involved in the exploration of alternative energy sources with a number of local firms, while student dissertations are occasionally used by local firms to improve their operations. But the company owned by the University to service business needs, Malta University Services, is far more oriented towards educational activities than towards research. The same applies for a committee set up between the University and local industry, which is mainly geared towards fulfilling human resource needs.

Innovation and SMEs

One common misconception is that innovation is a prerogative of large companies and hence largely out of reach for SMEs. Unarguably, SMEs are typically too small to fully exploit scale economics, and particularly those related to risk that are often associated with innovation. But innovation is becoming less and less about new wonder products, and more about incremental improvements, as blockbuster products are becoming harder to come by. In the US, which has become Europe's benchmark for innovation, spending on pharmaceutical R&D has doubled over the past decade, but the number of new drugs approved each year by America's Food and Drug Administration has halved. Even large companies should hence focus on making many small improvements rather than chasing new wonder products (The Economist, 2004).

There are also ways for SMEs to minimise the setbacks arising from their smallness. One of the most successful strategies is industry clustering, a strategy that is still not popular enough among local SMEs but which is working well for those who have taken the plunge and formed industry clusters to face up to the challenge of competitiveness. Indeed, industry clustering, together with the identification of potential niche markets, constitutes an integral element in the development stage of the innovation process for SMEs to maximise their potential to translate R&D into marketable innovation. At this stage, entities such as Malta Enterprise, have a key role to play. Encouragingly, Malta Enterprise seems to be conscious of the importance of fostering an innovation culture among local businesses and helping local SMEs to identify potential niche markets and form industry clusters to be able to penetrate such markets.

We initially asked whether innovation is a necessary prerequisite to higher per capita GDP levels, in the absence of natural resource endowments like Norway's or niche specialisations like Luxembourg's in financial services. Unarguably, a country cannot emulate Norway's natural resource endowments, but niche specialisations can be sought and developed. But then again, the development and exploitation of a niche market inevitably requires innovation. Indeed, the fragmentation of markets into several niches creates further scope for specific innovation, which has been termed "demand innovation", whereby enterprises succeed not by meeting existing demand in a new way, as in "product innovation", but by discovering new forms of demand and adapting to meet them. Ultimately, an innovative enterprise is one that can adapt in response to changing market conditions.

SMEs in the New Enlarged Europe

All business organisations in the 25 Member States, including SMEs, are subject to the same rules of the competition game. Those organisations that are most innovative are the ones most likely to be able to compete. This is an important consideration for SMEs in the new Member States as well as in the candidate countries. One of the most apparent advantages of EU membership is that of gaining full access to the sizeable EU market. But this advantage cannot be exploited unless SMEs are able to compete in this highly competitive market. For SMEs in the new Member States and candidate countries that have not been previously exposed to such a competitive environment, this is a real challenge that requires SMEs to reinvent themselves.

The pre-accession phase for most of the new Member States has been characterised by nationwide industrial restructuring programmes to gear up local SMEs to face up to the competitive challenge of the free market. While these programmes have achieved mixed results, in Malta as well as in other countries, with some industries registering substantial progress in a relatively short span of time and others being less successful at reinventing themselves, what lies at the heart of these restructuring programmes, and particularly the more successful ones, is innovation. Innovation is not a one-time shot. It has to take place continually and systematically, because no single innovation, or major invention for that matter, conveys lasting advantage. It would be a crucial mistake to think that once enterprises survive beyond EU accession, then their restructuring programme can be said to have been successfully completed. Effectively, restructuring can never be over and done with, precisely because it is an on-going process rather than a "programme" with a target completion date as is so often implied.

The pre-accession process has instigated local SMEs, as well as policymakers, to assess their strengths and weakness. EU membership offers a multitude of opportunities for local SMEs, from market opportunities to financing and learning opportunities, which have to be exploited to the full. While financing and learning opportunities can contribute towards the innovation process, innovation will enable local SMEs to be more productive and competitive and hence to be better positioned to exploit market opportunities. It is therefore imperative that all stakeholders look upon innovation as an engine of economic growth and work together towards a more dynamic, knowledge-based economy.

References

Community Research and Development Information Service (CORDIS) (2003): 'Innovation Policy Issues in Seven Candidate Countries: the Challenges', Vol. I

European Commission (2000): 'An agenda of economic and social renewal for Europe.' Contribution of the European Commission to the Special European Council in Lisbon, 22nd – 23rd March 2000, DOC/00/7

European Commission (2003a): 'Choosing to grow: Knowledge, innovation and jobs in a cohesive society.' Report to the Spring European Council, 21st March 2003, on the Lisbon strategy of economic, social and environmental renewal, COM(2003) 5

European Commission (2003b): 'Innovation Policy: Updating the Union's approach in the context of the Lisbon strategy', COM(2003) 112

European Commission (2003c): 'European Competitiveness Report 2003', SEC(2003) 1299

Islands Consulting Services (2003): 'Innovation policy in seven candidate countries: the challenges – Innovation Policy Profile: Malta', Community Research and Development Information Service (CORDIS)

The Economist (2004): 'Don't laugh at gilded butterflies.' Special report on business innovation, April 24th - 30th 2004

World Economic Forum (2004): 'The Lisbon Review 2004: An assessment of policies and reforms in Europe'

Online Resources

Community Research and Development Information Service (CORDIS): www.cordis.lu

European Innovation Scoreboard: www.cordis.lu/scoreboard

Government of Malta: www.gov.mt

Lisbon Strategy: http://europa.eu.int/comm/lisbon_strategy/index_en.html

Malta Council for Science & Technology (MCST): www.mcst.org.mt

Malta Enterprise: www.maltaenterprise.com

University of Malta: www.um.edu.mt