



Title: Nord Trend Workshop Issues Paper
Date: 1 November 2008
Ref: CKA2008110100
Website: www.cka.be

NORD TREND

Workshop Issues Paper

Author: Patrick Crehan of CKA, Brussels
Project Leader: Jorn Bang Andersen of NIC, Oslo
Date: 1 November 2008

'When you as a leader understand this, you can map, systematize, manage, measure and improve this social process to produce a steady stream of innovations ... innovation is not a mystical act; it is a journey that can be plotted, and done over and over again. It takes time and steady leadership ... But it can be done.'

A. G. Lafley & Ram Charan in 'The Game-Changer' 2008

'A business that wants to ... succeed and prosper in a time of rapid change has to build entrepreneurial management into its own system. It has to adopt policies that create throughout the entire organisation the desire to innovate and the habits of entrepreneurship and innovation. To be a successful entrepreneur, the existing business, large or small, has to be managed as an entrepreneurial business.'

Peter F. Drucker in 'Innovation and Entrepreneurship', 1985

'The first thing people really understand when they move into management is that if you don't measure it, you can't manage it'

Carl J. Schram speaking on 'Measuring Innovation in the 21st Century', 2007

Key words: Open Innovation, Hidden Innovation, Forced Innovation, Entrepreneurship, Business Models, Management, The Aho Report, Lead Markets, Public Procurement, Public Goods and Services, The Top Runner Programme

Table of Contents

Executive Summary	1
The Changing Face of Innovation	2
Open Innovation.....	2
The Sources of Innovation	3
Hidden Innovation	6
Service Innovation	7
Organisational Innovation.....	10
Cost Innovation.....	13
Forced Innovation	14
Business Model Innovation.....	16
Management Innovation	17
Drivers of Innovation Performance	18
Competition and Globalisation	18
Skills and Capabilities.....	20
Entrepreneurship	23
Management.....	24
Measurement.....	25
Indicators for Entrepreneurship and Innovation	26
Where are we Today?	26
Recommendations for the Future.....	27
Key Question 1: Where Does Innovation Happen in Your Organisation?	29
Key Question 2: How Do You Manage and Organise Innovation?	29
Key Question 3: How do you Support Those Who Make Innovation Happen? ..	31

Acknowledgements

The NORD TREND Project is financed by the Nordic Innovation Centre in Oslo. The partners in this project are NIFU STEP of Norway, VTT of Finland, SISTER of Sweden, RANNIS of Iceland, The Danish Centre for Studies in Research and Research Policy, as well as CKA of Belgium.

Executive Summary

Innovation is one of the most important issues facing business and government in recent years. Our formal understanding of what innovation is, who does it and how to make it happen, seems to be constantly changing. The recent interest in 'open innovation' concerns a radical shift in how innovation is organized, where it takes place and who is involved in the process. It is a relatively new phenomenon and poses considerable challenges for managers. It is important to get a clear understanding of what is going on and what kind of help businesses, especially small and medium sized businesses might need to help them take advantage of such new ways of doing things.

Innovation experts in the UK have coined the term 'hidden innovation' to refer to innovation which is not picked up by economic indicators traditionally used by government to understand what is happening in the economy. It comes in many forms and there is a need to understand this better, not only to inform public policy, but to help industry see what is happening and benchmark itself accordingly. By some estimates as much as 80% of innovative activity lies below the radar of national measurement systems. To clarify the issue and open up a discussion this paper briefly illustrates the scope of hidden innovation under headings such as service, organisation, management and business models.

Many countries are now in the process of revising their system for measuring innovation. The US intends to include measures of innovation in its system of national accounts, and has spent the last two years consulting with industry to understand the changing face of innovation and how it is measured by industry. The Nordic countries are among the most innovative in the world. One of the goals of this workshop is to hear from innovative Nordic companies how innovation is changing for them so that our system of indicators will evolve as industry evolves, to reflect as much as possible what is happening and to provide meaningful, actionable feedback, not only to governments but to captains of industry as well. To motivate the debate we briefly review what drives innovation performance at enterprise level under headings such as competition and globalisation, skills and capabilities, entrepreneurship, management and measurement. The issue of entrepreneurship is especially important as it corresponds to the human dimension of innovation. The entrepreneurs are the ones who make innovation happen and innovative companies need to provide environments in which entrepreneurship can thrive.

Finally we put forward suggestions as to what future innovation indicators might look like. Perhaps they will provide a snap-shot of where innovation is happening on a sectoral basis, perhaps they will indicate how innovation is being managed, or how companies encourage and sustain entrepreneurship. Perhaps they will reflect important social goals related to energy use, climate change or work-place satisfaction. In any case we want to hear views from industry. Their input has implications for public policy in terms of how innovation is measured and programs to help enterprise improve their innovation performance and position to compete in the global knowledge economy.

This meeting is intended to be highly interactive. Participation is by invitation only. To get the most value out this meeting it will help for each participant to consider 3 key questions about their organisation:

- Where does innovation happen in your organisation?
- How is innovation organized and managed?
- What kind of an environment is provided to support those who make innovation happen?

Aggregate data may be published, but the information from individual participants will be treated as confidential.

The Changing Face of Innovation

Innovation is about new ideas adding value. It concerns organisations in general and business in particular. It is the key to sustainable growth and prosperity and it is at the top of the agenda for most firms in the world. Innovation is not simply about the creation of knowledge, but the novel combination of old knowledge. It stems from all kinds of knowledge and not just from traditional areas of science and technology and engineering.

The traditional approach to understanding innovation starts in the research laboratory and ends up in the market. This approach appears natural to scientists in public sector research laboratories and to many who work in government. This view may have been inspired by images of great inventors such as Thomas Edison., but it is mistaken. It is not a process that starts with inspiration and ends with profit. Reality is much complex and much more interesting than that.

As our understanding of innovation improves we see that it is not a simple static process. We see that innovation itself is changing over time. This has important consequences for people in business and in government.

Open Innovation

One of the most significant trends in how innovation has changed in recent years is the adoption of open models for the organization of innovation¹. Open Innovation helps companies to reduce the risk associated with invention or new technology development, reduce key factors such as time-to-market and create new sources of revenue. Open Innovation poses challenges for management and is likely to remain an important focus for organizational and management innovation for the years to come.

A study carried out by the Nordic Innovation Centre reports that 70% to 80% of new products and services that fail in the marketplace, do so not for lack of advanced science and technology but due to a poor understanding of user needs. Companies that enjoy a high rate of success introducing new products or services, tend to collaborate closely with end-users. Integrating users into the innovation process is a form of open innovation referred to as user-led innovation. It may seem like common sense but such companies are the exception and not the rule.

An important question for us is whether or not improved systems of innovation indicators could provide actionable evidence for managers of companies, encouraging them to experiment with and adopt such practices.

Most of what has been written about open innovation is about a specific type of technological innovation. Patents play an important role and open innovation practices often focus on the management of IP assets such as patents and related know-how. The sale of IP from failed projects or even successful projects that fit badly with company strategy can provide a new profit center for a company. The most famous example of course is IBM. In 2001 for example it spent \$600M on basic research while generating \$1.9B from royalties received for IP licensed to other companies.²

¹ 'Open Innovation: The New Imperative for Creating and Profiting from Technology' by Henry Chesbrough, Harvard Business School Press, 2006, ISBN 13: 978-1-4221-0283-1.

² Ibid page 109.

Science- or research-based companies are becoming better at seeking knowledge outside rather than relying on what they can develop themselves internally. Increasingly companies realize that they need not invent or develop something themselves if it is already available for license elsewhere. Until 1989 INTEL, a pioneer in micro-electronics relied almost entirely on the results of research and development conducted elsewhere. It now has formal advanced research functions in-house, but only embarks upon research projects when it is satisfied that what it requires is not already available elsewhere³. Merck realized in 2000 that it carried out 1% of global biomedical research, that to be globally competitive it needed access to the other 99%, and that to gain access it needed to connect to research being conducted in other firms, universities and research organizations around the world. It realized that it was now impossible for a single organization to master the torrent of new discoveries, insights and technologies being created all around the world. It instructed its research managers to create virtual laboratories capable of harnessing the global knowledge base, on the basis of its own internal research resources. This transformed the role and meaning of research in Merck. It required very different skills from its research managers, and a very different approach to the organization of research within the overall innovation process of the company.⁴

All in all there currently seem to be three main elements to open innovation:

- Making internally created IP available to external entities
- Using external ideas or knowledge to realize or complete innovation projects
- Managing and organizing innovation processes at the level of the entire value chain, involving not only customers and clients, suppliers of physical components and raw materials, but suppliers of knowledge-services and know-how.

The Sources of Innovation⁵

The innovation that is important for any firm of organization happens partly in its own workshops, laboratories, assembly lines and business departments, but much of it is done in collaboration with suppliers, its customers, business partners and even competitors.

From observing and talking to managers of companies in the 1980s Eric Von Hippel realized that technological innovation tends to occur in different parts of the value chain in different industry sectors. He discovered that key technical advances in a sector were the result of innovations located at the user, the manufacturer or a supplier. That in the case of scientific instruments 77% of all innovations sampled were due to the efforts of the user of the instrument. In the case of tractor shovels, engineering plastics and plastic additives, more than 90% of all observed innovations originated with the manufacturer. In the case of wire termination equipment 56% originated with the supplier. As a general rule innovations originated anywhere within the supply chain, but in certain sectors there was a tendency for the balance to lie in one part of the supply chain rather than in another. Studying the process of innovation and how it was organized he developed concepts that are important for those who manage innovation processes, such as the concept of the lead user. Although he was mainly interested in products and process innovation he drew attention to user-dominated innovation processes and the need for management innovations to accompany technological innovation. He emphasized that ‘... new sources of innovation demand new management tools as well as new organization ... tools for analyzing and possibly shifting the functional sources of

³ Ibid page 50

⁴ Ibid pages 53 and 54

⁵ Peter F. Drucker wrote about ‘the seven sources of innovation’ in 1985 in his book ‘Innovation and Entrepreneurship’. Eric von Hippel studied this and wrote in more detail in ‘The Sources of Innovation’ published in 1988 by Oxford University Press, ISBN 0-19-509422-0

innovation are not in firms' current management inventory and must be developed'⁶ In other words he made innovation the business of managers and of innovation users, as much as that of researchers, engineers and scientists.

Innovation happens in all functions of a business, not simply in product or process development. This has always been true. What has changed is that it is increasingly being organized and managed so that it takes place, not in an ad-hoc or serendipitous manner, but systematically, on the basis of new tools for collaboration and new models for organisation and management.

It happens in sales and marketing where the focus might be on the use of on-line catalogues, blogs or web2.0 media. It happens in new product development and may involve outside design firms, retail partners and outsourced manufacturing partners. It can happen in the administrative and legal departments of companies. It could happen in 'accounts payable' when a company moves from aggressive-confrontational approaches to the management of late-payments to more conciliatory approaches based on the negotiation of flexible payment terms that may help the client through hard times while generating extra revenues for what is effectively a new financial 'service'. It can happen in the human resource function of the company, as they experiment with flexible hiring practices or new compensation and incentive schemes. It could happen in training and career development when a company develops a corporate university based on training done by managers and content sourced from suppliers and clients.

Construction is a major user of products and services from sectors that have some of the highest expenditures for R+D in the economy, for example machinery and equipment and telecommunications, however despite construction being the end-user, such innovation does not show up in innovation statistics for the construction sector.

This emphasizes the need to understand the process of innovation and how it happens, not simply at firm level, but as a complex distributed process throughout whole value chains. This is needed to guide innovation related policy making, innovation related research, research on the management of innovation and entrepreneurship as well as research into entirely new and poorly understood sectors such as services.

The recent interest in open innovation underlines the fact that innovation is not a simple 'event' internal to a company, that it can involve people and organisations scattered right throughout the established or emerging value-chains with which an organisation is involved.

Understanding innovation has implications for policy in the sense that 'attempts to direct or enhance innovation must be based on an accurate understanding of the sources of innovation'.⁷ Von Hippel helpfully points out that if US semiconductor equipment makers are falling behind, it may be futile to pump money for innovation directly into the equipment makers. The equipment makes are not the innovators in this sector, the innovators are the users. If the sector falls behind in terms of innovation, it is more likely that this is due to a lack of capability at the level of the user. It is the user that needs help, not the manufacturer, as the manufacturer is lead by the user in most cases of innovation in the sector. Since the main driver or source of innovation is located in different parts of the value chain for different sectors, effective innovation policies should be tailored to sectoral needs. They should address the issue of the capacity of the relevant actor to initiate and lead innovation projects in that sector. This concerns the innovation related leadership, entrepreneurship and management

⁶ Eric von Hippel 'The Sources of Innovation' page 9, 1988, Oxford University Press, ISBN 0-19-509422-0

⁷ Von Hippel 'The Sources of Innovation' ... page 9.

capabilities of the organization, and not simply access to research finance based on complex and highly constrained arrangements with local universities and research centers.

Innovation is any process for using ideas to add value. It is not restricted to projects that start in a research laboratory and end up as offerings in a market. We are still very much in the early days of learning what it is and where it occurs, how to recognise it when happens and how to measure it so it can be managed and improved.

Innovation in one sector enables innovation in others. For example innovations in ICT enable innovations in retail, distribution, finance, marketing and manufacturing. Innovations in chemicals enable innovations in agriculture, food, plastics and engineering. Innovations in agriculture enable innovations in energy, food and industrial chemicals. Innovations in textiles enable innovations in clothing, fashion, sport, housing, home-decoration and medicine. Most innovations are not technological innovations. Many innovations are the application of existing technologies and old ideas in new, useful and cost-effective ways.

It would be a mistake to believe that the location of innovation that is important for a sector is static, as sectors mature the dynamic of innovation changes. The story of the car is a case in point. While Henry Ford is often credited with the invention of the modern assembly line, he was largely inspired by the organisation of work in slaughter-houses at the time. He is quoted to have said that his customers 'could buy cars of any colour as long as they were black'. In effect this was the reason why General Motors overtook Ford in the 1920s when it developed innovative marketing based on a range of products with essentially the same content in terms of technology, but differentiated on the basis of styling. GM is also responsible for the financial innovation known as 'payment by instalment'. This expanded the market for cars considerably and was adopted as by other sectors too. Toyota has conquered the world mainly on the basis of its lean-production system. Car companies today compete with each other on many fronts, but not on all fronts equally. Some focus on safety features such as air-bags and crash-test modelling. Others compete on the basis of environmental impact and fuel economy. More recently companies from India and China are trimming features to open markets in countries with large low-income populations. As companies and the markets they serve grow and mature the frontier for innovation moves too, it is not a single or a static target.

A series of recently completed innovation studies has tried to better understand how innovation happens in different sectors of the economy⁸ and what are the challenges currently faced by companies innovating in sectors that include aerospace, automotive, biotechnology, chemicals, energy, food, ICT, machinery and textiles. Interviews were used to gather feedback from industry on the innovation related challenges they face now or expect to face in the future. The feedback emphasizes the importance of knowledge sourced externally to the company, from partners, suppliers, clients and research organisations. It mentioned challenges relating to productivity, management systems and logistics, business intelligence and the ability to understand new technology trends, management capabilities and leadership skills, skills for collaboration and the development of networks, planning capabilities, the ability to prioritize innovation initiatives, cooperation with competitors to reduce the overall cost of research, access to skills in areas that are not important now but will be in several years time, challenges related to the de-centralization of research, the quality of their partnerships, the ability to develop long-term relationships with clients and understand their future needs.

Very few were of the identified challenges were of the 'we need access to technology' kind, they mainly belonged to categories such as organisation, management and human resources.

⁸ The reports of the SYSTEMATIC project are available from <http://www.europe-innova.org/>

In the UK only 1% of businesses consider institutes of higher education as information source of information, whereas 27% rated other businesses, clients or customers of high importance⁹. This suggests that it may be more important to support companies in their efforts to link up with clients and customers. This is why it is important to understand how innovation happens in these other sectors, the barriers to innovation and the kind of measures that may be required to support and encourage it.

Writing from a 'business' perspective Sawney, Molcott and Arroniz¹⁰ examine how companies innovate and come up with a list of twelve ways in which companies innovate in terms of their:

- Offerings, platforms and solutions,
- Customers, customer experience and value capture,
- Processes and organization,
- Presence, networking and brand.

This provides the basis for 'Key Question 1' in annex. It is interesting to note that they do not explicitly mention research. Of course research is important, but it is one of many inputs to innovation, along with good management, state-of-the-art equipment, money or high quality human resources. It is important to understand innovation from an organizational perspective to avoid the mistakes of the past where most innovation activity is ignored due to inappropriate metrics.

In the past, there has been a strong emphasis on technological innovation. Less attention has been paid to what is happening that is not technology based in the traditional sense of the term. We have become reasonably good at measuring technological innovation, and overlooked the rest. This is why we talk about 'hidden innovation', innovation that is important but unmeasured on the basis of traditional indicators. Un-measured means unmanaged and this is why it is important to understand hidden innovation in more detail.

Hidden Innovation

The term 'hidden innovation' seems to have been coined by NESTA - the National Endowment for Science, Technology and the Arts in the UK¹¹. Traditional indicators of innovation performance relate to R+D expenditure, patenting activity and the number science, technology and engineering graduates, are heavily biased toward investment in scientific and technological invention. The result has been policy approaches to supporting innovation that emphasize measures such as increased expenditure on R+D and developing links with industry. Unfortunately the traditional measures only represent innovation in small parts of the economy, to the neglect of others. What about music, entertainment, design, architecture, retail, agricultural production, green-house systems and contract farming, finance, sports, marketing, television programming, catering, food-service, health and life-style related services. Current concepts and measures of innovation are focused on science and technology drivers. They ignore innovations in service, business model and organizational form.

NESTA performed detailed analysis on six sectors that perform poorly on traditional measures of innovation. These sectors were oil recovery, retail banking, construction, legal aid services, education and the rehabilitation of offenders. They cover not only activities of

⁹ NESTA

¹⁰ Spring 2006 Vol. 47 No. 3 of the MIT Sloan Management Review in an article entitled 'The 12 different ways for companies to innovate'.

¹¹ NESTA Research Report: June 2007 on 'Hidden Innovation: How innovation happens in six 'low innovation' sectors'

private industry but the work of public administration as well. In the case of oil recovery they focused on issues such as extraction from mature fields where the work is difficult due to the depth of the well-head or especially turbulent sub-sea conditions. This requires new techniques for oil recovery, but such techniques cannot be tried in a laboratory on land, they are developed in the field. This kind of innovation though very risky and costly is hidden in the sense that it is integrated with the real-work of extraction. A similar situation arises at Dell in the process of assembly. Research on the process of assembly and design for assembly of lap-tops requires creative experimentation and observation. It does not take-place in a separate formal laboratory but on the assembly-line itself.

Despite not being measured, hidden innovation is often the kind of innovation that most directly contributes to the real practice and performance of a sector.

Based on the examples it studied sectors where we can expect to find hidden innovation include those characterized by:

- Low formal R+D intensity
- Low levels of patenting activity
- Public sector activities (education, legal-aid, rehabilitation of young offenders)

94% of the UK economy is in sectors that are considered by the OECD to be low-tech due to their low expenditure on formal scientific research these are considered low-tech sectors. Low-tech sectors can be highly innovative and hi-tech sectors can have high levels of hidden innovation. The story of the development of the iPod by Apple is a case in point. Business and financial services accounted for 33% of Gross Value Added in the economy. It is disturbing that sectors where innovation is largely hidden because it is poorly understood and un-detected by traditional measures represent the greatest part of the economy.

Competing on innovation in the 21st century will require innovation in all its forms, not just innovation based on the work of formal research labs it will require ‘total innovation’¹², hidden as well as traditional forms of innovation. This has important implications for policy¹³.

NESTA identified four forms ‘hidden innovation’. They call them:

Type I: Based on S+T research but not implemented in a laboratory situation.

Type II: Non S+T based, relying on new organizational structures.

Type III: Novel combinations of existing technologies and processes.

Type IV: Small scale engineering and science problems derived for example on the basis of quality systems. The Toyota production system emphasizes the elimination of waste and inconsistency. It generates 1,000,000 ideas per year, roughly 3,000 ideas a day. Many of these are for process improvements. Some of these are small scientific or engineering problems that require know-how to solve, rather than new scientific discoveries.

Our understanding of innovation is as yet incomplete but improving rapidly. It is likely that this characterization by NESTA does not cover all areas that we will need to consider. In the following sections we look at various forms of innovation which go beyond traditional concepts and which may be important for the future.

Service Innovation

¹² NESTA Policy Brief TI/24/May 2008 entitled ‘Total Innovation: Harnessing all forms of innovation to maximize competitive advantage’

¹³ NESTA Research Report October 2006, ‘The Innovation Gap: Why Policy Needs to Reflect the Reality of Innovation in the UK’.

Services were once the box for the convenient classification of economic activities that did not obviously fall into easy to understand and obviously distinctive categories such as agriculture, mining or manufacturing. The designation effectively meant 'miscellaneous' or 'other economic sectors' and service companies represented a small part of the economy. Times have changed and services now represent 70% to 80% of most advanced economies. Yet we struggle to understand it. One of the reasons is that many traditional sectors that represented some form of manufacturing or physical production are becoming partly if not entirely service providers. The machinery sector in Europe for example derives 60% of its revenues from maintenance and only 40% from the sale of new products.

It was not easy even for GE top management to shed old habits of thought and move from measuring performance on the basis of units sold, whereas the big money was being earned in maintaining what was sold before and in the provision of maintenance services or upgrades, often provided on the basis of enhanced software based systems for monitoring, fault diagnosis or control, rather than new hardware. Jack Welch the former CEO of General Electric once expressed frustration¹⁴ at how his top managers would debate whether they would sell 50 or 58 gas turbines in one year when they actually spent most of their time and generated most of their profits from maintenance of the 10,000 or so turbines they had already sold. The reality is that old habits of thought die hard. Traditional indicators of innovation performance sometimes rely on data for the 'number of products new to the market' or 'share of revenues generated' by new products. This entirely misses revenues generated from services and so it is appropriate to think of innovation in services as a form of hidden innovation. The goal of creating new improved indicators is to bring this kind of innovation out of hiding. To do so it is important to understand what kind of a sector we are talking about, what do the value chains look like, how and where does innovation happen there.

Many traditional areas, not necessarily subscribed as services are migrating towards a service model. It is useful to look at how 'ownership' is being replaced by rental or leasing and how this simple move has enabled a range of services than one would ever have imagined before. The standard case is that of the jet-engines or turbine, typically these are leased, users are charged based on use, and important maintenance related tasks are done remotely or automatically on-line. Much more mundane activities however are being transformed by a process of 'service innovation' that is essentially hidden from traditional indicators.

Car rental is one example. People who make regular short commutes that require a car often find that outright car-ownership is inconvenient, poor value for money or unacceptably bad for the environment. They can hire a car, catch a taxi or join a car pool. More however they can join one of the many innovative care-sharing clubs that are springing up around Europe. London based City-Car¹⁵ for example provides users with the ability to find out where the nearest available car is located and reserve it on-line. City-Car provides users with a city-wide system of dedicated parking-spaces. Access to the car is granted by an electronic car-key. All administration related to petrol fills and payments are streamlined and settled over the internet. Systems such as these are being encouraged by city mayors because they reduce traffic congestion and are good for the environment.

¹⁴ 'Jack straight from the gut' by Jack Welch, Warner Business Books 2001, ISBN 0-553-29698-1

¹⁵ <http://www.citycarclub.co.uk/>

Another case is 'tire hire'. Traditionally drivers had to buy their tires. Now they can hire them, although for now the option is mainly available for fleets. The traditional approach was for the tire company to sell the tires to a garage or fleet owner on the basis of price, durability and brand awareness. Now you lease the tires and pay for usage on the basis of kilometers driven. The tire itself provides continuous feedback to the driver or the tire company from embedded sensors about speed, tire-pressure, driving conditions and other relevant parameters. Combined with GPS data from the vehicle the smart-tires can offer advice to the user on driving, avoid blow-out and other problems. They can tell the driver when to pull-in to a service station for replacements. It is not hard to imagine how such systems will eventually reduce the need for new tires, lower rates of accidents, help avoid unplanned incidents such as sudden loss of pressure, help lower fuel consumption and increase safety for the driver. Goodyear already has a mileage based service for its fleet customers and Bridgestone is starting to experiment with a service model. These firms are moving from a product to a service, from a transaction to a relationship and from a B2B model to a more consumer centric one based on the individual driving habits of a user¹⁶.

Food is undergoing a transformation as well. Several years ago a Danish company called 'Four Seasons' became famous for its home delivery of vegetable boxes adapted to the life-style and needs of the buyer. The service included a single weekly delivery of vegetables to the user. It took account of the fact that the person would eat alone on Monday, eat out on Tuesday and host a dinner party at home for 6 on Wednesday. It attempted to avoid that the user did not like, provide a balanced and varied diet and it even provided a help-line for anyone who needed help with the cooking. This was premium priced offering that used the 'box of vegetables' as a platform for providing a knowledge based health and living service. Variations on this theme are popping up all over the world. Similar services are available in places such as London, Athens and Shanghai. Some deliver to the home and others to the place of work and they vary in terms of the health advice they give, but it looks like the start of a long innovation trajectory that will combine the business of agricultural production, with logistics, food preparation, healthcare, lifestyle and leisure.

Legal services are in general the antithesis of innovation and change. There is great variation in service across Europe and great scope for improvement. NESTA reports for example that per capita legal aid costs 10 times more in the UK than in France or Germany and 4 times more than in the Netherlands. There is hope however. The Financial Times has carried out a benchmarking of the legal services each year for the last 3 years. The results for 2008 were published in October in a 60 page supplement¹⁷ and innovation awards were presented under headings such as legal expertise, client service, billing and fees, technology and know-how, management, the environment, human resources, diversity, marketing and public relations as well as Corporate Social Responsibility. The rankings seem to change from year to year. The report computes an innovation index it lists the top 50 law firms, and celebrates case-studies of good practice. There is clearly scope for initiatives in other professions such as teaching and healthcare.

It is clear that the service economy is somehow different from the material economy. Many companies are consciously making the transition from a product based business to a 'product-less' business. Nestlé is no longer in the business of 'food and beverage' it is in 'health and nutrition'. IBM is no longer really in the business of selling hardware, it provides professional services, and hardware is the platform to support many of its services. IBM in particular has grappled with the challenge of human-resources needed for a service economy. It has started to develop a new discipline called 'Service as a Science' short for SSME or Service Science,

¹⁶ C. K. Prahalad and M. S. Krishnan in 'The New Age of Innovation' published in 2008 by Mc Graw Hill, ISBN 978-0-07-159828-6.

¹⁷ www.ft.com/innovativelawyers2008

Management and Engineering¹⁸. T When we talk about science we usually mean established fields such as physics or electrical engineering, but there is a now an obvious need to create new fields of science and engineering. The provision of services is very different in nature from the production and distribution of goods. The skills required both for managers and front-line workers are very different. Universities and other institutes of learning do not provide graduates with skills matched to the needs of the service economy. So IBM has established an academic initiative¹⁹ to promote curriculum development and research in the domain. European Universities in Germany, the UK, Spain and Sweden have started to get involved.

Organisational Innovation

The organisational dimension of innovation is illustrated by the story of how the cargo helped to transform global trade, distribution and supply chains²⁰. In the old days ships spent a lot of time in port. Hundreds of people were employed to carry items onto the ship and stack them in the hold. Goods were lost or destroyed. It was all very time consuming and expensive for ports, ships, traders. The invention of standardised 'containers' and an associated loading system meant that goods were arranged for storage before they ever went to port and that loading was very quick and easy. This increase the capacity of ports, increased the time ships spent at sea, reduced costs for trade, helped avoid loss and damage. It also provided a platform for other logistics innovations such as multi-modal services that combined sea and rail for example, refrigerated containers, RFID and systems for traceability and quality control. However the innovation is not about a simple technical fix of using a standardised box. Many battles had to be fought, not only about standards such as the size of the box, but also about practices such as whether to use cranes on the shore or on the ship, and who would pay for them, how to retro-fit old ships to accommodate the new boxes as well as their being loaded and unloaded, issues such as whether the cranes would be situated on the boats or on the shore, and finally how to handle the unions that governed labour in the ports. The success of this innovation was not based on the simple engineering task of building and demonstrating prototype containers, it was in the system for loading, unloading and managing the thousands of containers in many ports and ships around the world, as well as the hard-nosed negotiated accommodations and business deals that had to be struck with workers, unions and organisations encountered throughout a voyage.

Amazon did not invent the on-line bookstore. It is not an IT company it is basically a retailer. It may have some technology patents but these support innovations in retail such as one-click purchasing. It used technology to secure an advantage in retail. There were many stores before Amazon and many since. Amazon was the first to convince large numbers of people to use their store. This was not a simple matter of putting catalogues on line and supporting on-line payment by credit card. It meant solving myriad problems of logistics and administration. It meant building confidence among users and encouraging adoption, not just among the buyers of the books it sold, but among the writers and publishers as well. Success depended on getting thousands of small creative steps related to on-line publishing of catalogues, the pacing of orders, the contracts and agreements with suppliers, the procedures for handling returns, losses or mistakes. It involved creating entirely new supply chains and distributions

¹⁸ http://en.wikipedia.org/wiki/Service_Science,_Management_and_Engineering

¹⁹ <http://www-304.ibm.com/jct09002c/university/scholars/skills/ssme/index.html>

²⁰ 'The Box – How the shipping container made the world smaller and the world economy bigger' by Marc Levinson, 2006 Princeton University Press, ISBN 978-0-691-13640-0.

systems, entirely new relationships with suppliers and customers. It totally re-organised the act of buying. Eventually its mastery of the use of this technology in retail has allowed it to progress from books to other sectors such as clothes, shoes, music and electronic goods. Finally it has become a provider of retail infrastructure that it effectively leases to other retailers for a share of their turnover.

Innovation often amounts to as much as 'changing the way things are done' rather than the introduction of a new invention or technology. New technologies that enable reorganisation are worthless unless the re-organisation is appropriate. In this sense technologies enable organisational innovation much as the violin enables the making of music. The value lies in the 'organisation' and is created by the organiser, usually a manager not necessarily an engineer, just as the value of the music lies in the musician more than in the maker or even the inventor of the violin. The analogy is useful if it helps us to realise that investing only in research and wondering about its impact on innovation is a bit like manufacturing violins and wondering after-all where is the music?

It is important to understand the issue of organizational innovation, because this can often help you understand the true nature of the problems you face. According to Amar Bhidé²¹ the problem with healthcare is not a lack of knowledge about general medicine to be addressed by increase spending on medical research, it is very badly run hospitals an entirely different problem, one that is scarcely being adequately addressed. The potential for an 'organizational' innovation approach is illustrated by a US healthcare case recently described by Mc Kinsey²², where the IHI – Institute for Healthcare Improvement – over a period of 18 months and at a cost of only \$3.3M helped 7,000 US hospitals save 100,000 lives by helping them to introduce more ergonomic practices with the goal of avoiding preventable errors.

Innovation in agriculture seems to have been all but ignored by academics in recent years. Agriculture is important once again because of the role it can play in sustainable development. It is not only the start of the value chains for food, feed and fibre, but more recently for bio-fuels and for industrial feed-stocks. In other words it now part of the supply chain for the energy and industrial chemicals industry. It is playing an increasingly central role in all parts of the economy. It provides many examples of organisational innovation, not only in practices such as contract farming, but in the vertical integration of sectors such as chicken production, the internationalisation of pork production, the global cut flower supply chain. Agriculture is no longer confined to rural areas. It does not just happen in fields in rural areas, it can also happen in greenhouses in urban areas. Major cities of the world such as London, Beijing and Copenhagen²³ now have policies for urban agriculture. In both the Netherlands and the US experimental systems for agricultural production based on multi-storey buildings^{24 25} are now underway. Success in agriculture in the future is not a simple matter of breeding new varieties it is about re-organising supply chains around the world in food, energy and industrial chemicals.

Unless we are dealing with the techniques and processes of scientific research, organizational innovation cannot be done in a traditional laboratory, least of all university or public sector research laboratory. It has to be done in-situ, in the company, in the field, in the interface

²¹ Audio interview with Amar Bhidé by the economist available at http://video.economist.com/index.jsp?fr_story=1c8255a7709fc1172e016842d49f7699673ca7c5

²² 'The Ergonomics of Innovation' by Hayagreeva Rao and Robery Sutton in Mc Kinsey Quarterly 2008 No. 4 pages 131-141.

²³ See <http://www.sustainweb.org/page.php?id=454> for a recent conference about urban agriculture in London, <http://www.cityfarmer.org/subeuropa.html> for more general views and for a more 'development' perspective go to <http://www.ruaf.org/node/512>.

²⁴ Business 2.0 September 2007 Page 32

²⁵ www.verticalfarming.com

between the company and its partners and client, in the supply-chain, in the market place. For this reason it has largely gone unmeasured as an activity, it is a form of hidden innovation. Dell, Toyota, Nike and Apple are all among the great practitioners of organizational innovation.

The story of how Lafley transformed the way innovation was organized and managed at P&G provides a good illustration of the changes taking place²⁶. When he took over as CEO in 2001, consumer markets were already characterized by rapid change and relentless price pressure. There were growing opportunities in developing or emerging markets. In all markets but especially in these, there was a growing sense that 'superior technology per se is meaningless; it has to be technology that suits'²⁷ and there was a need to get closer to clients as shoppers and as well as users of the products P&G would develop. The process of innovation for new product development was extended outside the organization, beyond even retailers and first tier suppliers, to include the customers themselves. Research was no longer going to be sourced internally from company resources, or built up over several years, but from external sources anywhere in the world. Gradually the whole system would be opened up to entrepreneurial external companies not yet part of their supplier network, but which would consider P&G as a partner of choice on the basis of its ability to integrate them into a machine for bringing consumer product innovations to global markets.

The first thing that A. G. Lafley did when he took over as CEO was to catalyze change around a simple, concrete, synthetic goal, to base 50% of all innovations on partnership with outsiders. This goal was exceeded by 2007. In 2001 the rate of success for innovation projects was more or less in line with the industry average at somewhere between 15% and 20%. By 2007 the figure was closer to 50%. By 2008 P&G was making on average two deals a week with outside organizations and more than 200 products have been launched in this way. At the same time expenditure on R+D decreased from 5 or 6% down to about 3 or 4%. These improvements in performance and reductions in cost were thanks to organizational innovations.

Apple is often considered a technology company and took great pains to lock in advantage on the basis of proprietary technologies. Its latest success the iPod has been much studied as an example of how this model has changed²⁸. Prahalad notes that in the case of the fifth generation 30G iPod, the disk-drives and display modules are made by Toshiba and Matsushita in Japan, the SDRAM is made by Samsung in Korea and the video processors are made by Broadcom in the US. The products are assembled in China by Inventec from Taiwan. None of the technology comes from the US. The product concept and design came from Apple in California. Just as important perhaps as the original design was the ability of Apple to select, manage and integrate the partners into a global supply chain from its base in California. This is organizational innovation. It is difficult and risky and requires a set of skills and capabilities that go way beyond basic science, technology and engineering skills.

The Science and Technology session of the Summit for the Future organised in January 2005 by The Club of Amsterdam²⁹ focused on the fact that scientific knowledge is becoming a global commodity in the senses that every university and research centre in the world participates in a global marketplace for research services. Useful knowledge resembles a commodity when it can be sourced from multiple competing sources globally. Trends in the off-shoring and out-sourcing of R+D by businesses have been clear for many years. The Club

²⁶ 'The Game Changer' by A. G. Lafley and Ram Charan, published in 2008 by Profile Books Limited, ISBN 978-1-84668-162-2

²⁷ Gil Cloyd, the Chief Technology Officer of P&G quoted in 'The Game Changer' page 89.

²⁸ 'The New Age of Innovation' page 29

²⁹ <http://www.clubofamsterdam.com/press.asp?contentid=375&catid=61#science>

of Amsterdam is of the opinion that the key to the competitiveness of companies and nations in the future lies not simply in their ability to produce knowledge but in their ability to organize and manage the production of knowledge as part of an innovation process.

In response to these issues many experiments are currently being conducted on the development of platforms to support 'open innovation'. One model which is by now quite famous is the model of the living lab developed by Jarmo Suominen from Finland when working at MIT. A Finish example is the Helsinki Living Lab³⁰, but there are many. There is a European Network of Living Labs³¹ and similar approaches are being explored in other countries.

Cost Innovation

'Cost Innovation' in this case has nothing to do with pricing. It is the term used by Ming Zeng and Peter J. Williamson³² to describe the strategies of Chinese companies that in a very short period of time have come from nowhere to dominate global markets in specific niche industries.

For many companies China and other emerging economies provide opportunities to tap into large low-cost labour pools. Many Chinese companies however are aware that they also have access to low-cost research, engineering and design and that this provides them with a window of advantage compared to western companies. Chinese companies such as

The rise of China as a producers is well know for example, it is widely appreciated that by 2005 Shenzen exported \$47B of hi-tech products. What is less well known is that 57% of this was on the basis of intellectual property owned by Chinese companies. By some measures China is the most innovation ready country in the world. 90% of its investment in research is by companies.³³

A Chinese company called CIMC or China International Marine Containers Group, whose motto is 'learn, improve, disrupt' came from nowhere in 1980 to win 55% of global market share of shipping containers today. Their strategy was based on aggressive innovation and China as a whole accounted for the production of 70% of global marine containers. There are many other examples such as Lenovo in IT systems, Haier in white goods, Huawei in mobile telephony, Shanghai Zhenghua Port machinery Company in harbour cranes, Galanz in microwave ovens, Wanxiang in car-parts manufacturers, BYD in rechargeable batteries, Pearl River Piano in upright pianos, Vimicro in micro-chips for the cameras that go into PCs and mobile phones, Capital Bio for biochip technologies for drug discovery, genomics and proteomics, China Medical in high intensity focused ultrasound systems used to treat solid cancers and benign tumours, Tech Faith Wireless in mobile phone design, Action Semi Conductors in design of semi-conductors for mixed-signal and system-on-a-chip.

The message is that a significant number of Chinese companies have disrupted global markets by competing aggressively on the basis of innovation, exploiting their low cost of innovation for competitive advantage in the global marketplace. They have been successful in markets that are very small domestically. There is a lot to learn from the strategies that they employ. Smart western companies have started to do the same thing and are setting up research

³⁰ <http://www.helsinkilivinglab.fi/node/152>

³¹ <http://www.openlivinglabs.eu/>

³² 'Dragons at Your Door: How Chinese Cost Innovation is Disrupting Global Competition' published in 2007 by Harvard Business School Press. ISBN 978-142210-208-4.

³³ Quoted from 'Dragons at your Door'

laboratories in places such as China to provide proximity to market as well as the possibility of higher productivity in research and related tasks.

Forced Innovation

Innovation is not just an urgent issue for business it is an urgent issue for society as well. Nordic societies face grand challenges in terms of aging populations, increasing cost of healthcare, impact of climate change as well as energy and food security. Most recently we have been reminded of the need to tend to the security of our financial systems. These are all issues that unmanaged pose, a threat to social harmony and to the very existence of our society. Furthermore these are issues that can longer be addressed by conventional means, they require innovative approaches. If we are to indefinitely preserve our place in the world, our quality of life and our ability to sustainably grow, prosper and make progress for future generations, innovation is no longer nice, it is necessary!

Moreover, the ecological footprint analysis, which represents the extent of human demand on the Earth's ecosystems, shows that humankind is now using resources at a rate of 30% above the planet's capacity to regenerate them. The European Commission is preparing a series of ecological directives to encourage energy and natural resource efficiency. A recent paper³⁴ put forward a preliminary list of product categories that could become the subject of legislation setting minimum standards of efficiency. These product categories include equipment that use water, furnaces, equipment for heating and cooling, machine tools, space heating and ventilation, refrigeration and cooling, data processing and storage. Legislation based on these initiatives provides a strong incentive to industry to innovate to comply with these standards. Most countries nowadays pass such legislation as part of overall efforts to reduce energy consumption, reduce impact of industry on the environment and make better use of limited natural resources. The usual approach is to set compulsory minimum standards for industry. A typical example is the area of energy efficiency or green-house gas emissions.

The Teagasc 2030 was faced with the task of creating a vision for what is now referred to as the agriculture and the rural economy and creating a vision for what this would become in 2030. Eventually this vision was identified with what is known in Europe as the KBBE or Knowledge based Bio-Economy. It was considered that the usual categories for describing the economy were no longer adequate and the KBBE in Ireland was thought of as being made of four separate sectors;

- Production of Commodities
- Production of high value added goods
- New and sectors
- Agri-environmental goods and services

This last sector refers to goods and services that benefit the whole of society, that are bought by society via taxes and systems such as the Common Agricultural Policy that effectively transfer payment for these goods and services to farmers via systems of farm subsidies. They include food security, the preservation of bio-diversity and natural habitats, the protection or conservation of clean air and water, valuable landscapes and places of public amenity. In the 'Teagasc 2030' vision for the future these services are treated as a separate economic sector and it is considered that they will be of such importance for the overall economy and society that this will become an important area for innovation that these goods and services will have to be produced in ever greater quantities and at cheaper costs, that the knowledge and systems needed to do this is only now emerging and that considerable challenges must be faced to create the knowledge needed and to ensure its timely adoption.

³⁴ COM (2008) 660 final, entitled 'Establishment of a Work Plan for 2009 to 2011 under the Eco-Design Directive.

In 2006 Esko Aho a former Prime Minister of Finland launched a report entitled Creating an Innovative Europe. This became an important part of Finland's contribution to Europe under its Presidency of the European Union and is now known as The Aho Report³⁵ It focuses on the creation of innovation friendly markets and emphasizes the potential role of governments in the creation of lead markets for important areas of innovation. What this amounts to in practice is governments using their systems of public procurement to encourage innovative products and services. The European commission has taken this on board and has adopting this thinking as an important element in achieving the Lisbon agenda. Lead Market initiatives³⁶ now exist in sectors such as e-health, construction, recycling, renewable energy and renewable raw-materials.

The Aho report emphasized the ambitious use of standards. Although enterprise tends to complain, it establishes a level playing field and 'forces' results that are cumulative and have a tangible effect on the environment. Industry is already familiar with legislation for the environment. Buyers of cars are taxed on the basis of the performance of the car. European countries have established targets for energy derived from alternative and renewal energy sources. The commoditization of environmental or public goods is reality today. This provides the basis for the trading of carbon and other public goods. The system is not perfect but it will evolve and could play an important role in climate security and the transition towards sustainable growth and prosperity. Countries, business sectors and companies already measure and report their carbon footprint. Today they do this on a time a challenge voluntary basis. In future they may be compelled by legislation³⁷. This is at the same a challenge, an opportunity and a burden for companies, especially for small and medium sized companies. Some forms of innovation may cease to be considered desirable options but mandatory necessities. These will be forced via the obligation of compliance. It will require innovation in terms of management, organization, governance and accountancy.

In other words are companies innovating in response to the opportunities of globalization by sourcing further afield, off-shoring research or manufacturing, or are they pro-actively experimenting with new markets? Are companies innovating to produce public goods by lowering their impact on climate change or their dependence on fossil fuels? Are they developing more family friendly working environments?

It is possible to think of these various approaches where the public sector steps in to actively encourage innovation in key areas through legislation and by using the leverage of its enormous spending power, as 'forced' innovation. This is a situation where real pressure to innovative is applied to all companies in a category in response to a situation where innovation is no longer an option but a necessity. It is likely that we will have increasingly more of this in future.

Compliance is not usually associated with innovation, but compliance forces innovation. Such forced innovation is a form of hidden innovation that sends ripples throughout whole supply chains. Understanding how this happens is important for policy and for enterprise.

³⁵ http://ec.europa.eu/invest-in-research/action/2006_ahogroup_en.htm

³⁶ <http://ec.europa.eu/enterprise/leadmarket/leadmarket.htm>

³⁷ 'Carbon disclosure should be mandatory' by James Murdoch page 15 of the Financial Times on Monday 17 November, 2008.

The Japanese 'Top Runner' programme for energy efficiency in machinery and appliances³⁸ represents an approach which differs significantly from that of most other countries. On a category by category basis the programme identifies the most energy-efficient models already available on the market. These are referred to as the 'top runner' models in that category. The government then stipulates that the current efficiency of the **top runner model** should become the standard within a certain period of time, say for example five years. This approach constantly ratchets-up the performance of industry with each new generation of targets. The advantage of this approach is that innovation laggards in a category know that the goals are achievable because they are based on existing best-in-the-class models. They also know that they have a defined period of time such as five years in which to catch up or else they will be out of the game. On the other hand innovation leaders know that the market will have caught up with them in five years time and this gives them the incentive to continue innovating and exceed what will become the norm in five years time. Compare this with the usual approach where minimum standards are set and where industry has little incentive to do more than simply comply because exceeding the standard will not earn any extra recognition.

Business Model Innovation

As a sequel to his book on 'Open Innovation'³⁹ Henry Chesbrough wrote about 'Open Business Models'⁴⁰ and explains the importance of business model innovation or innovation in terms of who are the clients, what the company offers to its clients and how it captures value from its offering. He takes trouble to explain that there is little inherent value in a technology per se, that the value lies in the business model and that the business model itself is an important area for innovation. The example of tire-hire as a service innovation is also an example of an experiment in new business models. This is not tinkering by engineers but a major experiment in how to offer value to clients. It has major implications for the company in terms of how it describes itself, how it relates to its clients and what they buy. Business model innovation is very closely tied to strategy. The way in which Nestlé has shifted from being a 'food and beverage' company to being a 'health and nutrition' company signals an important change in thinking about how it creates value for clients. It corresponds to a whole new strategic trajectory that affects innovation in all other areas of its business.

Franchising is essentially a system for the sale of business models. The franchisor grants a license to a franchisee to employ under license a complete business model and all of the systems and services required to support it. A typical example is the fast-food restaurant. The business model goes way beyond the use of logos, signage, brand name and customized furniture and attire. It usually includes all of the systems for health and safety, food hygiene, sourcing, quality control, recruitment, inventory management, location spotting, refurbishment and new product development. The franchisor has invested to codify its systems and know-how and support the transfer of this know-how to a franchisee using manuals, training and advice. A fast-food franchise trades not in fast-food but in the intellectual property constituted by the business model and all of the systems needed to support it. It is in effect a technology transfer machine. This model applies not only to fast-

³⁸ Go to http://www.eccj.or.jp/index_e.html to find out more about the programme and download the report at <http://www.aid-ee.org/documents/018TopRunner-Japan.PDF> for an evaluation.

³⁹ 'Open Innovation: The New imperative for Creating and Profiting from Technology' by Henry Chesbrough, published in 2006 by Harvard Business School Press, ISBN 978-1-4221-0283-1.

⁴⁰ 'Open Business Models: How to Thrive in the New Innovation Landscape' by Henry Chesbrough, published in 2006 by Harvard Business School Press, ISBN 978-1-4221-0427-9.

food or retail, but to areas as diverse as credit cards, advanced food manufacturing, cleaning, training, real-estate, printing and accountancy. Franchising is a very effective and successful technology transfer system. Franchises can be very innovative, they often integrate whole innovation systems, and they play an important role in the dissemination of innovation. For some reason they are hardly ever considered by policy makers or researchers in innovation. Perhaps as a result Business Model Innovation and is an important form of hidden innovation.

Chesbrough provides many examples of business model innovation. He introduces what is in effect a maturity model for companies in terms of how they approach the management of innovation. It classifies companies as to whether their approach to the organization of innovation is:

- Undifferentiated
- Differentiated
- Segmented
- Externally aware
- Integrated
- Business model innovation

Most companies probably lie in the first ‘undifferentiated’ category where innovation is an almost random ad-hoc process. Few companies purposefully experiment with business models as part of their overall approach to innovation. Few companies actively experiment with business models adapting them so that they extract the greatest value from technological and organization change. It is important for businesses to be aware of how well innovation is integrated with strategy and the overall business development function. It is important for companies to know where they are today and where they need to be tomorrow to compete. Knowing where companies in general stand in terms of their innovation management maturity could provide important signals for policies in higher education especially business education, for industrial development and raise new questions for innovation researchers to explore.

Management Innovation

Gary Hammel⁴¹ argues that what really fuels long-term success in business is not operational excellence or new business models, but management innovation - new ways of mobilizing talent, allocating resources and building strategies. Peter Drucker writing in 1993⁴² he says ‘it has been a decade of innovations in all areas ... the most innovative area may have been management itself.’

Management innovation includes new ways of managing innovation, but goes far beyond that in the sense that it also includes the invention of the corporation, mass production, the assembly line, the corporate research laboratory, the living laboratory, the corporate university. It includes the invention of total quality management, 6 sigma, just-in-time inventory management, benchmarking as a management tool, outsourcing and a whole range of project management techniques and models applied in areas as diverse as construction and software development. It is clearly of great importance, not only in itself but as the enabler of technical innovation. Yet it is essentially off-the-radar for those who study innovation systems at either national or European level. It is a form of hidden innovation.

⁴¹ ‘The Future of Management’ by Gary Hammel with Bill Breen, published in 2007 by Harvard Business School Press, ISBN 978-1-4221-0250-3

⁴² Preface to a new edition of ‘Innovation and Entrepreneurship’ by Peter F. Drucker first published in 1985, available from Elsevier, ISBN 978-0-7506-8508-5.

Management innovation is not systematically addressed by managers even in major organisations. Most companies lack a formal process for disciplined management innovation. Yet management innovations can be traded. Vehicles for the diffusion of management innovation exist. These include the business literature, the schools of management, management consulting companies, corporate universities and franchise systems.

In a recent foresight exercise⁴³ the Irish national food and agricultural research centre recently noted that agricultural exports are no confined to physical goods, but have expanded to include services including services for the management of agricultural production systems. The exercise notes that 'the most significant export of Irish agriculture may one day be, not products such as milk-powder or butter, but intangible assets such as scientific know-how and brand equity, superior management skills and quality systems, as well as access to a global network of supply chain relationships'.

This is all but ignored in the current debate on the measurement of innovation canon and the shaping of innovation policy for the future. As far back as 1989 Ray Stata⁴⁴ the former CEO of Analogue Devices explained that 'at Analogue Devices and many other U.S. companies, product and process innovation are not the main bottleneck to progress. The bottleneck is management innovation. We have to ask ourselves as a company and as a nation are we investing enough in management innovation?' Understanding what it is, where it is and how it happens is important to industry and government. Maybe there is a need to invest in new non-traditional forms of research, education and training in new related disciplines, and new institutions like the Management Innovation Lab⁴⁵ recently set up by Gary Hammett.

Drivers of Innovation Performance

A. G. Lafley is very clear. To prosper, companies need to do four things well: develop leaders of the future, improve productivity, execute strategy, and create innovation. Innovation is the glue that binds everything together. Without sustaining the practice of innovation, no company can excel or survive.⁴⁶

One of the reasons for studying innovation is to understand what lies behind the ability of companies and entire economies to compete on the basis of innovation. Until now there has been a strong focus on the role of research in innovation and policies to support innovation have focused on increasing investments in research. In view of our changing, improving understanding of the nature of innovation, it is essential to ask if research is enough and what other factors drive innovation performance? Answering this question should have important implications for the way that enterprise and governments address the issue.

Competition and Globalisation

Denmark⁴⁷, Sweden⁴⁸ and Finland have recently established globalisation councils to consult with industry and society on how to retain their place amongst the world's most competitive economies. Denmark released its results in 2006 and a key finding was that whereas Denmark produced about 1% of the world's research its companies would need access to the other 99%

⁴³ Teagasc 2030 reports are available at <http://www.teagasc.ie/foresight/index.asp>.

⁴⁴ Stata, R. 1989 Sloan Management Review 30(3): 'Organizational Learning - The Key to Management Innovation' pages 63-67.

⁴⁵ <http://www.managementlab.org/>

⁴⁶ 'The Game Changer' by A. G. Lafley and Ram Charan, published in 2008 by Profile Books Limited, ISBN 978-1-84668-162-2

⁴⁷ <http://www.globalisering.dk/page.dsp?area=52>

⁴⁸ <http://www.regeringen.se/sb/d/9299>

to compete globally. This observation illustrated an important difference between 'doing research and doing innovation'. The immediate challenge for research systems is to choose wisely the 1% of global research that they perform and to do it well. The immediate research related challenge for the innovation system is to facilitate access other 99% of useful knowledge. These observations highlight an essential difference between research and innovation one that has not yet been full digested, either by the world of research or government policy. Exploring the consequences of this observation allows us also to observe that if the amount spent on research were to double it would not substantially change the innovation challenge of getting access to what has now become 98% of all the knowledge in the world. Applying this principle applied at the level of the five Nordic countries translates into the observation that whereas the Nordic countries carry out about 5% of all global research, the Nordic system would have to provide access to the other 95%.

Perhaps there is a need not so much for a quantitative change in research, but a qualitative change in what is done, why it is done and how. For Denmark has responded creatively to the challenge by establishing an international network of innovation centres, under the Ministry of Foreign Affairs, to help companies tap into global knowledge networks. The international dimension of innovation is of increasing importance in all countries and NICE has published a paper on 'The Establishment of Nordic Innovation Centres in Asia'⁴⁹.

The need to deal with the reality of where knowledge is created and how it is exploited was underlined more recently by Amar Bhidé pointing out to the Economist that the internet was created a Brit in Switzerland, whereas most of the value was being captured by companies in the US which have been much quicker to adopt electronic commerce⁵⁰. A 2006 company survey conducted by INSEAD with Booz Allan and Hamilton provided evidence that whereas corporate R+D was becoming more global, the main reason for situating R+D sites abroad was to access qualified staff. It also found that most companies possessed limited expertise in managing innovation networks involving cross-border partnerships. It is not clear that increased research expenditure will address these problems other measures will be required as well, measures that address education and culture and not just funding for research.

Apple has long been considered if not the most innovative, one of the most innovative companies in the world. It is based in Silicon Valley in California, but almost none of the technology employed in the iPod originates there. Even the data compression system was obtained from a Singapore based company called Creative Technologies. At least in the case of the iPod, Apple did not drawing upon the technologies of Silicon Valley, it drew upon the culture and human resources of Silicon Valley. It did not innovate in terms of traditional engineering, science or technology but in terms of design, supply-chain organisation, retail and marketing. An interesting question we need to ask is whether Nordic companies can compete with or emulate Apple in the way it has tapped into global competencies.

The stories of how IBM, Merck, INTEL Proctor and Gamble have addressed the issue of access to global knowledge are now well established parts of the lore of open innovation, but the issue is not confined to research. Talent is important as well.

Prahalad and Krishnan point out that the idea of what resources are available to the firm has moved from what was available in the division, to what was available in the corporation, to what was available in the supply chain, to the consumer community to anywhere in the world⁵¹. That is why IBM works with its international research centers such as IRL, the IBM India Research Laboratory in Bangalore, on innovation based on the development of 'Service

⁴⁹ <http://www.nordicinnovation.net/prosjekt.cfm?Id=3-4415-291>

⁵⁰ Audio interview with Amar Bhidé by the economist available at http://video.economist.com/index.jsp?fr_story=1c8255a7709fc1172e016842d49f7699673ca7c5

⁵¹ 'The New Age of Innovation' page 31

as a Science'. Tata Consulting from India established a subsidiary in 2006 Morocco as a hub for the provision of services to both Europe and the Africa. The Moroccan government is playing its part by laying fiber optic cables across the Mediterranean Sea to Europe with a view to capturing a part of the international market for services.

Innovation is not a first world phenomenon. C. K. Prahalad is well known for a book called 'The Fortune at the Bottom of the Pyramid'⁵². This is generally read as a book on economic development whereby 'poverty can be eradicated through markets', but it is also a book on innovation in emerging markets. It describes highly innovative companies from sectors as diverse as energy, agriculture, banking, insurance, construction, retail, IT, telephony and healthcare, that are based in low income economies and that have been able to serve populations with very low levels of income and low levels of innovation in the traditional sense. There is a lot to learn from innovative companies in emerging economies. Most of the ventures he describes are commercially scalable experiments that rely on radical innovations in terms of process, organization, human resource management, the structure of work, the distribution of risk, reward and responsibility.

The case study of ICICI⁵³ first bank in India to introduce internet banking, to securitize micro-finance portfolios, complete door-step service for home-loans, solar-powered ATMs, interfaces in multiple local languages, voice-only interfaces to help visually impaired customers, localized credit scoring, behavioral scoring of individual customers, micro-finance and personalized insurance for sufferers of diabetes provided via ICICI Prudential. These services are based on complex networks of partners that include pharmaceutical companies, doctors, nutritionists and local gyms and they link the cost of insurance to conformance of individuals to recommended behaviors.

The ICICI bank in India for example manages a client base of 200,000 customers with only 16 managers and a hierarchy of external regional coordinators and promoters. The work they do has been 'de-skilled' in the sense that it can be done by people with little formal education. On the other hand the work is skillful in the sense that it relies on the social skills, natural intelligence, leadership and entrepreneurial ability.

Organizing this on such a scale meant having radically different approaches to recruiting, training, incentivizing and developing the key people in the network. It meant designing the work of banking in a radically different way. Not many insurance companies in Europe have products adapted to the needs of diabetics, that link into health and lifestyle services to help the diabetic avoid a crisis and live a healthier life. ICICI has been extremely innovative by any standards. It profitably provides its services to low-income communities in India. However most of its innovation would count as hidden innovation. The measures of innovation we use in Europe would completely ignore this. It is not technology innovation in the traditional classic sense, but it is innovation in terms of management, finance, organisation, design of work and human resource development.

Skills and Capabilities

A culture of innovation is fundamentally different from one that emphasizes mergers and acquisitions, downsizing or cost-cutting, both in theory and in practice. According to the CEO of P&G innovation leaders have an entirely different set of skills, temperament and psychology. As industry changes, the skills needed to live and prosper change too. In this sense the 'traditional' system for higher education and learning is always follower rather than

⁵² C. K. Prahalad author of 'The Fortune at the Bottom of the Pyramid – eradicating poverty through profits' published in 2004 by Wharton School Publishing, ISBN0-13-187729-1.

⁵³ 'The New Age of Innovation' pages 62 to 76

a leader. For this reason industry-academic collaboration has played a very important role in the past.

In the 1980s IBM helped Columbia University create the first university course on computer science. IBM staff taught there until university staff acquired the relevant know-how and were able to operate without further help. Now most universities offer courses in computer science and the educational innovation inspired by IBM is now widely disseminated throughout the world. Examples like this are not rare and are a good example of successful university-industry collaboration. The inter-disciplinary field of molecular biology was created and promoted by the Rockefeller Foundation in the 1930s and is now a well established part of mainstream academic pursuit. Now IBM is working with Universities and research institutes around the world to create an entirely new discipline called 'Service as a Science'.

Back in 1985 Drucker realized that innovation needed to be organized as a systematic activity, that the business itself needs to be organized to be a successful innovator, and that this requires both a discipline of innovation and a discipline of entrepreneurship, a discipline of how to make innovation effective in the marketplace⁵⁴. Where is this discipline today? As our understanding of innovation improves it is highly likely that the need for new fields and disciplines will emerge as the old ones become less relevant and fade into insignificance.

One of the most interesting organisational innovations in business, on a par with the invention of the modern corporation or the corporate research laboratory, is the corporate university. It arose as a response to two issues, the frustration of companies with the quality of graduates from traditional institutes of learning and the need to address life-long learning needs of the work-force. It is driven by company strategy and is a key component of the enterprise innovation system. The modern corporate university does not at all resemble the campus-based traditional university with ivy covered walls and dons with funny hats and flowing gowns. It is essentially a set of processes for managing and supporting learning, not only throughout the enterprise, but throughout the supply chain and even the customer base. For the most part the students, teachers and content providers are the employees, business partners, suppliers and clients. The 'teachers' tend to be the managers at all levels of the enterprise in the role of facilitator, coach or mentor. Even CEOs are often required to spend several days a month in the role of a 'teacher'. The model has even been adopted by government administrations. It works for SMEs as well as has been adopted by companies with as few as 450 employees.

General Electric is often credited with the invention of the modern research laboratory, but it is also the inventor of the 'corporate university' at its Crotonville site in 1955. In the 1980s there were an estimated 400 corporate universities in the US. This number grew to over a 1,000 by 1998⁵⁵, even as more than 200 traditional institutes of higher learning closed down. The number grew to 2,000 by the year 2000⁵⁶. Many corporate universities have become profit centres for the parent company. Some have started to offer accredited degrees in collaboration with traditional institutes of higher learning and a few have become fully accredited institutes of higher learning in their own right.

George Buckley, the Chairman, President and CEO of 3M summed up the issue recently when he spoke to an advisory committee of the US Department of Commerce on measuring

⁵⁴ 'Innovation and Entrepreneurship' by Peter F. Drucker first published in 1985, revised edition available from Elsevier, ISBN 978-0-7506-8508-5.

⁵⁵ 'Corporate Universities: Lessons in building a world-class work-force' by Jeanne C. Meister, Mc Graw Hill 1998, ISBN 0-7863-0787-0.

⁵⁶ 'The Next Generation of Corporate Universities: Innovative approaches for developing and expanding organizational capabilities' by Mark Allen Editor, Wiley 2007, ISBN 978-0-7879-8655-1.

innovation in the 21st Century⁵⁷. Talking about international competitors in emerging economies such as Brazil and China he said “We need access to talent ... our competitors can just about invest as much as we can in manufacturing plant ... as much in marketing as we do ... even as much in technology as we do ... in the end the only thing that separates the best from the rest are the people you hire’. Few would disagree, but the real issue is what kind of talent?

Business models are implemented by business processes sustained in turn by both a technological and social architecture. This social architecture is intimately connected to the human resource function of the firm and corresponds to a form of knowledge that is deeply tacit and not easily reproducible by other companies that simply copy the model and its related processes.

The ability to identify and evaluate useful knowledge and sources of knowledge, the ability to evaluate these sources as partners, the ability to integrate them into a disciplined innovation process, the ability to design, manage and adapt this process is fundamental to innovation success. This is just as important, and maybe even more so, than the ability to perform research⁵⁸ and execute targeted development tasks. It is important to understand organizational innovation, where and how it happens, the skills required not only of manager but of employees who have to live with it.

Schumpeter drew an important distinction between invention and innovation, between inventors and entrepreneurs. ‘The making of the invention and the carrying out of the corresponding innovation are economically and sociologically, two entirely different things’ ... ‘often the two interact, but they are never the same, and innovations are usually more important than inventions’ ... ‘only confusion can result from focusing on inventions instead of innovations’⁵⁹. He pointed out that the task of innovation requires much more than technical invention. Innovation in the case of soap for example was not a simply the task of producing soap but that of inducing people to wash. This is a problem of an entirely different nature. It requires just as much creativity as the original for formulation of soap and the invention of the process by which to make it. Ultimately innovation succeeds not when it produces new things but when it changes behaviour, the behaviour of users or consumers and a whole range of vested interests as well.

Innovation in medical devices takes place when engineers work with those responsible for clinical care, when they cooperate not on designing the device but on understanding how it needs to be applied, nurses and those involved in after-care also have a role, the surgeon is only involved during the operation, the nurses are the ones involved afterwards, and they see the longer term effects and impacts on the patient during and after recovery ... Example of innovations in the remote monitoring of patients in intensive care, where physicians threw towels over cameras ... they saw such innovation as a threat to their business ... and reacted defensively ... focusing on the development of the system misses the big part of the picture ... the staff are a part of the system and until issues related to personnel, their ability and willingness to go along with change is not addressed, one cannot consider to have understood the innovation process ... there is a need to consider the management problem of introducing change as an integral part of the innovation process itself.

These issues are given very little attention in modern approaches to innovation, which in many ways identify innovation with research or invention, and fail to understand it as the basis process that drives change in business. A lot of effort goes into the development of

⁵⁷ The transcript of the meeting held on 28 July 2008 is available from www.innovationmetrics.gov

⁵⁸ Club of Amsterdam, Summit for the Future, 2005

⁵⁹ Joseph Schumpeter in ‘Business Cycles’ published in 1939.

engineers and research in innovation, but relatively little into the all of these other 'hidden' issues that are essential to the innovation process.

Lafley emphasis the ability to collaborate he says that 'Innovation leaders are comfortable with uncertainty and have an open mind; they are receptive to ideas from very different disciplines. They have organized innovation into a disciplined process that is replicable. And, they have the tools and skills to pin-point and manage the risks inherent in innovation. Not everyone has these attributes. But companies cannot build a culture of innovation without cultivating people who do'⁶⁰.

He mentions 'leadership'. This is significant as leadership and entrepreneurship are two important aspects of innovation. It used to be thought that leaders were born but we better now and actively develop leaders and leadership skills. Alan Todd, Chairman of the Board of US based CorpU claims that the overwhelming majority (90%), of large global enterprises do not have the leaders they need to remain competitive, whereas 70% of these feel that current approaches to identifying and developing leaders are falling short of doing that. This is a clear call for further innovation in the development of human resources. It is unlikely that traditional universities can respond to this need. Maybe the best approach is to directly encourage research, innovation, learning and networking involving those who run corporate universities.

As part of a strategy for innovation management within the organisation, the management and development of human resources is just as important as that of invention and patenting of intellectual property.

The corporate university and the creative destruction of disciplines rarely feature in discussions about innovation. Perhaps it is time that they should. According to Samuel J. Palmisano, CEO of IBM, 'we spent too much money - say somewhere between \$800M and \$1B a year training the workforce'⁶¹. Companies spend a lot of money on training. This cannot simply go on increasing year by year. There may be a need to re-balance the system perhaps new innovation metrics and new innovation research can provide actionable feedback on this dimension of the problem.

Entrepreneurship

The issue of entrepreneurship is closely linked to that of skills and capabilities. Joseph Schumpeter identified entrepreneurs, whether they operate in big firms or small ones, old companies or start-ups, were the agents of innovation and creative destruction⁶². In a nutshell entrepreneurship is the human dimension of innovation. It is often hard to identify the entrepreneur because nobody is an entrepreneur all of the time and nobody is 'only' an entrepreneur. The entrepreneur deals not only with the intellectual task of innovating but carries out day-to-day organisation and management tasks. Schumpeter recognised that much of the success enjoyed by individual entrepreneurs came down to their talent for seizing opportunities of the moment and that the main experience of the entrepreneur was the extreme difficulty of changing traditional ways of doing things.⁶³ An important factor in the successful entrepreneurship is the ability to overcome these difficulties and in this sense at least entrepreneurship requires leadership.

⁶⁰ 'The Game Changer' by A. G. Lafley and Ram Charan, published in 2008 by Profile Books Limited, ISBN 978-1-84668-162-2

⁶¹ Speaking at the 22 February 2007 meeting 'Measuring Innovation in the 21st Century'

⁶² 'Prophet of Innovation: Joseph Schumpeter and Creative Destruction' by Thomas K. Mc Graw, published in 2007 by The Belknap Press of Harvard University Press, ISBN: 978-0-674-02523-3.

⁶³ Joseph Schumpeter in 'Business Cycles'

Today speaking from an industry point of view and in view of the recent interest in ‘open innovation’ entrepreneurship should not be identified with intrapreneurship. To do so would be to miss the newest and currently most relevant dimensions of the issue.

Peter F. Drucker explained that innovation is capable of being presented as a discipline, capable of being learned and practiced, that there are basic principles to follow, in other words that entrepreneurship can be learned and practiced.⁶⁴

These views are born out by A. G. Lafely as he tells how he transformed P&G into an innovation machine. He describes innovation as a social process, one that can be formalized, and for which employees can be prepared and developed. He says that *‘when you as a leader understand this, you can map, systematize, manage, measure and improve this social process to produce a steady stream of innovations ... innovation is not a mystical act; it is a journey that can be plotted, and done over and over again. It takes time and steady leadership ... But it can be done.’*

The overall message seems to be that innovation can be treated as a discipline. That is a process or series of processes that can be managed and improved, that entrepreneurs can be systematically developed through appropriate training and experience. If this is so then where are there no schools of innovation and entrepreneurship? Maybe they only really exist in corporate universities? Maybe the most important indicator of the potential for innovation in the economy is a simple measure of the extent to which CEOs of companies know this and the extent to which they are acting on this.

Robert C. Wolcott and Michael J. Lippitz⁶⁵ provide a classification of companies in terms of the environment they provide for entrepreneurship. They characterize companies as belonging to four main types:

- The opportunist
- The advocate
- The enabler
- The producer

Their article provides the basis for a questionnaire at the end of this paper. This is provided with a view to stimulating debate on what kind of indicators might be of use for measuring what is happening in innovation in terms of entrepreneurship, not only within the company but at the level of the enterprise innovation system.

As our understanding of entrepreneurship improves there may be a need to improve upon, extend or otherwise revise this classification, until then however much can be gained by applying such schemes to populations of companies to see how they stand overall. Feedback of this kind though qualitative and subjective, provides those involved with innovation on a sector by sector basis with a view on how the industry as a whole is organized and specific clues as to where it may need to go to reach higher levels of performance.

Management

In 1985 Peter Drucker wrote that management was the new technology making the American economy into an entrepreneurial economy. He believed it was time has come to do for

⁶⁴ Introduction to ‘The Practise of Innovation’ in ‘Innovation and Entrepreneurship’ by Peter F. Drucker first published in 1985, available from Elsevier, ISBN 978-0-7506-8508-5.

⁶⁵ ‘The Four Models of Corporate Entrepreneurship’ and published in the MIT Sloan management Review in Fall 2007, Vol. 49 No. 1.

entrepreneurship and innovation what he and others had done for management in general some thirty years previously: develop the principles, the practice and the discipline⁶⁶. Writing in preface to the 1993 edition of his book 'Entrepreneurship and Innovation'⁶⁷ he noted that the innovative companies of 1993 were the same as a decade ago, that most companies believed innovation to be inspiration and entrepreneurship to be good luck. He drew a lot of inspiration from the Japanese noting that their success was not down to superior cost-cutting or marketing, but to the way they structured the way they did innovation, as a systematic, organized purposeful activity. They 'have made innovation systematic, purposeful and a discipline' and 'they have made entrepreneurship systematic, purposeful and a discipline.'

Much more recently A. G. Lafley says exactly the same thing – that 'there is a need to organize innovation into a disciplined process that is replicable'. He insists that ultimately there should be no department of innovation, since all must be involved in innovation, that all managers are innovation managers and that every leader should make innovation a driver of their unit's strategy.

The challenge of innovation is not something that can simply be delegated to the research laboratory or the engineering department of the company. It is a complex process that occurs not only throughout the organisation but through-out the entire value chain of the business.

The lessons are clear:

- Both innovation and entrepreneurship are related forms of work
- They apply to all functional activities of the organisation
- Both must be managed in a systematic and disciplined way
- The best companies should pro-actively innovate in the task of management itself

Measurement

Modern scientific management relies on measurement. The accepted wisdom is that what is not measured is not managed. Most major innovative companies employ their own set of innovation metrics. These tend to focus on outputs such as 'revenue per meter of shelf-space', 'revenues per square meter of floor area' or 'share of revenues generated from new products and services'. Single measures are good for simple tasks but complex activities require multiple simultaneous measures to be useful. These may be quantitative or qualitative in nature. They may serve as absolute measures of internal performance of or comparative measures of performance through benchmarking with other organisations.

Measurement systems can be designed for observation or for action. Good systems drive change. In the case of a company this means that it provides direction to managers and employees as to what kind of behaviour is required for success in future⁶⁸. In designing a measurement system it is therefore important to ask, who is going to use it and how are the measurements made intended to inspire or provoke consequent action.

Good measurement relies on a clear understanding of what is being measured, what success will look like and what drives this success. It normally accepted that as understanding evolves the system of measurement may change as well. Measurement systems need to evolve and an

⁶⁶ Page 15 of 'Innovation and Entrepreneurship' by Peter F. Drucker first published in 1985, revised edition available from Elsevier, ISBN 978-0-7506-8508-5.

⁶⁷ 'Innovation and Entrepreneurship' by Peter F. Drucker first published in 1985, available from Elsevier, ISBN 978-0-7506-8508-5.

⁶⁸ Carlos Gutierrez, Secretary of Commerce speaking a meeting of the advisory committee of the US Department of Commerce initiative on 'Measuring Innovation in the 21st Century', www.innovationsmetrics.gov. Page 57 of the transcript of the meeting on 22-02-2007.

empirical approach is often required. This paper is intended to motivate the following two questions:

- How will a better understanding of hidden innovation and of the drivers of innovation performance impact the enterprise level measurement systems?
- How will national, regional or sectoral measurement systems encourage appropriate changes in innovation related behavior of industry?

Indicators for Entrepreneurship and Innovation

Typical approaches to the measurement of innovation at national or regional level emphasize factors such as expenditure on research, the use of patents and industry links with academia. These approaches are heavily influenced by the so-called 'linear-model' whereby innovation is understood as a relatively simple process that starts with discovery or invention in a research laboratory and proceeds by incremental steps to 'the market'. These approaches have a distinctly 'public sector' point of view. They are probably helpful to public research agencies in that they are designed to provide an evidence-base for further investment in traditional research domains. However they ignore the complex reality of industry by treating it as a 'black box'. In particular they fail to register most non-technology and non-research related drivers of innovation performance.

There is general recognition of the shortcomings of current approaches, not only in Europe in countries such as the UK, but outside Europe in countries such as New Zealand, Australia and the US, as well as at the level of the OECD.

It is important to better understand what innovation is, where and how it happens, who is involved, what skills and capabilities are required for success. This is needed to provide better indicators, indicators that register activities that are currently hidden, indicators that reflect what is inside the black box of industry whether on the basis of sectoral breakdown, maturity of innovation management or breakdown in terms of non-research factors of Innovation performance, indicators that provide actionable feedback by major stakeholders such as industry.

In 2006, the US Department of Commerce established an advisory committee to provide recommendations for a new system of measurement of innovation for the 21st century⁶⁹, on the basis that a new system was required to help policy makers better understand how innovation occurs in different sectors of the economy, how it is diffused through the economy and how it impacts economic growth and productivity. The recommendations published in 2008 called for a system of indicators that would be included in the national income and product accounts on the basis of company data. The UK government relies on the work of NESTA to develop new measures for innovation activity at national level. There is specific interest in the sectoral specificities, innovation in the service sector and improvements in measurement systems that will track 'hidden' innovation.

Where are we Today?

The most comprehensive surveys of innovation activity in Europe are carried out on a regular basis with support of the European Commission. The CIS or Community Innovation Survey⁷⁰ has been carried out on four occasions since 1992. The national statistic offices in the EU member states gather data from industry and other sources on the basis of the conventions of

⁶⁹ <http://www.innovationmetrics.gov/>

⁷⁰ http://en.wikipedia.org/wiki/Community_Innovation_Survey

the Oslo Manual⁷¹. One of the difficulties with the Oslo Manual is that it is heavily oriented towards technological innovation. It is now clear that there is a need to go beyond science and technology and address innovation in a much broader sense, one that includes forms or innovation that are currently hidden because they are not counted using traditional measures of innovative activity.

The CIS data is used to compile the EIS or European Innovation Scoreboard⁷². This annual benchmarking of the overall innovation performance of European Union countries with external points of reference such as the US and Japan has been conducted every year since 2001. Sweden, Denmark and Finland tend to score very well in this exercise and are counted among the innovation leaders not only in Europe, but in the world. Iceland falls into the next group – the ‘innovation followers’ and Norway into the group of ‘moderate innovators’.

Other benchmarking exercises exist. The World Bank publishes the KEI or Knowledge Economy Index⁷³ that benchmarks countries in terms of their knowledge economy readiness. Denmark, Sweden and Finland hold the top 3 places with Norway coming at number 5 in the world. The World Economic Forum publishes an annual Global Competitiveness Report⁷⁴ which benchmarks countries in terms of a wide range of parameters. Many of these indicators refer to subjective and qualitative parameters such as levels of corruption in government or business confidence, but are nevertheless useful as indicators.

These surveys give policy makers in each country an idea of where they lie with respect to other countries in terms of innovation, and it provides clues to policy maker as to what kind of actions may be necessary in the future to ‘keep the economy on track’ in terms of innovation. They are constantly being revised and updated. The most recent CIS surveys have tried to look at innovation in service and it is possible that future ones will look into the issue of innovation management.

The OECD in its outlook for 2008⁷⁵ underlines the fact that ‘innovation in firms goes considerably beyond technological innovation and also includes process, organisational and marketing innovation ... and ... policies to foster innovation need to be broadened to cover the full range of innovation activities, including sectors that do not undertake much R&D’.

Recommendations for the Future

The US Department of Commerce report on ‘Measuring Innovation in the 21st Century’ was published in January 2008⁷⁶ and provided guiding principles for future systems of measurement, among which were the following recommendations:

- Base the system on how firms assess the effectiveness their innovation activities
- Makes use of subjective and qualitative data as well as traditional quantitative data
- Enable analysis at the level of firm, sectoral, national and regional levels
- Treat innovation measurement as an iterative process, an ongoing dialogue with learning and improvement at each stage
- Start with pilot projects to gauge the cost and impact of measurement system

⁷¹ <http://www.oecd.org/dataoecd/35/61/2367580.pdf>

⁷² <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=5&parentID=51>

⁷³ http://info.worldbank.org/etools/kam2/KAM_page5.asp

⁷⁴ <http://www.weforum.org/en/initiatives/gcp/index.htm>

⁷⁵ OECD published 27 October 2008

⁷⁶ ‘Innovation Measurement: Tracking the state of the art in the American Economy’ available at www.innovationmetrics.gov

These are good common sense recommendations and should be considered. The same report recommended that companies institute firm level measures of innovation, that they develop an implement best-practice in innovation management. It is nevertheless useful to consider a broader range of initiatives that could be of benefit for the region.

The first proposal that comes to mind, in view of recent interest in hidden innovation, is to continue to improve our understanding of innovation, what it is how it happens, who is involved and what skills and capabilities are required for success. It is clear that innovation is not a simple event that happens within an organisation, but a complex process that extends through the value chains into which it is integrated. Research is required to achieve this goal. Specific issues to be addressed include the characterization of the service economy and how traditional non-service sectors are integrating services in their offering. Research is also required to understand the full scope of hidden innovation, in particular so that future metrics can be designed that register different forms of hidden innovation and the extent of their contribution to growth and prosperity.

Research policy tends to be formulated with respect to traditional domains and disciplines. The past efforts of IBM to develop a science of 'computing' are to be contrasted with the private sector invention of the 'molecular biology' and more recent efforts to create a science of 'service'. Almost nothing in modern approaches to research and innovation policy allows for the possibility of the creation of such new domains or such new institutions as the 'management innovation laboratory' Gary Hammett. Maybe there is a role for the public sector to pro-actively support the creation of new disciplines of innovation, a science of 'timing' for example or of 'change'?

Greater insight is required on the real drivers of innovation performance. This would allow us to move beyond simple assumptions about research as the main input, and to account for other factors such as skills, capabilities and quality of management. There is a need to question traditional assumptions about the role of research in innovation, deal realistically with the international dimension of innovation, to make a virtue of 'not invented here' and support the access-to and innovative use of old knowledge as well as new.

The nature of learning in enterprise innovation systems is also of interest, in particular the role of new structures such as corporate universities. To what extent do these act as the glue that holds together enterprise innovation systems. Should public policy encourage the development of corporate universities and how should traditional institutes of higher education position themselves in this new universe?

There is a need to take an empirical, exploratory approach to indicators, so as to clarify their utility, their action-ability as well as the burden and cost of their collection. Qualitative, subjective measures that address the extent to which managers are aware of innovation related issues, models and factors of performance could be of use. It should be of consequence for the future activities of enterprise and for public policy to know how many companies:

- Have formal innovation processes?
- Have firm level innovation measures?
- Apply continuous improvement to these processes?
- Extend innovation management processes to suppliers or end-users?
- Experiment with new approaches to innovation management?
- Integrate innovation and entrepreneurship, HR or business-model development?

Japan's MITI used to use 'energy consumption per unit output' as a proxy for innovation performance. In view of the increasing significance of 'forced' innovation it could be of interest to explore innovation measures related to the production of public goods and services.

Key Question 1: Where Does Innovation Happen in Your Organisation?

Where is innovation happening in your firm and your sector, now and in three years time?
Tick all boxes that apply⁷⁷:

No.	Description	Now	In 3 yrs time
Q1.01	Offerings: Products and services sold ...		
Q1.02	Platforms: The use of components and technologies that provide the basis for a portfolio of offerings ...		
Q1.03	Solutions: Customized integrated combinations of offerings that solve end-to-end customer problems ...		
Q1.04	Customers: Discovering unmet customer needs ...		
Q1.05	Customer Experience: Everything a customer sees, hears and feels, customer interactions		
Q1.06	Value Capture: Revenue streams, method of payment		
Q1.07	Processes: How things get done for efficiency, effectiveness and performance ...		
Q1.08	Organization: Control, management, the form function and scope of activities ...		
Q1.09	Supply Chain: Sourcing and fulfillment ...		
Q1.10	Presence: Where and how you meet customers, sales channels ...		
Q1.11	Networking: Network intelligence, how you connect with partners ... human networking and IT systems ...		
Q1.12	Brand: Establishing, developing, positioning, leveraging, stretching, extending brands to create new meaning and value ...		
Q1.13	Globalization: Going beyond borders to seek and create value ... for customers, suppliers, partners, technology, knowledge and know-how ...		
Q1.14	Public Goods and Services: Going beyond the immediate goods and services that customers pay for to create value for society in terms of energy, climate, the environment, human health and well-being, security and sustainability ...		

Key Question 2: How Do You Manage and Organise Innovation?

A business model is simply what a company does to create and capture value. Every company therefore has a business model. Companies increasingly consider innovation as an integral part of their business model. Some innovate by changing the business model itself. Open questions for participants include:

- What is your business model?

⁷⁷ This list is based on that provided by the article of Sawney, Molcott and Arroniz published in Spring 2006 Vol. 47 No. 3 of the MIT Sloan Management Review entitled 'The 12 different ways for companies to innovate'.

- Is your business model OPEN to ideas and collaboration with suppliers, customers and other actors?
- Is innovation an integral part of your business model?
- To what extent is your innovation process OPEN to outside actors?

To understand this it is helpful to use the following classification. Select any or all that apply. Consider where you are today and where you would like to be in 3 years time.⁷⁸

No.	Level	Description	Now	In 3 yrs time
Q2.01	1	An undifferentiated business model, based on doing what many other similar companies do in more or less the same way. There is no innovation.		
Q2.02	2	A differentiated business model is one that enables the company to target its customers and sell on the basis of value-added beyond price and availability. Innovation is ad-hoc and unplanned. The company enjoys the occasional one-hit-wonder!		
Q2.03	3	A segmented business model that allows the company to compete in several segments simultaneously. Innovation is a continuous planned activity. It is treated as an investment. It has dedicated resources such as an internal research laboratory. The work tends to focus on new product or technology development.		
Q2.04	4	An externally aware business model that selectively incorporates external innovation ideas into the business. It is involved in both internally and externally initiated innovation projects. It actively seeks inputs from outside the organization to fulfill its own innovation needs.		
Q2.05	5	Innovation is an integrated part of the business model. It is often seen as a business function and lead by a senior manager. Suppliers and customers have access to the company's innovation process. Access is often reciprocal. Customers give access to their roadmaps so the company can anticipate their future needs. Customers and key-suppliers are engaged with the company at multiple organizational levels. The company sometimes markets itself as a partner of choice for external actors with innovation ideas.		
Q2.06	6	Innovation includes business model innovation . The company experiments with several simultaneous business model variants. It coordinates internal and external R+D. It shapes the future of that coordination. Customers and supplier invest alongside the company to achieve innovation goals. Suppliers and customers are segmented and integrated into business model experimentation. Products, technologies and services are sometimes positioned as a platform for innovation that extends throughout the whole value chain.		

⁷⁸ This list is based on the work of Henry Chesbrough in 'Open Business Models – How to thrive in the new innovation landscape' published by Harvard Business School.

Key Question 3: How do you Support Those Who Make Innovation Happen?

Entrepreneurs are the people who make innovation happen. How do you support the entrepreneurs in your organisation? Select all of the options that apply today and all that you think should apply in 3 years time.

	Organizational Models	Now	In 3 yrs time
Q3.01	Opportunist: A diffused ad-hoc approach that characterizes starts ups but which can work well for mature companies that possess a diverse well-networked environment of trust. The disadvantage is that opportunities can fall through the cracks and ...		
Q3.02	Advocate: An approach where the company advocates for innovation but the responsibility and funding resides at the level of the business unit.		
Q3.03	Enabler: Funding and senior executive attention is given to projects. The mode is based on the premise that employees across the organization will be willing to develop new concepts if they are giving adequate support.		
Q3.04	Producer: The company establishes a full-service group with a mandate for corporate entrepreneurship.		

‘Knowledge is a Commodity’

What does this mean for your organization and its ability to compete? We help organisations ‘discover the future’ and understand their innovation needs using a structured ‘Foresight approach. We conduct research on the management and measurement of innovation. We help managers understand design and put in place the systems they need in order to make innovation happen.

‘Management Matters’

To find out more visit our website at

WWW.CKA.BE

**CKA
2 rue d’Arenberg
1000 Brussels
Belgium**

© CKA 2009 All Rights Retained