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Contents

Manufacturing for the future
mass customisation, RFID and consumers

By Julie Basset, LL&A

European manufacturing in its traditional resource-intensive form is facing a challenge from low-wage and high-tech competition in developing and developed countries. This situation underpins a broad consensus on the need for a manufacturing strategy based on research, innovation, and added-value. There is also a widely shared perception that the manufacturing paradigm must evolve so as to address societal needs, help overcome resource related constraints and environmental concerns, while continuing to create economic dynamism and competitiveness.

RFID for mass customisation

For some time now, mass customisation has appeared to be an important part of this new paradigm. It is based on closer interaction between firms and their customers, so that manufacturing systems produce tailor-made products to meet customers' needs, at costs and speed comparable to those of mass production. Such an approach can preserve or revitalise competitiveness as compared to low-wage countries, while meeting consumers' specific needs much more precisely. Mass customisation is however a significant challenge: ensuring quality, timely but flexible production, without incurring costs well above those of mass production, requires a significant improvement in manufacturing performance – and thus involves rethinking and reorganising entire manufacturing processes. In other words, mass customisation depends on technical, technological and organisational innovations.

Among the technological elements of these solutions, one particularly worth attention is Radio Frequency Identification (RFID) technologies. These are wide-reaching and fast spreading tools that can be used in effectively all sectors of the economy, and which may modify our production habits and challenge our consumption attitudes. RFID allows for the identification of unique items by radio – if necessary several items can be simultaneously identified, as opposed to, for example, bar code technologies, even if they are contained within a larger package. The system relies on tags or smart chips that store information and can be placed on (or in) objects, packaging, animals or human beings. When exposed to radio waves, these tags emit a signal, transferring data to a receiver. The use of RFID in manufacturing contexts is relatively recent but is spreading fast, bringing organisational

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GRIPS' news

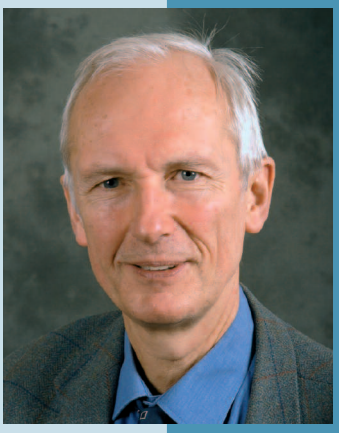
- Open Innovation and IPR: A two day workshop for early career researchers explored the interrelations of Open Innovation and IPR. Presentations from this workshop, as well as the resulting prospective paper are available online: *http://grips.proinno-europe.eu/*

- Scope for international cooperation on green building standards: GRIPS' next ministudy is currently underway and will soon be available on the GRIPS website.

Editorial

Editorial

by Ian Miles, Manchester Institute of Innovation Research.



We are more than half way through the European Year of Creativity and Innovation, and what a year it has been so far! It began with an economic crisis that was largely triggered by some unwelcome innovation in the financial services sectors, though it remains almost inevitable that a period of boom and frenzy will end in tears. At the time of writing it looks as if the unprecedented joint actions of leading governments have prevented the recession spiralling into depression, though there are still huge instabilities in the system. The financial reforms pursued by regulators are liable to provide opportunities for more fertile – and risky – innovations from financial services, and in the long run our regulators will need to become more innovative themselves. It has been encouraging to hear many political leaders voicing support for the view that continuing creativity and innovation is important for overcoming the crisis (and the looming environmental crisis) in a sustainable way. The actual behaviour of governments and industrial leaders is somewhat more mixed.

The European election results displayed diverse reactions to the crisis, with the left being widely punished and a variety of erstwhile fringe parties gaining more of a spotlight. While there was support for environmental movements – and in one case for "piracy" (or at least rethinking intellectual property and internet regulations) – much concern has been provoked by the increased role for parties of the less moderate and in some cases far and nationalistic right. One thing that most of these parties have in common is opposition to much of the diversity in culture, ethnicity, gender, sexual orientation, and other hallmarks of creative modern societies. Their ability to come to terms with innovation more generally is a matter for speculation: it would be interesting to assess the impacts of their governance of cities for innovation in these localities. At the same time, the US seems to be moving in the opposite direction, though both the US and the EU feature a great many inertial forces.

Reduction in economic growth may have led to fewer CO_2 emissions than expected but the environmental news continues to be alarming – despite renewed signs of action on the political front. Innovation will almost certainly be called for not only to reduce our impacts on climate change, but also to help us cope with the probable impacts of changes already underway. The two goals must be complementary, despite warnings that a focus on adaptation will divert attention away from amelioration. If we do not help people in threatened regions adapt to rising sea levels, then we will be condemning millions to unnecessary suffering even while we are trying to prevent future developments becoming worse. The effects of global warming on agriculture and habitat are liable to be so severe as to make the far right's nightmares about immigration seem like wishful thinking. Already we hear calls for the boats of illegal immigrants to be sunk – the conflicts into which we will be plunged if ecological crisis spreads do not bear thinking about. Europe's Grand Challenge is to apply creativity and innovation in ways that can benefit humanity at large. Change will be required in production and consumption, trade and travel: some solutions will involve dramatic and others more mundane change. We need urgently to identify, pilot, and implement ways of moderating the environmental crisis – and ways of moderating the negative impacts of the changes we may face. ■

innovation alongside the technological change, and extending far beyond the production process itself.

Automation of modularisation

RFID offers major benefits to logistics, for example in reducing inventories and allowing for rapid location of components and finished commodities, making for smoother flows of materials and goods. Most importantly, RFID allows the development of more flexible and better demand-adjusted production processes. Mass customisation relies on the concept of modularisation: products and processes are divided into basic elements or sequences that can be assembled or organised along specific needs (an individual car structure, for example, may be assembled with options A and C or B and D). RFID allows for the automation of modularisation, and thus for a flexible but timely production. Tagged car constituents and assembling machines can share information. As a result, when an order is placed (e.g. for a car with options A and D), the corresponding constituents are automatically identified while assembling machines switch to the adapted programme. This system allows meeting demands in a timely manner, while keeping stocks at a minimum.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RFID is thus a major production tool for mass customization and a true asset for competitiveness. This helps explains why the technology is developing and diffusing, even though implementing it still represents a heavy investment – in terms of acquiring the new technology and reorganising the production processes. RFID is also being used way beyond the factory stage: to organise transportation, to track products and monitor stocks in retail stores, to verify quality and authenticity, to fight theft and fraud. For example, there is growing use of RFID to check the authenticity and quality of medications. RFID can even contribute to the definition of new types of services to the customers. The German store 'Galeria Kaufhof' in Essen, for instance, recently harnessed the technology to provide clothing assistance for male customers. Smart chips placed on each clothing item helps the client to locate matching items. When the client places a tagged tie in front of a specific interface – in this case a mirror-type surface – a choice of potentially suiting shirts appears on the mirror. There can be environmental benefits too, beyond reduction of waste in production and retail. At the very end of product's life cycle, RFID can contribute to a more efficient recycling process: the smart chip can help identify the product's components and define the best suited recycling/re-use option for them.

All these possible applications tend to make RFID potentially a very pervasive system. And once they have invested in it, businesses and public organisations try to maximise benefits by using the technology extensively (this includes actively promoting it to business partners: In the US, Wal-Mart and the Department of Defence having both adopted RFID subsequently imposed it on their suppliers – thereby diffusing the technology widely in the US.) Given the specific features of RFID (and tagging systems more generally), this pervasiveness raises many questions. Some are technical (international standards for radio frequencies), some societal (data monitoring and privacy issues), some health-related (potential impact of consumers' and citizens' increasing exposure to electromagnetic waves). The European Commission issued a Communication on RFID in 2007, followed by another on the 'Internet of Things' only a few weeks ago. FP7 and CIP projects are still exploring technological aspects of RFID, though privacy issues are thought to be handled by the Directive on the protection of private data. However, future trends in manufacturing and consumer and public services, and questioning our consumption attitudes in relation to sustainability and other societal concerns, may mean that we have to balance support for the use of RFID in industrial settings with examination of risks in terms of privacy and data protection. ■

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Patenting aids innovation: *an SME's perspective*

An interview *with*... Steve Dobson

By Kathryn Morrison and Jennifer Hayden, Manchester Institute of Innovation Research

Steve Dobson is Managing Director (Commercial) of 'Sourcing 4 Success', a UK based Sourcing and Profit Improvement Business Consultancy. Their work includes global and local sourcing, operational improvement, purchasing consultancy (including overhead cost reduction) and interim procurement management and they help inventors to bring products to the market. He is also the co-founder of C-Major, a newly incorporated business whose aim is specifically to collaborate for valorisation and commercialisation of some interesting intellectual property rights- which are discussed in this interview.

Steve Dobson

Mr Dobson has 15 years experience at director level with UK manufacturers in the industrial engineering sector in multi-national engineering companies and is a chartered mechanical engineer. He has an MA from Oxford University and MBA from Warwick University, UK. His experience covers general management, operations, contract management, sales and customer services and he has assisted European and American companies to establish joint ventures and other long term collaborations. In this interview we uncover the experiences of a small firm using patents for intellectual property protection and collaboration in the medical device field and the challenges and risks associated with this; whether IPR is viewed as a stimulus for innovation and what 'open innovation' really means to a small firm.

New opportunities

Mr. Dobson's new venture is a micro-firm, C-Major which has recently become involved in the invention and patenting of a revolutionary new medical device that could enable safer hypodermic injections for patients and eliminate the risk of needle-stick injuries for health professionals in the future.

For Mr. Dobson, the patenting process for his company's potentially radical new device has been an arduous one at times. An original deal to commercialise the invention was struck six or seven years ago between the inventor and a businessman. The deal collapsed and Mr. Dobson was approached by the inventor who wanted to know what he should do; as he knew nothing about the status of the patenting process and was unsure of how to proceed. C-Major saw a business opportunity and stepped in to help. *"A lot of time and money was spent re-invigorating these patents and finding out what other patents also needed to be in place"* says Mr. Dobson of the initial stages. In the case of this new medical device, which will enable the user to administer injections using one hand only, he explained, *"we tried to learn from other*

businesses mistakes, such as having too limited a product range to enter the market, by providing a large number of offerings to cover the most common uses of hypodermic syringes, for example inoculations, intravenous injections and epidurals. We are trying to get as many different design applications in place as possible and we are also talking to clinicians about the usage of these devices in order to take account of how they are operated, which has led to further developments". Reflecting these enquiries and findings, the new company will be based around a holistic set of patents, not all of which are in place yet.

Patents encourage innovation

In the medical devices field, does he see patents as encouraging or discouraging innovation in small firms? To this his answer is clear: *"They have to encourage. If you are a small person then what protection have you got [when you approach] a bigger person if you do not have protection for your intellectual property? So it's got to be a stimulus to innovation. If there were no patents we would not even start doing what we are doing".* Does he worry about threats from larger companies? *"Yes. Even with strong patents, we still fear the possibility of going to a large player who may behave incorrectly. I'm familiar with that sort of behaviour outside the medical industry. It's difficult to fight the big players".*

Collaboration and risk

As a micro-firm with no development or production capabilities, C-Major will need to collaborate with a large, probably multi-national firm to develop a prototype and then perhaps with a third party for the manufacture of the product on a large scale. So, does he see the way that he will use his patent to approach another firm as a form of collaboration? *"Yes, of course it's going to be collaborative later – definitely, but for us to have any strength of position, as a small company, before we go in we have to have that patent in place. Before you get into any dealings with anyone you have to get agreements signed...before you give any information away".* Mr. Dobson says that he is aware of the danger of people copying new ideas, or 'trolling' databases for opportunities to develop similar products now that the patent is out there, though he acknowledges that this is just part of the process. *"It's normal practice. You would have to be foolhardy to think that this was not happening, but we are not currently aware of any similar products to ours."*

'Open innovation'?

Does this mean that he sees what the company does as a type of 'open innovation' or of patents being used for collaboration rather than exclusion? *"No. I am not really familiar with the term 'open innovation'. I have heard people talk about it recently but in our case patents were used totally to protect a medical invention so we have Intellectual Property to sell. Our intention is to set up a deal with a major medical company and a distribution arrangement, and armed with that to find a manufacturer to subcontract the manufacturing to".* Asked whether he thinks 'open innovation' is really happening in small firms, Mr. Dobson said that, in his field at least, he had not seen patents being used for collaboration purposes per se, but acknowledges that this particular case is not necessarily representative of what is happening everywhere, and that it is probably happening in larger firms.

Whilst C-Major's case may be highly specific, perhaps it is not unique. On the one hand, they are using patents first as a means of protection, so the IP system is working there to aid an important innovation that otherwise may not have come to fruition. On the other hand, once the proper protection is in place, the patents will allow C-Major to collaborate, and whether it is intentional or not, the publication of patenting information may act as a signal to other interested collaborators. This case is not obviously an example of what might be labelled 'open innovation', but it is an example of where the IP system is facilitating collaboration between innovative firms. ■

http://www.s4sltd.co.uk/

Patents: for protection or partnering?

By Jennifer Hayden, Manchester Institute of Innovation Research

Open Innovation is a wide reaching term, maybe even having the status of a 'buzzword' whose meaning has become too diffuse to apprehend with certainty anymore. It most generally refers to a network of disparate actors harmonising to create, develop and market a new product or service. It is perhaps easier to identify by its opposite: traditional intra-firm based R&D-intensive innovation - a closed model that involves fewer actors, often employed by the same firm, bound by secrecy or informal agreements and working with a common motive. Of course, the lines between these two modes of innovation can often be blurred and each case will have its particularities that place it somewhere on a continuum between the two.

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Given the 'buzziness' of the term, both within academia (the academician Henry Chesbrough writing in the late 1990s is often credited with its elucidation, although clearly it has a much longer and more complex derivation) and policy circles, it is not surprising that it has been the subject of GRIPS activity recently. A functioning IPR system is crucial for small firms who need to collaborate with larger firms to deploy an innovation but also need to protect themselves from the potentially unscrupulous behaviour of these larger firms. In this sense, patents do aid collaboration but in a very traditional and intended way – by protecting the patent holder.

What is perhaps more exciting than this 'fear-based' patenting, is collaboration-seeking patenting. This novel view, expressed most recently by Patrick Cohendet and colleagues[1], holds that patents are being used as signalling tools that bring previously unknown actors together to form new collaborations while also providing a common language around which to organise the innovation process. They suggest that this kind of patenting activity would most likely be found in complex high-tech fields where the necessity for collaboration is profound in the early stages. A firm holding one new component patent could simultaneously signal their willingness to collaborate through the patent publication itself and also by searching patent databases for likely partners. Of course, this view may be considered somewhat optimistic as it glosses over the increasing prevalence of unscrupulous actors 'trolling' the databases and patenting in order to stifle innovation and/or extort great sums in the process.

While we have yet to come across any field examples of collaboration-seeking patenting, there are certainly a myriad of instances that highlight fear-based patenting in aid of collaboration. It is unfortunate that this is the case, but not surprising given the avarice and iniquity which often accompany great innovation. If there is money to be made and the inventor is not well protected, she or he will most often lose out to the stronger armed 'collaborator'. Given the IPR system we have, patents are providing a necessary means for collaboration; but the motives for engaging with the system are lacklustre next to the golden trumpet call of 'Open Innovation'. ■

1 Cohendet, P., Farcot, M., & J. Penin (2009, April). Intellectual property in a knowledge-based economy: Patents to include vs. patents to exclude. (Document de travail n. 2009-15). BETA: Strasbourg.

By Pierre Bitard, ANRT

What is innovation policy ?

Photo by Steve Harwood

This digest does not pretend to answer the billion Euro question about the very nature of innovation policy. Instead, we propose a synthetic account of analysts and journalists' coverage over the last year, based on a check of the Inno-Grips' world press Innovation Monitoring System[1].

Strikingly enough, out of the 24 000 articles collected with a view to providing intelligence on innovation and its policies, only a very minor share (i.e. 101 articles) uses the exact expression 'innovation policy'[2]. Innovation policy might then be considered a rather immature branch of policymaking.

From our body of articles, major referenced locations are, by order of importance, America, Europe, Asia, Oceania and Africa. The first rank of the US may be partly explainable by the new orientation of the Obama administration, with Susan Crawford being nominated special assistant to the president for science, technology, and innovation policy (4). Over a one year period from June 2008, citations of the term 'innovation policy' remained stable, with about 10 hits per month. So far, innovation policy making still consists mainly of efforts to coordinate the policy schemes that government sectors are launching in various innovation-related fields.

Through semantic clustering, performed on the one-hundred articles which refer to 'innovation policy' that were collected over the same period, we found three main orientations of innovation policy developments. The first one mixes the global challenges – i.e. climate change, healthcare, employment and energy – with their traditional policy answers i.e. science, research, education, university, science parks and taxes. The second stream gathers the usual key 'sector' focuses, such as intellectual property, entrepreneurship, nanotechnology, foresight, SMEs and medicine. The third grouping refers to presidential commitment to manage the transition to an innovation economy: innovation policy as an engine for growth – where the users and the consumers are placed at the heart.

The existence of these practical pathways is common knowledge within the innovation policy community, and provide innovation policy making, worldwide, with its basic terminology. The debate remains nonetheless open between two main modes of implementation. On the one hand, from a government perspective, there is still a tendency to apply the old 'command and control' model to investment in academic or governmental research and call it innovation policy. On the other hand, the alternative approach, which consists of creating the conditions that favour the emergence of business solutions, is gaining in importance. Though the latter is broader, both approaches can be associated with grand challenges or society-driven innovations.

On closer inspection, it seems that emerging countries (such as China, Russia, India and Thailand) need to develop an ecology of innovation, primarily through investments in research and in patent protection systems, and much else; whereas established

About GRIPS

INNO-GRIPS is a project funded by the EC Directorate General Enterprise and Industry under the **PRO-INNO** Europe initiative. The **INNO-GRIPS** initiative compiles and analyses existing studies and information world-wide on innovation policy making, business innovation and academic discussions.

INNO-GRIPS provides a platform for open discussion among experts on relevant innovation policy and business issues to foster intellectual debate and provide a workshop setting for future developments. This contributes to building an "early-warning" system for policy-makers to facilitate the timely adoption of appropriate policy responses.

Key **INNO-GRIPS** activities are research, analysis, consultation and dissemination activities involving the Commission, researchers and other important stakeholders in the innovation process.

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GRIPS' digests *(followed)*

countries (e.g. Britain, Norway, the US, Australia and Finland, cf. below) are aiming at transforming their main socio-economic trends into competitive advantages, through innovation. In Thailand the National Science Technology and Innovation Office plans to support knowledge management and research and development needs by facilitating the training of researchers and developers to support the logistics industry, so that it has a base in knowledge and innovation (5). In Russia, president Medvedev insisted that, despite modest achievements - Russian companies spend 6-7 percent of their budget on innovations, while developed countries spend 50-60 percent, and Japan over 70 percent - innovation policy should be pushed forward, bearing in mind that it is important to "create structures with which young people – i.e. scientists - could cooperate on normal market terms with good salaries"- the reason why he had established state prizes of 2.5 million roubles each for young scientists (1).

In the more established countries such as Britain, Norway, the US and Australia, it is Finland, with its 'New Innovation Strategy' which is the emblematic example. A four-pronged strategy was put forth: "creating innovation-friendly markets, strengthening R&D resources, creating a new paradigm of flexibility and adaptability in human resources, finance and organizational structures, and fostering a culture that celebrates innovation" (2). A core objective of the new strategy is to move beyond a primarily 'knowledge push' environment, in which scientists and engineers come up with ideas and push them to the market, to a 'demand pull' system, with private companies and users playing an active role in market-oriented innovation. As Petri Peltonen, director general of Finland's Innovation Department Ministry of Employment and the Economy and author of the strategy report stressed, "users need to be more involved in the innovative processes; for instance a more patient-centric development of public health and medical services is to be pursued" (2). And, even further, the president of SITRA (the Finnish Innovation Fund) calls for an "innovation policy 2.0", migrating to software and services for medical monitoring and preventative health services because Finland has the second-fastest-ageing population in the world (6).

Irrespective of the way forward chosen, careful monitoring and sound evaluations of socio-economic impacts of policy measures are crucial parts of the process. In this respect, Grand Challenges innovation policies are certainly easier to communicate to citizens – and for them to monitor the success or failure of innovation policies. ■

1 For details of the method, cf. *http://grips.proinno-europe.eu/innovation_communities_updates/*
2 'Policy' alone is used in 4 000 articles; and 'policy' OR 'government' OR 'regulation' returns 10 000 articles.

Some references

(1) 'Medvedev says innovation policy must continue despite modest achievements', *Itar-Tass,* 30 July 2008
(2) 'Finland to Implement New Innovation Strategy', *Research Technology Management,* 1 November 2008
(3) 'Research', *The Irish Times,* 6 April 2009.
(4) 'Obama Adviser Looks at U.S.-Built Broadband Network', *Congress Daily,* 26 May 2009.
(5) 'Thailand: Plans being formulated national framework aimed at improving performance of logistics industry', *Thai News Service,* 29 June 2009.
(6) 'Governments study how innovation policy can be an engine for growth', *The International Herald Tribune,* 22 June 2009.

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