Supporting innovation in services

BERR | Department for Business Enterprise & Regulatory Reform

Department for **Innovation, Universities** & **Skills**

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Foreword

For many years the debate around improving innovation and business performance has been couched in the relatively narrow framework of R&D, technology and the manufacturing sector. In June 2007, Alistair Darling, then Secretary of State of DTI, and Jonathan Kestenbaum, CEO of NESTA, launched two reports to shift the balance of discussion towards innovation in a service oriented economy: the DTI Occasional Paper No 9, "Innovation in Services" and the NESTA report on "Hidden Innovation". In doing so, they commissioned work into how Government might stimulate and support innovation in services. This report is the product of that work.

With services accounting for over 75% of the economy, the report makes no pretence at covering all aspects. It has focused on five areas with very different characteristics, accounting for some 25% of the UK economy, which provide a range of insights into the barriers to innovation and growth, and how Government intervention might help to strengthen business performance. The findings add weight to the Enterprise and Innovation Strategies published earlier this year by the Government, they complement the Public Services Innovation Review published recently, and anticipate some of the thinking in relation to the growing "servicisation" of advanced manufacturing which will feature in our review in the autumn. But most of all it makes its own contribution to Government thinking and the wider business debate on the important issues we need to address, if the UK is to be at the forefront in developing a sustainable, high value economy.

We are therefore grateful to NESTA for the support they have given to this study and to the Chairmen, research teams and members of the Sector Innovation Groups who have provided much of the input and key business insights.

We now need to work with business, and other stakeholders in Government and the regions, to fulfil one of the overriding messages from this project, namely to implement vigorously the policy measures which this report recommends.

Shriti Vadera
Parliamentary Under Secretary of
State for Business and Competitiveness
Department for Business Enterprise
and Regulatory Reform

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and Innovation
Department for Innovation
Universities and Skills

Executive summary

The United Kingdom is often said to have become a "service economy" with services accounting for three quarters of our total national output.

This report is based on a consultation of business in five sectors of the economy[1] to develop a better understanding of what is driving innovation in service sectors, how innovation is developed and managed by leading firms, the barriers to innovation and the role Government might play in improving the UK environment for innovation in services.

It identifies a number of important trends based on the radical changes taking place in global value chains and networks and the rapid changes taking place in ICT, particularly the growing capacity of the internet. It highlights three in particular:

- The convergence between manufacturing and service innovation, as manufacturing firms seek to capture greater value added from their knowledge of the products by adding a "service wrapper" and service firms work more closely with their supply chains to respond more quickly to changing customer needs;
- The role and power of consumers/users in the innovation process brought about by developments in the internet and globalisation and, in response, the development of a much more networked approach to developing new services; and
- The growing concerns around sustainability and the environment which are impacting upon a wide range of service sectors and unlocking new opportunities: innovative services have a role to play in the transition to a low carbon, resource efficient economy.

This business-led report follows on from the broader policy frameworks established earlier this year by the "Innovation Nation" White Paper and the Enterprise Strategy, "Enterprise: unlocking the UK's talent". It is also one of a trio of studies which Government has commissioned over the past twelve months to ensure that policy is in tune with the needs of the modern economy: the other two are the Public Service Industries report recently published by Dr DeAnne Julius and the forthcoming review of advanced manufacturing, due to be presented in the autumn.

1 Retail, logistics, construction, environmental and internet delivered content services

Key Messages from Business

- The more difficult the economic climate, the greater the imperative to have systems which provide the firm with market focus, the ability to differentiate itself from the competition through innovation, and the processes to manage scarce resources.
- There is the opportunity for businesses to respond to the new competitive challenge by looking to innovate in all aspects of their business. While fortune may play an important part in innovation and business success, companies which are successful over time are those which have well developed processes for:
  - identifying customer needs and market trends, including potentially radical shifts in demand or the means of addressing it;
  - creating an environment which is open to new ideas, while sifting rigorously those to pursue against clear commercial objectives;
  - scaling up the most promising quickly and effectively, to exploit the commercial potential to the full, including capturing customer appreciation in the form of brand recognition and loyalty;
  - tailoring their processes to respond to the new demands or even moving to a new business model;
  - benchmarking rigorously their own performance against the competition, and learning from others and their own experience.
- The above processes require strong leadership and a skilled and motivated workforce. They also require investment in systems which allow decision takers, at all levels in the firm, to make decisions on the basis of the best possible management information. However, the prize is that customers will find the overall package distinctive and compelling, and enjoy an excellent experience.

In examining the drivers of change and the barriers to innovation, the report has some clear messages for Government.

Messages for Government

Openness and Flexibility of Markets: Innovation is driven by competition and substantially by new firms bringing new ideas to the market. Government therefore has an important role in ensuring that markets are as open and flexible as possible. Aside from promoting a liberal international trading environment and pursuing an active competition policy, business identified three important levers where, it felt, Government could focus greater effort:

- Where Government is an important actor in the market, as procurer or regulator, strong leadership in the form of clear, consistent, objective oriented policies, and a shared perspective of the policy challenge, gives business the strong market signals it needs to offer innovative and sustainable solutions.
- Information is the raw material of an "Information Society" and business believes that Government has an important duty in making public data as accessible as possible
- Markets also require a framework for defining and comparing offerings, and delineating quality and performance over time i.e. a standards framework which is interoperable. This is particularly important for the new models of advanced manufacture and for PFI contracts, where firms are seeking to service assets over a very long period. Given the global nature of value chains, business considers it is important to ensure that the international standards framework provides opportunities for UK firms.

The Government has recognised the force of these arguments and is addressing them:

- **it announced in Innovation Nation a strategic review of standards for the service sector, to be conducted by the BSI, which will feed in to the discussions of the EU Services Directive and the International Standards Office (ISO) as part of UK policy to liberalise trade in services and provide an objective framework for assessing the impact of supply chains on the carbon footprint;**
- **It has also announced that it is undertaking an assessment of the Trading Funds to be carried out by the Shareholder Executive which will give a particular focus to the role that information, collected by the Trading Funds, should play in the wider economy.**
- **In following up this report, BERR, together with Defra, DfT, DIUS and the Technology Strategy Board will co-ordinate policies to strengthen innovation in the fields of waste and resource management and logistics. The upshot will be a clearer, more consistent policy environment aligned in each of these two areas to the development of new technologies, skills and standards which will enable innovative firms to develop new value added services.**

The Importance of ICT: Innovation in services is being driven by rapid developments in ICT, specifically the ability to capture, store, analyse/manage and exchange massive quantities of data. Knowledge based services need early access to knowledge based tools and an ICT infrastructure which can handle media rich services. To remain competitive, UK firms have to be able to tap into the technology and talent which will drive the next wave of internet development.

- **Government is committed to providing an ICT infrastructure which befits a modern economy and is working with Ofcom to this end. BERR has launched an independent review by Francesco Caio, looking at barriers to private sector investment in next generation broadband networks in the UK, complementing Ofcom's work in this area.**
- **In developing its strategy, the Technology Strategy Board is giving a particular focus to the needs of knowledge intensive services and the technology which underpins them. It also recognises the importance of disseminating knowledge about new technology and applications to as wide a business audience as possible, including firms in the service sector.**
- **In this context, the Knowledge Transfer Networks of the Technology Strategy Board and the business clusters supported by Regional Development Agencies provide a valuable starting point for companies looking to improve their knowledge of technology developments and identify new business opportunities.**

Leadership and Management Skills: The development and delivery of complex services, and the ability to respond to the rapid evolution of service markets, places a considerable premium on leadership and management skills. Leading UK service firms consider the UK to be a source of such talent but that there is no room for complacency: service firms will migrate to locations where young professionals have the requisite all round skills.

DIUS's "Train to Gain" programme, targeted at improving the leadership and management skills of SMEs, has been expanded from £4 million pa to £30 million pa. The Knowledge Transfer Partnership (KTP) programme, which provides support to firms to transform their businesses and, in so doing, develops a cadre of young executives with a range of project management skills, will be doubled. BERR and DIUS will work with the Regional Development Agencies to strengthen business engagement with provision of learning opportunities and best practice. In the light of this report:

- **BERR is considering a pilot in the West Midlands, to transform business processes through the innovative application of information and communications technology, in order to identify the benefits to SME performance, the barriers to wider uptake, and the case for developing a wider network of expertise.**
- **BERR and DIUS will also work with the Advanced Institute of Management to disseminate more effectively, to a much wider audience, the outputs from its network of research in leading schools of management.**
- **The aim is to raise the profile of management skills and ensure that firms, with the ambition and capability to grow, have access to the knowledge which lies in the UK's leading management schools; and that they develop the business processes and exploit ICT to maximum effect.**

Access to Finance: Access to finance remains difficult for some innovative, high growth service businesses.

- **BERR will lead implementation of the Enterprise Strategy, which aims to be a catalyst for helping small businesses to access the finance they need. BERR is working with a wide range of public and private stakeholders to improve access to finance for business. BERR is collaborating with NESTA and the Regional Development Agencies to establish a "Framework for Investment Readiness" and continues to support private sector investment in high growth early stage businesses through Enterprise Capital Funds.**

The proposed action programme to address these key messages is set out in more detail in Chapter 9 of the report, and will be delivered alongside the Government's Business Support Simplification Programme.

But perhaps the most important response to the business message is that the Government is aware of the strong interest in service innovation in competitor countries. It is firm in its commitment to strengthen the environment for innovation in the UK to make the UK an attractive place for firms to locate, not least to capitalise on its world class capability in knowledge intensive services. To this end:

- **The Government will seek to ensure that the implementation of the EU Services Directive opens up opportunities for innovative UK firms, and will play a full part in promoting the competitiveness of services in Europe after 2010 (the "Lisbon2"agenda);**
- **BERR/UKTI will survey firms with a global perspective to benchmark UK performance in terms of the quality of knowledge intensive services and the attractiveness of the service environment; and**
- **BERR/DIUS, working with stakeholders, will tackle any identified weaknesses.**

Chapter 1
Introduction

1.1 On 19 June 2007 the then Secretary of State for Trade and Industry, Alistair Darling, and Jonathan Kestenbaum, CEO of the National Endowment for Science Technology and the Arts (NESTA), launched two reports on innovation in the service sectors: DTI Occasional Paper No 9, "Innovation in Services"[2] and the NESTA report "Hidden Innovation"[3]. They announced that both organisations would work in partnership to determine how Government might stimulate and support innovation in the service sectors, and specifically:

"To formulate recommendations to Government on how to stimulate and support innovation in and across service sectors to enable them to meet the global challenges of the future."

1.2 This report has been prepared by the Department for Business, Enterprise and Regulatory Reform (BERR) in partnership with NESTA, and working in close collaboration with the Department for Innovation, Universities and Skills (DIUS). It has also engaged a range of other Government Departments, the Technology Strategy Board and BSI British Standards. It provides a synthesis of the issues and findings from five sectors which were selected to provide insights into innovation in a service oriented economy and, specifically, the scope for effective Government intervention.

1.3 Each of the project's sector reports is similarly structured and has its own set of specific policy recommendations which also offer a brief assessment of potential impact and indicative benefits. It is these reports which provide a potential model for future activity and define the scope for tangible interventions to promote innovation.

1.4 The actions flowing from this work will enable the UK to strengthen its position as a global hub of service innovation, where service oriented companies would choose to locate because the infrastructure, business environment, skills sets and culture are recognised to be conducive to successful innovation.

1.5 The project has rested strongly on consultative working with business. It has drawn directly on evidence from the business community, to develop a basis for Government to take practical actions, via a range of interventions, to support innovation in service sectors. The project speaks in the first instance to Government, indicating how policy might be developed to promote innovation while delivering specific goals in relation, for example, to sustainability,

2 http://www.berr.gov.uk/files/file39965.pdf
3 http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/hidden_innovation_report_NESTA.pdf

improved exploitation of public sector information and more efficient transport and logistics.

1.6 It will also be relevant to others, including the academic community, with an interest in these issues. It is also intended to inform and assist the sharing of good practice amongst those in business who are themselves initiating and managing change and innovation in services; and for their customers, the users of these services.

1.7 Turbulence in international financial markets is impacting on economies worldwide and this makes it even more important for Government policymaking to be responsive to issues of concern to the service sector. While there are messages for Government, the messages for business are no less significant: when economic conditions are difficult, the businesses which prosper will be those which differentiate themselves from the competition and have the processes in place to manage innovation and risk.

1.8 Alongside this project, a Review of the Public Services Industry[4] has recently been conducted for BERR by Dr DeAnne Julius. This parallel project focused specifically on the private and third sector delivery of public services. It looked at how to define and measure this sector[5]; it reviewed lessons learned about private and third sector delivery of public services; and it considered what Government can do to help this sector be more successful in delivering high value public services at home and abroad. The Review's final report was published on 10 July 2008.

1.9 Both the Innovation in Services project and the Review of the Public Services Industry share an emphasis on identifying where and how Government should intervene in support of performance and growth in service businesses.

1.10 Over the past twelve months there has been a growing interest in services innovation. The CBI/QinetiQ partnership's project on innovation in UK service sector businesses has just reported[6]. This report focused on innovation, practices and culture in service businesses. Its findings, drawing on case studies, emphasised the roles of attitudes and leadership in driving innovation within businesses: specifically in developing cultures, structures and processes to facilitate innovation and develop customer trust and market differentiation. There is a strong resonance between the two reports.

4 Review of the Public Services Industry, http://www.berr.gov.uk/about/economics-statistics/economics-directorate/page46937.html

5 The Review defined the Public Service Industry for its purposes as "All private and third sector enterprises that provide services to the public on behalf of Government or to the Government itself".

6 "Excellence in service innovation", CBI/QinetiQ, July 2008, http://www.cbi.org.uk/ndbs/press.nsf/0363c1f07c6ca12a8025671c00381cc7/3ac2dcd67d53fff180257478003241e4?OpenDocument

Chapter 2
Productivity in services

Summary

This project's work elaborates further the Government's analysis of productivity in the economy and its development of policy. This section provides a brief overview of the differences in service productivity between the UK and the USA and confirms the importance of the sectors which this project has studied.

2.1 A major goal of promoting innovation is to improve productivity and business performance. It is important therefore to consider the project's work in the wider context of the economic analysis of productivity funded and undertaken by BERR[7] [8], as part of the process of developing policy measures to address the difference in service productivity performance between the UK and the USA.

2.2 The OECD analysis of the productivity gap with the USA points to a number of key sectors as the bar charts below, drawn from the OECD report[9], illustrate. The difference can be explained in the main by four sectors: retail/wholesale, business services (which comprises a wide range of activities including real estate), manufacturing and financial intermediation. Transport and storage is only a small contributor to the gap while construction, according to this analysis, is an area of relative UK strength.

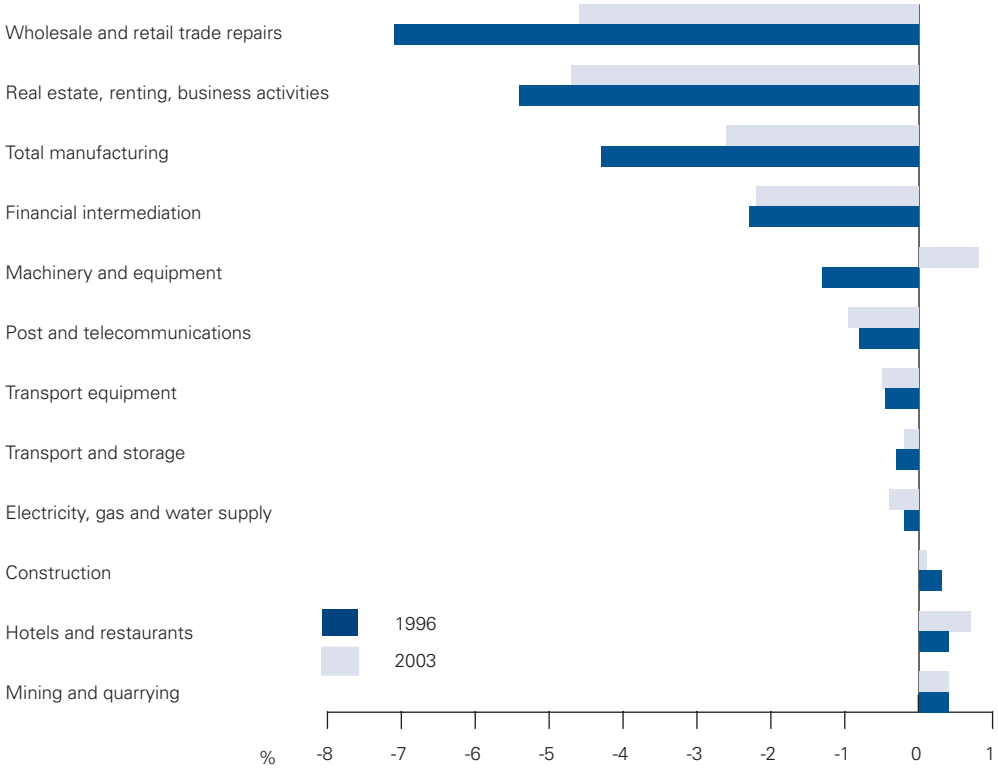
7 Cross-Country Productivity Performance at Sector Level: the UK Compared with the US, France and Germany by Geoff Mason et al, NIESR, published by BERR, as Occasional Paper No. 1, February 2008, http://www.berr.gov.uk/files/file44507.pdf

8 Productivity in the UK 7: Securing long-term prosperity, November 2007, http://www.hm-treasury.gov.uk/documents/enterprise_and_productivity/the_evidence/ent_prod7_index.cfm

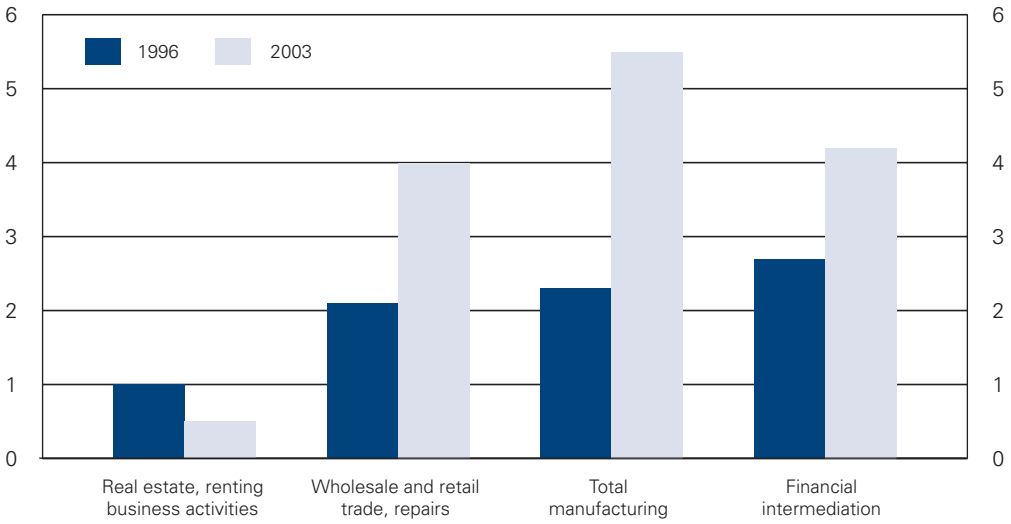
9 OECD Economic Surveys, United Kingdom, September 2007

Figures 2.1 and 2.2. Productivity gap relative to the United States (per cent)

Contribution to the overall productivity gap[1] in selected industries



Labour productivity growth per employee[2] in selected sectors (1995–2003)



1 Productivity measured as value added per employee, coverted to US dollers using2000 purchasing poer pariries and weighted by employmet share.

2 Using current purchasing power parities.

Source: Calculations based on the OECD (2006), Structural Analysis (STAN) database, www.oed.org/sti/stan
StatLink http://dx.doi.org/10.1787/116364431428

2.3 Researchers at the National Institute of Economic and Social Research (NIESR)[10] have undertaken a more detailed analysis of sectors and the analysis confirms the relative strength of US labour productivity in the sectors under consideration. In contrast to the OECD results, NIESR estimates suggest US labour productivity in construction to be some 30% higher. With the interesting exception of architects services, total factor productivity – the ability to harness inputs, such as labour, ICT and other forms of capital – explains a high proportion of the difference in labour productivity performance across these sectors; capital intensity and relative labour quality being the other factors analysed.

10 Op cit 7.

Chapter 3
Methodology and coverage

Summary

This project's approach has been to consult business to build analyses of the processes of innovation in a set of five service sectors: retail, logistics, internet content construction and environmental services. These were selected for their scale and importance in the economy (25% by gross value added) and their diverse market characteristics (which captures the heterogeneous nature of service sectors). Researchers, commissioned by NESTA, worked with sectoral business groups convened by BERR to develop analyses of the drivers of key sectoral innovations, the barriers to these, and considerations of the scope for Government intervention. These analyses were subject to wider validation; and augmented by consideration of the wider business and economic literature. They form the evidence for the project's recommendations and planned follow up.

3.1 The project approach has, of course, been informed by the two reports which launched this project, but also by studies undertaken by overseas counterparts, such as Tekes (Finland)[11] and Forfas (Ireland)[12] and the Fraunhofer Institute for Labour Economics and Organisation (IAO) at Stuttgart[13], and by a wide range of papers related to the key themes to emerge from our work. This international perspective has been supplemented in several ways:

- the DIUS international science & innovation network has provided a summary of policy developments in their countries (see Annex D);
- participation in international workshops; and
- a specifically commissioned study of innovative developments overseas in the construction industry, which has provided insights and a library of case studies to promote the dissemination of ideas to UK construction companies.

3.2 The Innovation in Services project's approach has been primarily business driven, through business-led Sector Innovation Groups. With one exception (logistics, where trade associations primarily led), these have included 6-12

11 Seizing the White Space: Innovative Service Concepts in the United States, March 2007
12 Services Innovation in Ireland – Options for Innovation Policy, September 2006
13 Research in the Services Sector by Walter Ganz, July 2005

companies. The fundamental aim has been to encourage business to advise us on the four main questions around which this report is structured, namely:

- the drivers of change;
- the way innovation has developed and how it might be measured;
- the barriers to innovation; and
- the scope for effective Government intervention.

3.3 Research teams commissioned by NESTA worked with each of these groups. Five sector specific reports were prepared[14]. The reports were subsequently validated with a wider business community.

3.4 To develop the project's insights into service innovation, and to focus its work to deliver this report, five sectors were selected on the basis of the following criteria:

- Size and importance of the sector to the economy;
- linkage between the sectors to help our understanding of value chains;
- the potential for Government intervention, over and above support for technology development; and
- the quality of our contact with sectors.

3.5 As a result, the following were chosen:

- Retail
- Logistics
- Construction
- Environmental services
- Internet delivered content services.

14 Four of these five reports were written by the researchers. The construction services report was prepared by BERR's construction unit. It was informed by the SIG and then agreed with the Strategic Forum for Construction, which brings together umbrella bodies representing the trade associations in the industry.

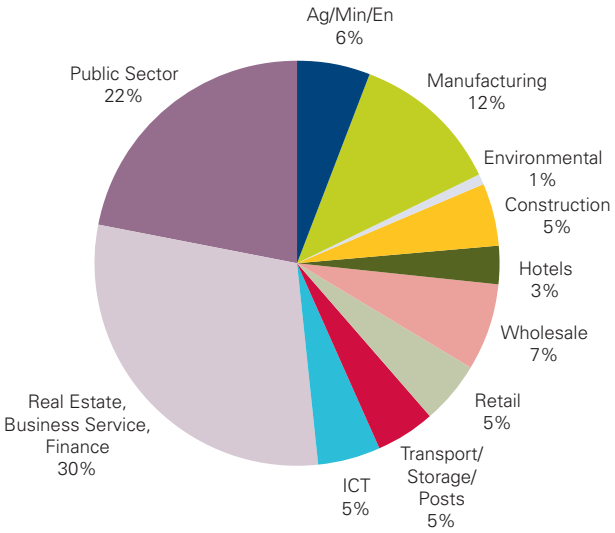
3.6 This has provided a wide range of experience:

Table 3.1. Service sector market characteristics

Market characteristic	High	Low
Average Value added per head	Internet Services Environmental consulting	Retail Logistics
Growth and new entry	Internet services	Construction Retail
Regulation	Environmental services Construction	Internet services
Market dominance	Retail supermarkets	Logistics Internet services

3.7 The pie charts below show their importance to the economy in terms of gross value added and employment. Wholesale/retail, construction, transport/logistics (minus the communications element), environmental services and internet services together account for around 25% of UK GVA and for a similar proportion of people employed. Internet content services are hard to define for the purposes of official statistics and are included here, but cannot be shown separately.

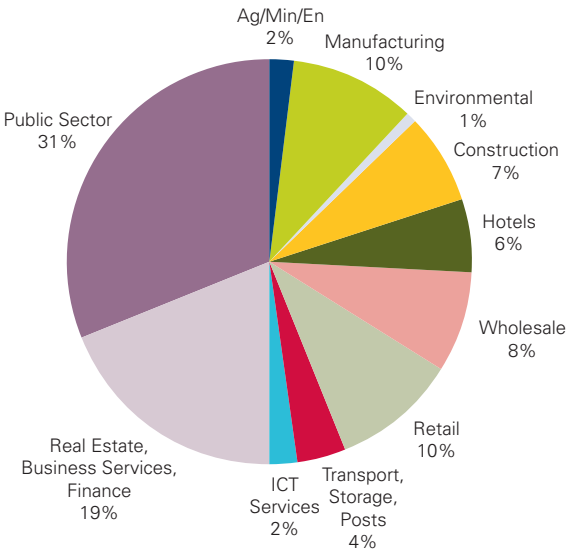
Figure 3.1. UK sector gross value added 2006



Source: Office of National Statistics National Estimates 2006: industrial analyses at current basic prices and Annual Business Enquiry for two digit SIC and below.[15]

15 http://www.statistics.gov.uk/downloads/theme_economy/Blue_Book_2007_web.pdf

Figure 3.2 UK sector employment 2006



Source: Office for National Statistics, Blue Book 2007 and Annual Business Inquiry for two digit SIC and below

Notes for Figures 2.1 and 2.2:

i) Environmental Services comprises recycling (SIC 37) and Waste services (SIC90)

ii) ICT (Information Communication Technology) comprises computer and related activities (SIC 72) and Telecommunications (SIC 64.2)

iii) Public Sector comprises: SIC section L Public Administration and Defence; SIC section M Education: SIC section N: Health and Social Work (including private sector provision); SIC Section O: Other Community Social and Personal Service Activities, *which include some private sector activities*.

3.8 As noted above, the process has been business-led and the table below sets out the chairmen and researchers for each Sector Innovation Group:

Table 3.2. Chairmen and researchers to the Sector Innovation Groups

Construction:	Michael Murray, Managing Director, Skanska Professor Peter Barrett, Salford University Richard Saxon, Consultancy for the Built Environment
Retail:	Dr Kevin Hawkins, Director General, BRC Dr Jonathan Reynolds, Latchezar Hristov, Said Business School, Oxford
Logistics:	Ian Cramb, Business Development Director, DHL Dr Carlos Mena, Martin Christopher, Mark Johnson, Fu Jia Cranfield School of Management
Environmental Services:	Peter Jones, Director, Biffa Professor Peter James, Jonathan Selwyn, Simon Chiva, Gareth Jones, UK Centre for Economic and Environmental Development (UKCEED)
Internet Services:	David Worlock, Research Director, Outsell Inc Kirstie Keeling, Associate Researcher, Outsell Inc

3.9 The participants in the five Sector Innovation Groups are listed at Annex A. To ensure consistency to the outcomes of the five work streams, we developed a common analytical approach, which is described in Annex B.

3.10 Finally, this project on service innovation has been used by BERR as an opportunity to innovate itself, in terms of its contact and engagement with business. In two areas, internet services and environmental services, BERR piloted a Web 2.0 platform to make available background papers, to prepare initial findings, to obtain feedback from the Sector Innovation Groups and wider validation.

Chapter 4

Drivers of change in service innovation

Summary

This chapter considers the main external drivers which seem to be influencing service innovation by businesses. It draws on the project's analysis of its five service sectors, plus wider research. The evidence suggests the main drivers to be information and communications technology, which is changing business operations and fundamental business models; the growing empowerment of consumers, which forces service providers to innovate to retain their distinctive "edge"; the increasing influence of sustainability, particularly in terms of resource efficiency; and public procurement, including Government policy moves to increase private sector involvement in public service delivery.

Introduction

4.1 As the earlier DTI report on innovation in services indicated, the boundaries between manufacturing and services are becoming increasingly blurred and there are significant interdependencies between the infrastructure, products and services which are provided to meet the needs of consumers. In effect, the productive sector of the economy can be considered, not so much as the sum of completely independent manufacturing and services operations, but as a series of interconnected value chains or networks, many operating on a global scale, comprising design, assembly or aggregation of intermediate goods and services, marketing and distribution, and a range of financing and after-sales services which ultimately provide the consumer with the experience he or she is expecting from the purchase.

4.2 A combination of technology and skills development in low cost regions of the world, together with a steady reduction in tariffs brought about by the GATT/WTO, has resulted in radical changes to the structure and composition of these value chains, in particular a degree of specialisation of labour not experienced hitherto.

4.3 This has resulted in a move from highly integrated business models to greater fragmentation, a focus on core competences and the outsourcing of specific tasks, not only in the manufacture of products but also in the service elements. This fragmentation has brought about both challenges and rich opportunities. The challenges stem from the lack of consistency and continuity in information in a highly fragmented value chain, particularly where services relate to an asset

which needs servicing over a very long period e.g. buildings and infrastructure, aircraft and ships. The opportunities lie in the ability of enterprising organisations to bring new ideas and solutions into an environment which is far more open than before. It is therefore important to ensure that markets stay as open and flexible as possible, not least because a high proportion of innovation derives from new firms entering a market.

The drivers of change

4.4 The project has identified the external drivers of change for service innovations in its targeted sectors using a PESTLE (Political, Economic, Social, Technological, Legal and Environmental) analysis. Each of the sector research reports used this approach. This chapter synthesises conclusions. Inevitably, a wide range of factors impacted upon the different markets, according to their varying natures, but the project identified the following factors as the most important drivers of change:

ICT is the key technological driver (and it is also a key enabler of change): the growth of broadband usage, in particular, is transforming service processes and business models;

Increasing power of consumers: consumers are being empowered as never before by access to information, the ability to compare prices and share widely their experience, and businesses need to ensure their service offerings have distinctive characteristics to meet rising customer expectations;

Globalisation is creating opportunities for logistics organisations and knowledge based services as well as posing threats to lower skilled "back office" services;

Resource efficiency: Concerns about the environment, reflected in legislation and regulations, and rising material prices are encouraging innovative approaches in all the sectors examined in this report; and

Impact of the public sector, including public procurement and changes in the models of public service delivery which are increasing private sector involvement and promoting innovation.

4.5 The following paragraphs, 4.6-4.25, discuss these drivers in turn.

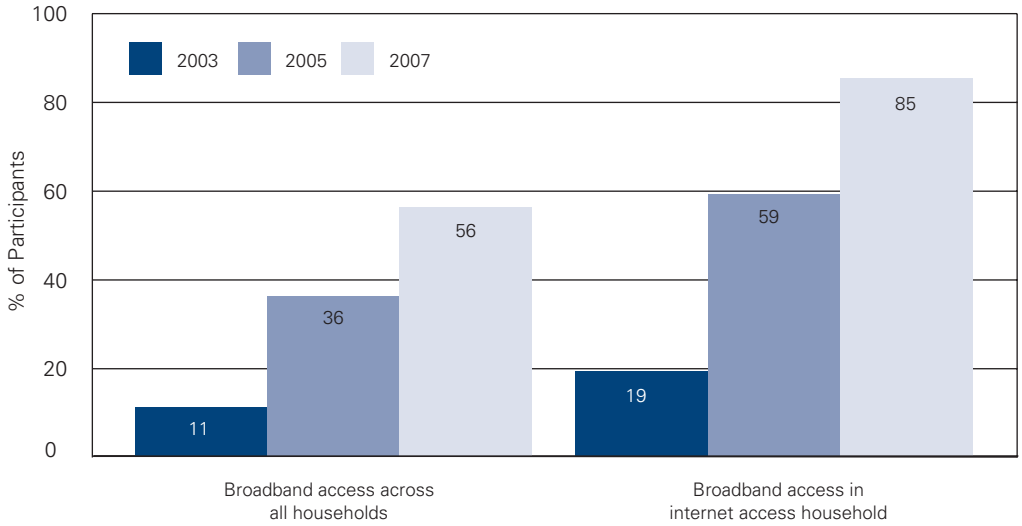
ICT as the key technological driver

4.6 The growth of the internet and the widespread availability of broadband, in particular, have brought about a paradigm shift in service development and delivery. According to a recent survey by the Oxford Internet Institute[16], only one third of the population had access to the internet in 2000, compared with two thirds today. In 2000 only 11% of households had access to broadband

16 The Internet in Britain 2007 by Prof William Dutton and Ellen Helsper, http://www.oii.ox.ac.uk/microsites/oxis/publications.cfm

compared with over 50% in 2007. This compares favourably with other countries, with the exception of South Korea and the Netherlands where broadband access is around 90% and 75% respectively. Developments in connection speed permit more advanced applications and the importance of this issue is reflected in Ofcom's recent consultation[17] on the approach to next generation access. BERR has launched an independent review to look at how Government can help pave the way for the UK move to next generation broadband, including considering possible barriers to investment in new infrastructure.[18]

Figure 4.1. Broadband access in UK households



Source: Oxford Internet Survey 2007 Report, The Internet in Britain, Dutton & Helsper, 2007

4.7 The impact on the business world has been considerable. Internet based e-commerce increased by a further 29% between 2005 and 2006 to over £130 billion, compared with the growth of EDI and other ICT based e-commerce of around 10%. Twenty-seven per cent of the value of all purchases made by non-financial sector businesses were made over the internet or other information and communication technologies during 2006.[19] Large businesses have led the way in broadband take up: nearly 99% of UK businesses with 1,000 or more employees had broadband connections by 2006, compared to 70% of those with 10-49 employees. Our study of internet information and solution services illustrates the pace of change. For example, the ability to embed web based tools into business processes – so that the right information automatically becomes available – has become an important driver of innovation in a wide range of applications from construction, where intelligent object modelling and design is transforming the time from concept to commission and construction, to business services such as compliance. The Complinet case

17 Future broadband, September 2007, Ofcom, http://www.ofcom.org.uk/consult/condocs/nga/

18 http://nds.coi.gov.uk/environment/fullDetail.asp?ReleaseID=354760&NewsAreaID=2&NavigatedFromDepartment=True

19 2006 e-commerce survey of business, ONS, http://www.statistics.gov.uk/downloads/theme_economy/ecommerce_report_2006.pdf

study below provides an example of the latter, in the context of financial services. However, according to the ONS 2006 Survey of e-commerce, there remains a considerable disparity across the broader economy between small and large firms in the extent to which ICT is embedded in their business processes, which we describe further in Chapter 7.

4.8 The recent growth of interactive social networks, such as FaceBook and MySpace has brought a new dimension to the internet (Web 2.0). Commentators are already anticipating the move to Web 3.0 and semantic databases and search, assisted by the development of grid, or networked computing, technologies[20]. Provided these developments take place in the context of open systems and "interoperable" standards, i.e. standards which enable information to be used for different purposes in the value chain automatically without further manual intervention, then these developments will provide a fresh impetus to competition and the flexibility of markets, as the entry barriers to innovative SMEs – regardless of location – are reduced even further.

CASE STUDY

Complinet driving analysis and workflow integration

Complinet is a leading provider of connected risk and compliance solutions to the global financial services community. It has grown rapidly since its foundation in 1997 and now employs over 200 people in London, New York, Sydney and Dubai.

Complinet's connected approach is unique. All its content is connected by taxonomies developed by regulatory experts. The taxonomies structure contextualizes and connects content, creating order out of chaos. The content and support mechanisms (such as training, e-learning and a wide-range of online solutions) go hand-in-hand to improve decision making and compliance - significantly reducing their client's exposure to risk. This approach allows clients to create a relationship between all external regulatory change and the internal systems that are in place to control them.

With over 100,000 Compliance professionals using the Complinet system every day, the company is successful in building and bringing together an industry founded on best practice, meaningful collaboration and diverse communication options (from events/forums to dedicated message boards). It has a global reach providing all its clients with the ability to comply with confidence, making informed decisions and communicate them to their internal and external teams, and their partners around the world.

http://www.complinet.com/connected/

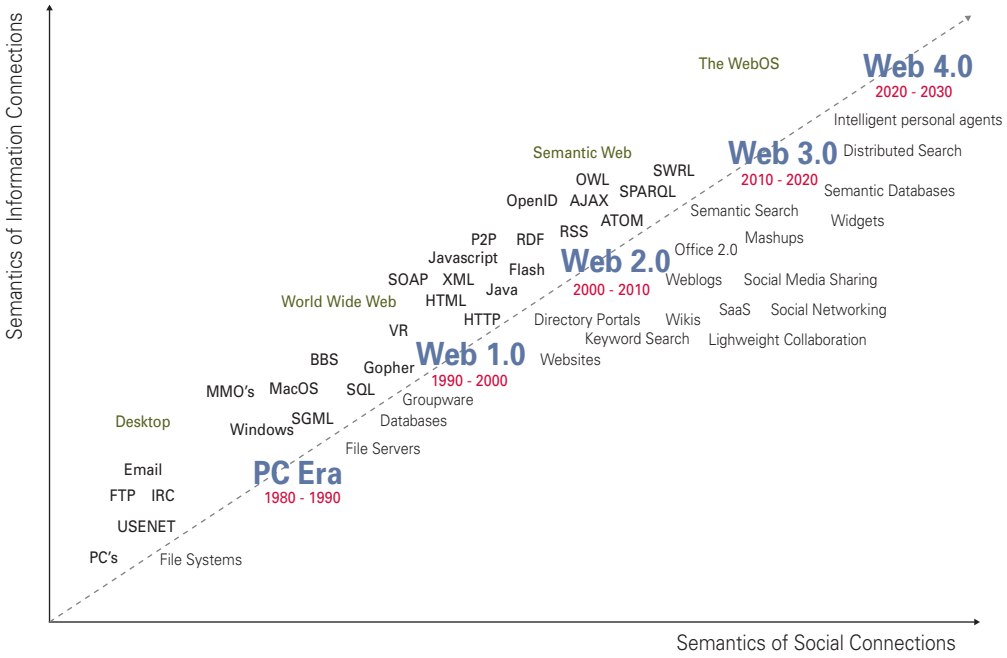
4.9 The UK is well placed to capitalise on future developments. EPSRC has funded a £7.5 million programme in advanced knowledge technologies which involved a range of universities including Edinburgh, Southampton and the Open

20 Times Online 24 October 2007

University[21]. It has also recently funded a research cluster involving Imperial, Oxford and Southampton, "Agenda for the Next-generation Internet". Furthermore, this knowledge is being transferred to the business community, not least via collaborative research projects funded through the Technology Strategy Board. For example, a consortium comprising firms from a wide range of sectors of the economy – manufacturing, banking, insurance, logistics and utilities – is drawing on the academic research relating to the semantic web for commercial purposes.

4.10 As noted above, technology is underpinning and enabling widespread change. For example, the ability to develop ideas in the form of increasingly complex, interactive computer simulation models is a new driver of innovation in construction.

Figure 4.2. Growth of information networks



Source: Radar Networks & Nova Spivack 2007 – www.radarnetworks.com

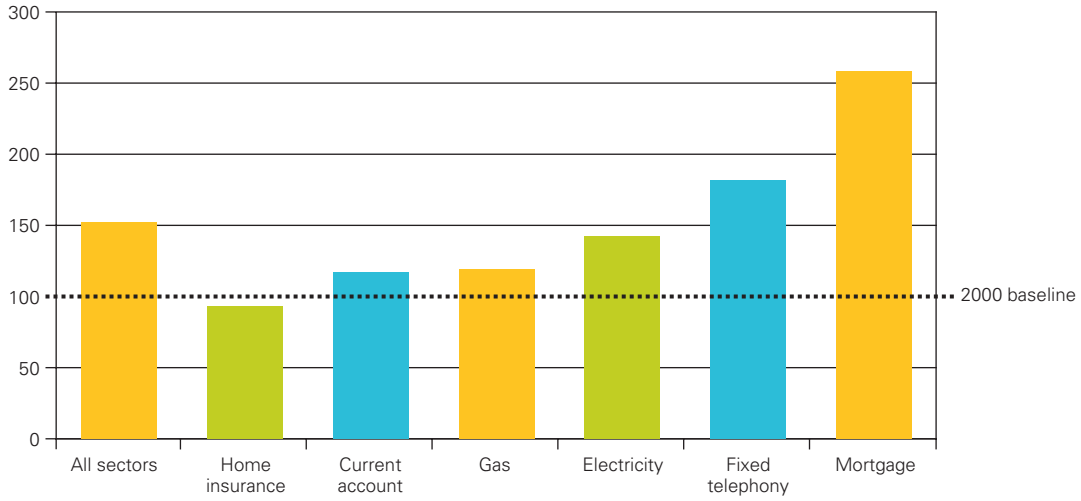
This is also true for retail, logistics and environmental services where modelling, together with the ability to track and trace goods in transit, through radio frequency identification tags (RFID) tags, is having a significant impact. As the need to design-in re-use increases, further developments in component identification and intelligent and sustainable packaging will improve the sustainability of the production and distribution value chain. Similarly, further developments in sensor technology and sensor systems will transform facilities management in the construction industry, when buildings will develop an intelligence of their own and, hence, the capability to make the necessary adjustments to changes in weather conditions etc.

21 www.aktors.org

Increasing power of consumers

4.11 Perhaps the most important social driver of innovation is the growing expectation and power of consumers, and their willingness to exercise it in the form of purchasing decisions. The ability to compare prices and exchange information about quality and experience is a phenomenon of the internet age which has brought a new dynamic to markets. This has been recognised by the National Consumers Council[22] in the form of an analysis of consumers' willingness to change suppliers in core markets. As the table below illustrates, there has been an 82% increase in the willingness of consumers to switch their fixed telephone supplier, a 158% increase in the willingness to switch mortgage lenders and a 52% increase overall between 2000 to 2005.

Figure 4.3. National Consumer Council active consumer index



Source: NCC Active Consumer Index December 2005

4.12 The power of the customer is also reflected in SME behaviour towards Broadband suppliers. Notwithstanding high levels of satisfaction among SMEs, more than a quarter have switched their broadband connection[23].

4.13 Successful businesses select the ideas which anticipate consumer demand in a timely manner and develop/scale up the concept in a way which provides consumers with the right quality/price/value proposition, relative to the competition. It is this focus on customers and ensuring that each customer has a positive experience which is central to success.[24] [25] Because of the ability of competitors in the service sectors to replicate quickly, the truly innovative firms are those which are continually trying to distinguish their service offerings better to meet rising consumer expectations. It is this rolling effort of ideas

22 The NCC Active Consumer Index, Dec 2005

23 The Communications Market: Broadband Digital Progress Report, April 2007, Ofcom, http://www.ofcom.org.uk/research/cm/broadband_rpt/

24 Chris Voss and Leonieke Zommerdijk "Innovation in Experiential Services – An empirical view" DTI Occasional Paper No 9 June 2007

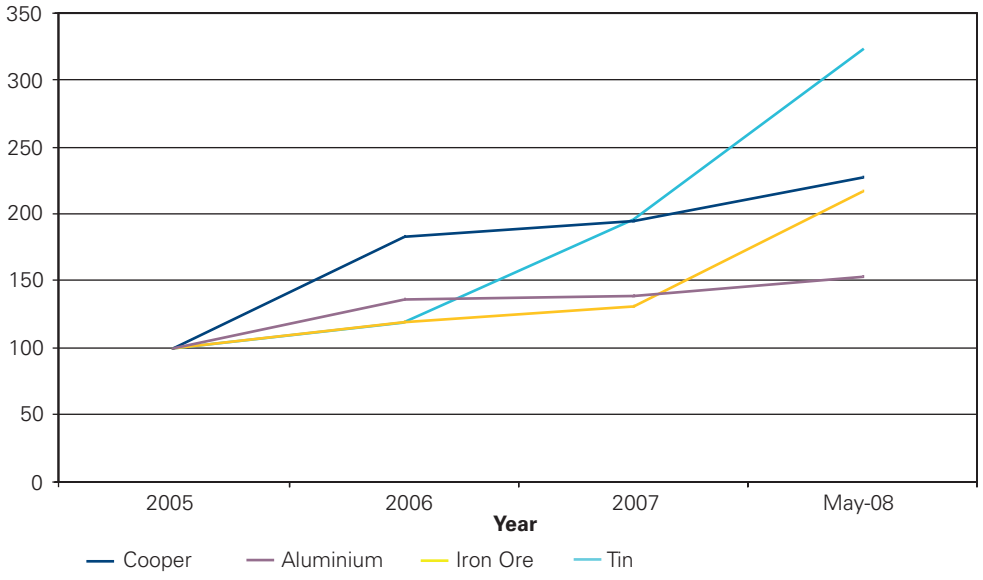
25 Op cit 3

generation, selection and the ability to scale up to market exploitation quickly and secure brand recognition, which requires considerable management skill and financial resource – a process which is increasingly being developed in a more open environment. In the market for culture and leisure services, customer demand is often transitory, even "spur of the moment", so that failure to satisfy need may not only result in an immediate missed opportunity but, more importantly, the loss of customer goodwill to another supplier who can fulfil the request.

Globalisation:

4.14 The growth of developing countries such as the BRIC (Brazil, Russia, India, China) group has transformed global supply chains, including those related to services, and forced companies to innovate in order to remain competitive. It has sparked considerable growth in the logistics sector but has also given force to questions around sustainability: while the rising price of energy and projected CO_2 emissions from China have hit the headlines, the rising price of key raw materials (see figure below) has also helped to transform business perceptions about the value of waste and the commercial returns from recycling. This is of particular importance to two of our sectors: environmental services and logistics.

Figure 4.4. IMF metals commodity price index



4.15 To date the long period of relatively stable growth, prices and low cost of capital has provided business with a benign environment for innovation, but recent events in financial markets, together with imbalances in the US and UK economies, could impact upon innovation and risk in the short to medium the term.

Resource efficiency:

4.16 Another emerging trend is the growing influence of "green issues" as a driver of innovation. Climate change will alter the context in which business is done, e. Existing modes of resource use are unsustainable and the UK faces particular challenges in moving the emphasis of its waste management away from reliance on landfill.

Figure 4.5. Waste per UK household

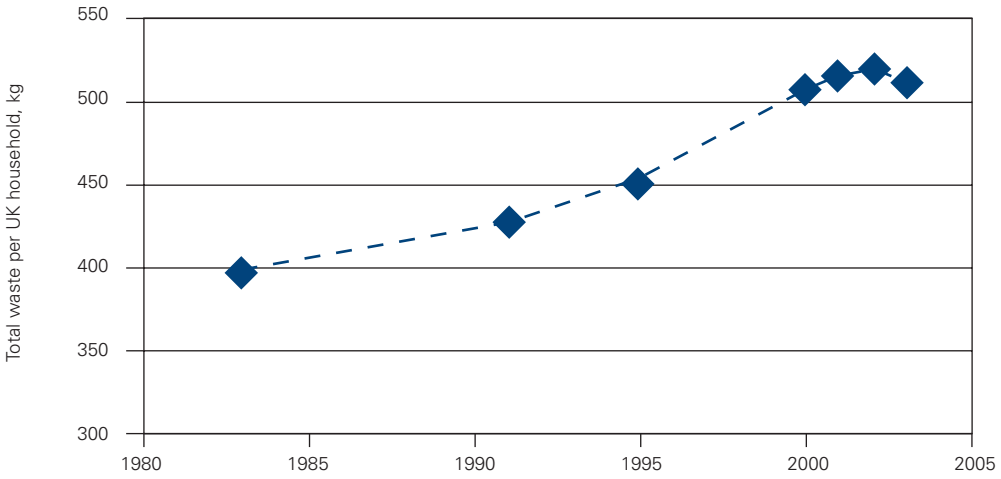
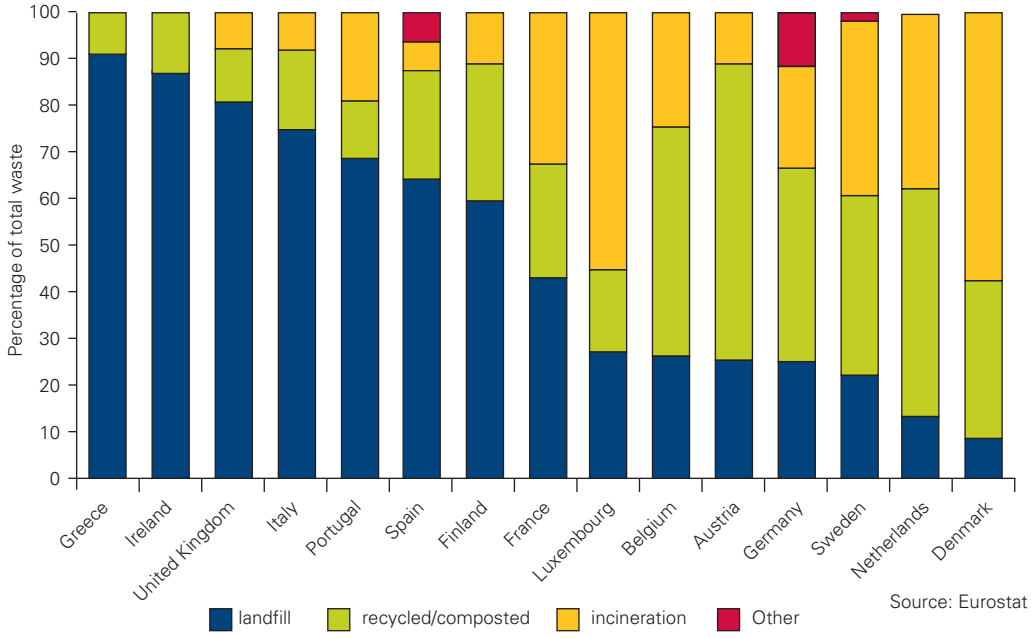


Figure 4.6. Municipal waste management in the European Union



4.17 The recent report from the Commission on Environmental Markets and Economic Performance and the Government's response to this, which are considered further in chapter 6,[26] highlighted the need for transition to a low carbon, resource efficient economy to meet the challenges of climate change and sustainability; and the threats and opportunities for business. Business recognises the need to "incorporate climate change policies into its DNA"[27] (CBI Climate Change Task Force's report).

4.18 Whether it is the highly tangible impact of rising energy and raw material prices on business costs, or the more intangible reputational issues around the impact of their activities on the environment, firms in all sectors are looking for innovative solutions to the challenges of sustainable resource use. For example, it is with pride that the 2012 Stadium is exceeding the target to recycle at least 90% of all demolition material on the site. Marks & Spencer plc has set aside £200 million over five years to promote sustainable and ethical projects; and the logistics industry is implementing a range of innovations, including improved planning, reverse logistics, low energy warehousing and low emission vehicles to minimise costs and reduce its carbon footprint.

4.19 Government too is seeking to play an active role, at national and local level. For example, the £9 billion cross Government investment in the Thames Gateway project aims, not only to achieve the economic regeneration of the eastern approach to London, but also to develop an "eco-region", establishing higher environmental standards, developing new technologies and reducing carbon emissions in existing homes as well as new ones.

4.20 A focus on sustainability requires firms to think systemically about the environmental impact of their activities, to measure and monitor the impact, and to weigh the costs and benefits of different approaches. ISO 14001 and the European Eco-management system are effective environment management systems. BSI British Standards, Carbon Trust and the Department for the Environment Food and Rural Affairs (Defra) are developing a Publicly Available Specification (PAS) for a method for measuring the embodied greenhouse gas emissions from goods and services. This will help communicate accurately businesses' positions to customers and others in the supply chain. We consider what steps Government might take to promote resource efficiency in chapter 6.

4.21 Traditionally legislation and policy from Government have driven compliance across business on sustainability and resource management and they have opened opportunities for environmental services. Traction has overwhelmingly come from legislation. This was strongly reflected by the project's environmental services Sector Innovation Group. There was a strong message about the importance of the Government giving clear long term policy direction and commitment in legislation ("long, loud and legal"). The body of environmental policies and legislation is significant and includes:

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26 Report of the Commission on Environmental Markets and Economic Performance, published November 2007, http://www.defra.gov.uk/environment/business/commission/pdf/cemep-report.pdf

27 CBI Climate Change Task Force's report "Climate Change: Everyone's Business", November 2007, http://www.avtclient.co.uk/climatereport/

- The headline existing national policy commitment on climate change emissions to reduce carbon dioxide emissions by 60% by 2050 (from 1990 levels). The draft Climate Change Bill defines intermediate steps[28].
- The EU emissions trading scheme[29] is a key market-based mechanism requiring certain business installations to meet mandatory emissions caps and trade allowances to comply. The proposed Carbon Reduction Commitment, announced in Energy White Paper 2007[30], would extend mandatory emissions trading to further large businesses.
- Renewable energy is an integral part of the Government's longer-term emissions reduction policy. A consultation on a renewable energy strategy was launched in June 2008 putting forward policies to drive up the use and deployment of renewable energy, to tackle climate change, to help towards UK security of energy supply and the EU 2020 target of 15 % energy from renewables.[31]
- On waste, the UK faces significant challenges and a need to invest in new waste infrastructure in response to the EU Landfill Directive, which sets demanding targets to reduce the amount of biodegradable municipal landfilled progressively in the years to come.
- The 2007 Waste Strategy[32] sets targets for progressive reductions in biodegradable municipal waste landfilled in England; and new recycling/composting targets for household waste of 40% by 2010, 45% by 2015 and 50% by 2020
- The landfill tax[33] escalator, standard rate currently £24 per tonne but due to rise by £8 per tonne per annum until 2010/11, is now rendering economic alternative waste management approaches to landfill
- The principle of "Producer Responsibility"[34] is applied in legislation in several specific waste streams, including packaging electrical/electronic equipment and end-of-life vehicles
- A national strategy for air quality[35] draws together various relevant policies. A new European air quality Directive has been under negotiation.
- The Pollution Prevention and Control regime[36] regulates environmental impacts of categories of installations operated by business e.g. industrial process industries.

28 Climate Change Bill, http://www.defra.gov.uk/Environment/climatechange/uk/legislation/index.htm
29 EU emissions trading scheme, http://www.defra.gov.uk/environment/climatechange/trading/index.htm
30 Energy White Paper 2007, http://www.berr.gov.uk/energy/whitepaper/page39534.html
31 UK Renewable Energy Strategy, http://www.berr.gov.uk/energy/sources/renewables/strategy/page43356.html
32 Waste Strategy for England 2007, http://www.defra.gov.uk/environment/waste/strategy/index.htm
33 Landfill tax, http://www.hm-treasury.gov.uk/Documents/Taxation_Work_and_Welfare/Tax_and_the_Environment/tax_environ_index.cfm
34 Producer Responsibility, http://www.defra.gov.uk/environment/waste/topics/producer-responsibility.htm
35 Air quality, http://www.defra.gov.uk/environment/airquality/strategy/index.htm
36 Pollution Prevention and Control, http://www.defra.gov.uk/environment/ppc/index.htm

Impact of the public sector:

4.22 Government spends around £150 billion a year on goods and services and the project's sectoral analyses reinforced the importance of public procurement as a driver of service innovation. Chapter 6 summarises the evidence from these sectors. For example, public procurement accounts for 40% of construction in the UK and the Government is active in promoting sharing of good practice across different parts of the public sector: BERR has developed a virtual network to help ensure Departments are aware of best private sector practice in offsite construction. The project's environmental services Sector Innovation Group emphasised the importance of addressing innovation in public sector procurement, referring to local authority procurement as the critical driver of waste management services. The recent Innovation Nation White Paper has committed DIUS to work with the Office of Government Commerce, the Technology Strategy Board and Government Departments to promote innovation through procurement and Budget 2008 announced plans for a centre of expertise in sustainable procurement.

4.23 The Review of Public Services Industry (see paragraphs 1.8-1.9) identified four key Government policies which have supported growth of private and third sector provision of public services: (i) emphasis on contestability, initially through the compulsory tendering approach; (ii) the role of employment policies like TUPE in facilitating transfers of workers from public to private sector; (iii) the move from strictly lower cost to more general "value for money" criteria in procurement; and (iv) the use of the Private Finance Initiative (PFI) model, which was primarily used for attracting private sector finance and expertise to procure long-lived infrastructure assets, but is now being used to procure bundles of interrelated goods and services.

4.24 Discussions with the project's Sector Innovation Groups tended to focus on the last of these factors. They emphasised as a significant driver of innovation the trend towards outsourcing public services to the private sector via the PFI mechanism. Use of PFI contracts[37] has transformed the whole business model around infrastructure projects from the procurement of an asset into one of procurement of services over many years. Where implemented effectively, PFI has accelerated innovation. The Government has developed PFI in the light of operational experience. For example, the waste sector has been an area where progress in the provision of PFI projects has been slow. Projects have experienced planning problems relating to facility construction, a constrained market of bidders for end-to-end services (encompassing collection, treatment and disposal) and affordability pressures relating to the costs of disposal. However Defra has moved to address these issues by improving the quality of local authority business cases, increasing engagement with the market and encouraging interest amongst private sector funders and contractors. The 2007 Waste Strategy[38] also addresses key issues in relation to the need to develop

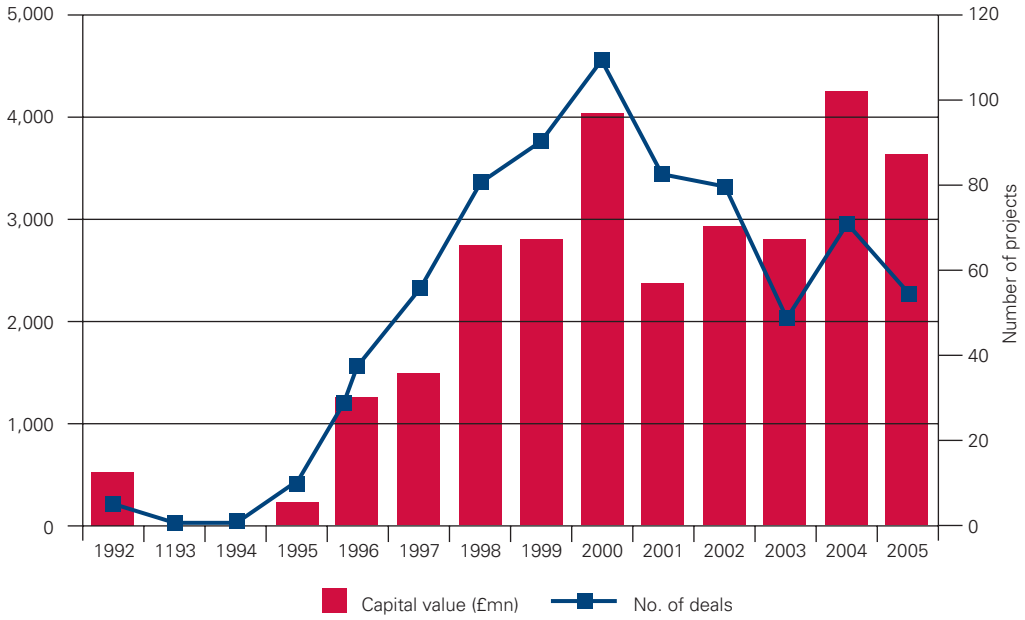
37 Private Finance Initiative: Strengthening long term partnerships HMT March 2006, http://www.hm-treasury.gov.uk/media/7/F/bud06_pfi_618.pdf

38 Waste Strategy for England 2007, http://www.defra.gov.uk/environment/waste/strategy/index.htm

waste infrastructure. The illustrative charts below are drawn from the Treasury's PFI report.

4.25 The SIG groups' perspective on public procurement, including where they saw scope for Government to intervene to ensure stronger support for innovation, are explored further in chapter 6. The findings chime with the analysis of the Review of Public Services Industry, e.g. concerns that local authority contracting for waste management could be less prescriptive and more outcomes-based to foster innovative solutions.

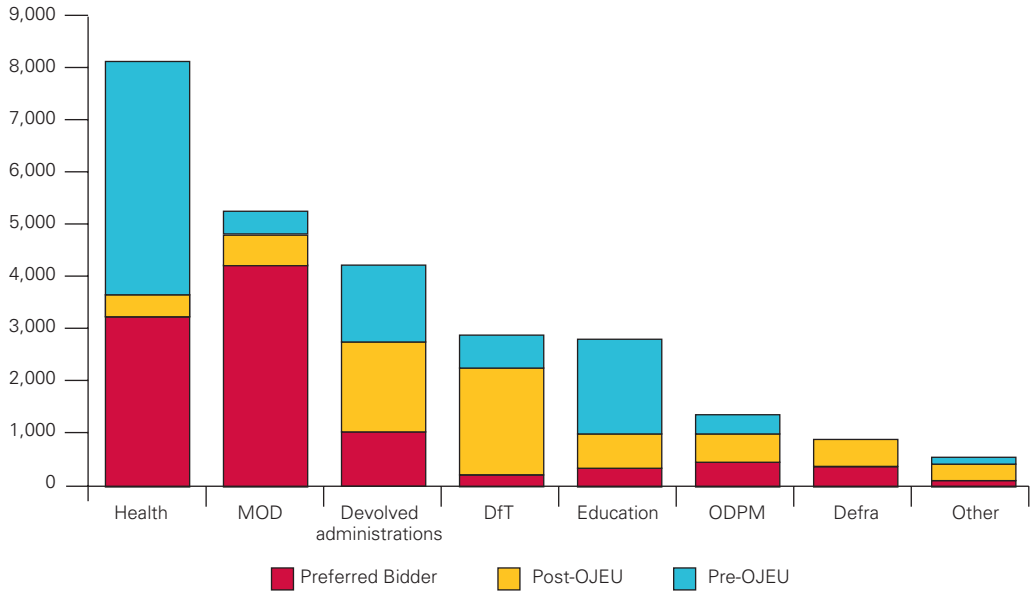
Figure 4.7. Number and value of PFI projects by year



Note: Excludes London Underground PPP contracts

Source: "PFI: Strengthening long-term partnerships", HM Treasury, March 2006, http://www.hm-treasury.gov.uk/media/7/F/bud06_pfi_618.pdf

Figure 4.8. Deal pipeline by sector department



Source: "PFI: Strengthening long-term partnerships", HM Treasury, March 2006, http://www.hm-treasury.gov.uk/media/7/F/bud06_pfi_618.pdf

Chapter 5

Trends in innovation in services

Summary

This chapter reports trends in innovation evident from the project's analysis of service sectors.

It considers **the definition of innovation in services**. It helps understanding of service innovation to look at whether this occurs in process, service offering, mode of delivery or new financial or business models. Examples drawn from the project's service sectors illustrate this.

Two key **generic trends in service innovation** are evident from this enquiry:

- the move from the concept of sequential value chains, particularly in digital services, to their more simultaneous integration through more loosely configured value networks; and
- convergence between traditional manufacturing and services as manufacturing firms seek to create a "service wrapper" around their products and focus on customers' needs and usage of the asset.

Measurement of performance in services is considered. The project's analysis of service sectors confirms that their innovation is less likely to be the product of formal R&D, than to come from a close connection with customers and the wider supply chain. Service providers track customer satisfaction, experience and behaviour in order to determine the development of services and potential for innovation. They tend to focus on business outcomes to measure their own performance, but recognise that innovation and business performance are critically influenced by:

- having the information readily available about customer preferences, developments in the value chain, and their own business performance in order to capitalise on opportunities and respond to threats;
- having skills in both management and workforce to respond effectively to market opportunities and threats; and
- the need to work within a business model/framework based on quality, which encourages innovation.

Definition of innovation in services

5.1 The importance of innovation to business performance is widely recognised but also subject to a wide range of definitions and interpretations. One of the first steps taken by the US Advisory Committee on Measuring Innovation in the 21st Century Economy[39] (appointed by the Secretary of Commerce in September 2006) was to define what it had been tasked to measure. Its definition of innovation is as follows:

The design, invention, development, and/or implementation of new or altered products, services, processes, systems, organisational structures or business models for the purpose of creating new value for customers and financial returns for the firm.

5.2 The UK Government has consistently used "the successful exploitation of new ideas" as it applies to products, services, business processes and models, marketing and enabling technologies[40].

5.3 Both of these are all-embracing definitions of a process which can be highly complex, and many commentators consider further analysis is needed. In particular, it is possible to draw a distinction between ideas generation in an organisation and the ability to scale up those ideas into a fully fledged new product or service. For example, the traditional view of innovation in a hi-tech manufacturing environment emphasises the role of R&D in developing the knowledge of how to develop new products, which can often be protected by a patent. In the service economy the process of ideas development is far less likely to be the product of formal R&D and much more usually derives from a close connection with customers and the wider supply chain. The scope for protection of new ideas is considerably reduced; indeed, a feature of the service sectors is the speed with which new ideas are adopted and adapted by competitors. But in both cases – product manufacture or services – the key to business success is in selecting the ideas which anticipate consumer demand in a timely manner and then scaling up the concept in a way which provides consumers with the right quality/price/value proposition, relative to the competition.

5.4 New ideas can relate to different parts of service development and delivery and so, to disentangle the complexity of the innovation process in services, the Tekes, Forfas, Fraunhofer and DTI studies developed typologies and models. In developing our understanding of innovation we have considered these models and sought to apply them to the main developments in the sectors under examination. The Tekes[41] approach (carried out by Peer Insight LLC and based on the work of Larry Keeley, President of Chicago-based consultancy Doblin Inc.), identifies the potential for ten types of innovation, under four broad headings:

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39 Innovation Measurement. Tracking the State of Innovation in the American Economy January 2008

40 Innovation Nation (para 1.7) March 2008 Cm 7345

41 Tekes Op cit 3.

Process: the firm's proprietary processes and organisation to support innovation, influenced considerably by the sophistication of the organisation's ICT infrastructure and its ability to capitalise on it;

Offering: the service system, relationship with customers and improvements to performance;

Delivery: channels for delivery, branding and customer experience;

Finance: the business model and its links to the value chain

5.5 Table 5.1 summarises the application of this typology to the main innovations which have occurred in companies which are in the five sectors.

Table 5.1. Examples of service sector innovation

Sector	Process	Offering	Delivery	Finance & business model
Retail	Customer analysis & targeted marketing Track & trace (RFID) Automated stock control& purchasing	Choice, variety, value & quality Sustainable products buildings & services	Multi-channel [shop + "e" + catalogue]	Financial services Property services "Manufacture without factories"
Logistics	Warehouse automation Transport modelling/ management Telematics/RFID Digital administration	Value added services e.g. labelling, co-packaging Green logistics	Global capability	Joint ventures Fourth party logistics Alliances/shared services
Construction	Supply chain integration (Including BIM)	Sustainable buildings Design build offerings Multi-discipline services Off site construction	Client participation Outcomes based design	Construct and manage
Environmental Services	Recycling processes 3D Modelling	Holistic approaches Bundled services Compliance services	On-line services (product recycling advice & producer responsibility calculator)	Waste brokerage
Internet Services	Search/Matching tools	Info/Solutions embedded in work processes Tailored information	Job boards	Virtual companies Software as a service

5.6 The table shows a wide range of innovative activity across the sectors but also a high degree of commonality. Concerns about sustainability have been a key factor in driving the development of new offerings across a wide range of sectors and the quality of the customer experience has been a major focus of attention in retail innovation, internet services and construction, where the design of buildings now takes account of fundamental parameters, such as quality of light and space, in determining specific outcomes for which the building is designed e.g. education[42]. The following case studies, along with others elsewhere in this report, exemplify some of the modes of innovation identified in Table 5.1.

CASE STUDY

Modern methods of construction: Lemon Tree House

Lemon Tree House is a new-build housing development on a brownfield site in Tower Hamlets, London. The development (a seven-storey block around a central courtyard) comprises 49 flats and three ground-floor retail units for William Sutton Homes. Avebury International acted as the constructor and designer on the project with an off-site solution provided by WAVE.

The large number of constraints on the site meant that it would have been difficult to use traditional methods of construction – close proximity to several underground lines and main roads, lack of space on site, virtually no storage space, and a neighbouring school requiring restrictions on noise and working hours.

The response was to use a timber panel off-site construction system. A 'just-in-time' MMC (modern methods of construction) delivery, including off-site manufacturing solutions was essential. MMC also involved quicker construction times than traditional methods. At the height of the work, one floor was being erected each week. The WAVE solution, in combination with Avebury's innovative procurement and extensive knowledge of MMC construction, resulted in the development being delivered for an affordable cost: an independent analysis stated costs were in the lowest quartile of the lowest quarter for projects of a similar scale. The flexibility of the system allowed compliance with the pre-existing planning permission for the site.

As the decision to use an MMC solution was taken at an early stage it was not necessary to make major changes to the project process, although some changes were made to the sequencing of the work, and scheduling was constantly monitored and amended due to the speed of the construction process. An integrated approach to supply was adopted, and there was also a far greater need for communication across all parts of the project team. The handling of materials on-site also needed attention to ensure that site staff were trained in the use of MMC.[43]

42 Prof Peter Barrett, "International examples of service-driven innovation in construction" IiS Project Nov 2007, www.nesta.org.uk/understanding-innovation/

43 Constructing Excellence Demonstration Programme, http://www.constructingexcellence.org.uk/default.jsp

CASE STUDY

Multichannel delivery in retail: Hotel Chocolat

"British chocolate has been a joke for quite a while. We are at the forefront of its resurgence" (Angus Thirlwell, co-founder). Hotel Chocolat has exploited a vacant niche within UK retailing for authentic, high quality British-made chocolate. Hotel Chocolat was founded as a catalogue business in 1993. Its first store did not open until 2004. It now operates a corporate gifts service and a tasting club with 100,000 members, in addition to its website and 27 outlets in the UK, which generate £39 million in sales. It won Emerging Retailer of the Year award at the Retail Week Awards in 2007, as well as being nominated as a CoolBrand and plans international growth."[44]

44 http://www.hotelchocolat.co.uk/. Innovation in the UK Retail Sector, IiS, Reynolds and Hrestor, December 2007, http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/retail_report_NESTA.pdf

CASE STUDY

Process innovation in logistics: Marshalls Plc

Marshalls plc is the UK's leading manufacturer of superior, innovative hard landscaping products supplying the home improvement, construction and landscape markets. The company distributes its materials from 12 strategically positioned manufacturing and service centres throughout the country.

In 2004 Marshalls piloted a telematics solution from Cybit and later rolled it out to a fleet of 200 plus vehicles. This system has enabled the company to monitor its logistic operations in real time improving their already high standard of delivery efficiency by over 20 percent and allowing them to be more responsive to changes in the environment.

"If anything happens whilst our vehicles are operational – be it congestion to a delay at a customer's site – we are aware of the situation within a maximum of five minutes. This information then allows us to re-plan, re-prioritise and reschedule our delivery workload, to ensure we constantly meet our customers' needs; our own high standards of deliver efficiency and maintain our operations at maximum delivery output."

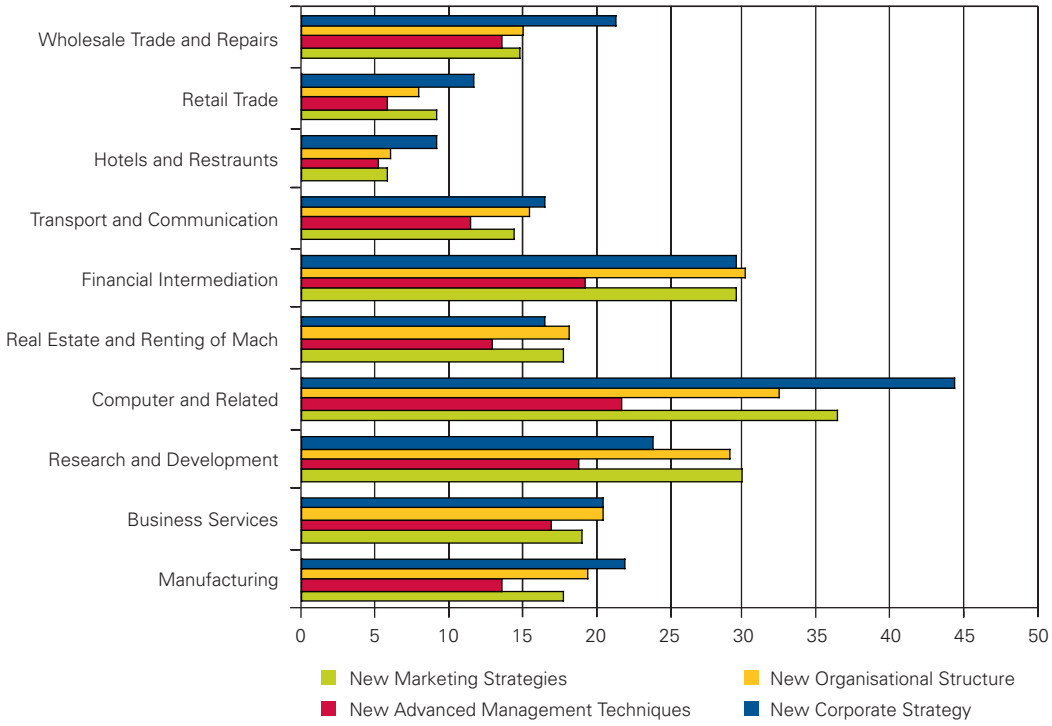
Stewart Potter, Group Logistics Director at Marshalls[45] [46]

45 http://www.marshalls.co.uk/

46 Innovation in Logistics Services, IiS, Mena, Christopher, Johnson and Jia, November 2007, http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/logistics_services_report_NESTA.pdf

5.7 The project's findings in relation to the nature of service sector innovation are very much corroborated by the findings of the UK contribution to the Community Innovation Survey (CIS4). Organisational and marketing innovation are clearly important to service sectors as the Table below shows:

Figure 5.1. Wider innovation by sector



Source: NESTA research report "Taking Services Seriously. How policy can stimulate the "hidden innovation" in the UK's service economy", Cambridge-MIT, May 2008. (Data from Community Innovation Survey 4).[47]

Two generic trends in service innovation

5.8 The report has identified two important trends:

- the speed of service composition in digital networks is resulting in a move from the concept of sequential value chains to more simultaneous integration of services through more loosely configured value networks and "ecosystems"; and
- a very real convergence between traditional manufacturing and services as manufacturing firms seek to create a "service wrapper" around their products and focus on customers' needs and use of the asset over its life.

47 http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/taking_services_seriously_report_NESTA.pdf

The move from value chains to value networks

5.9 Much innovation, particularly in business processes and in enabling new business models to emerge, has been generated or underpinned by technology, especially ICT. The ability to capture, analyse, match, manipulate and communicate instantaneously (and securely) ever increasing amounts of data has enabled innovation in the form of:

- Design, Modelling and Simulation of new products and services;
- Precise matching of information to users needs in real time;
- Systems intelligence in supply chains (including logistics) and buildings; and
- The growth of "virtual" companies, utterly reliant on the internet, to respond to customer needs.

5.10 The pace of innovation is largely in response to growing customer awareness and sophistication, and the low cost of identifying and transferring custom to alternative suppliers. For example, in the market for culture and leisure services, customer demand is often transitory, even "spur of the moment" so that failure to satisfy need may not only result in an immediate missed opportunity but, more importantly, the loss of customer goodwill to another supplier who can fulfil the request. As a result, management thinking[48] [49] is moving away from linear concepts such as global value chains, which tend to be based on a limited number of well established providers, operating in a "walled garden" with long lead times and limited offerings, to much more flexible arrangements to enable easy sign-up of providers, negotiation, real time service offerings and settlement against a clear service level agreement.

5.11 It is also engaging consumers and anticipating their needs through social networks, online discussion forums or other feedback mechanisms. In some areas, such as electronic publishing, it is directly involving the consumer in generating content and marketing the service offering. This is enabling continuous improvement in services and short lifespan services to develop, based on a network model. Where the service is linked to low cost, digital storage, service providers are able to offer highly segmented products to meet diverse customer needs and tastes (the "Long Tail" of service offerings) through a variety of delivery channels.

5.12 This process will continue apace. Grid computing, i.e. the ability to harness the diffuse computing power contained in a network of organisations, affords micro businesses the opportunity to combine their specific high value knowledge with massive computing power to provide solutions to the most complex of problems. This, together with the move from Web 2.0 to the semantic web, offers the prospect of a step change in open market access and, hence, innovation as the concept of autonomous digital "business ecosystems" becomes a reality. These have negligible costs of market entry, and service offerings are, to a significant

48 From Value Chain to Value Network: Insights for Mobile Operators, Peppard and Rylander, European Management Journal 2006

49 Reconfiguring the Value Network, Verna Allee, Journal of Business Strategy, 2000

extent, generated automatically. We are well on the way already, as the skill-set for the new innovative firm – large or small – is the ability to compose and recompose services rapidly, from a wide range of offerings, which meet more precisely customer needs. But there are significant potential barriers to these developments and we consider them in the following chapters.

Convergence between manufacturing and services

5.13 Developments in ICT and the internet have also enabled manufacturing firms to transform their own business models. For some firms, strong global competition in the manufacture of components, sub systems and final assembly is forcing them to consider their position in value chains and to move to areas of higher value. An example of this has been the migration of IBM from computer manufacturer to supplier of computing and business services. In other cases leading manufacturers are realising the full potential of their knowledge of the assets which they have manufactured and are able to lease and service those assets to the mutual benefit of the user and themselves. They have often been encouraged to do so by the changes in their users' business models: PFI in the case of Government procurement and, in the private sector, a greater focus on financing and service models by service providers, as service firms seek to focus more on their core competences and tie up less of their capital in assets or skilled staff outside their central business purpose. Examples of PFI include the recent EADS contract to provide aircraft refuelling services for the Royal Air Force – a contract which is worth £13 billion over 27 years and includes parts and maintenance, while affording the consortium the right to lease the aircraft to other users when the RAF does not require them.

5.14 Financing and service arrangements have been an important feature of the supply of major household appliances, and the automotive and office equipment industries for some time. Very often these services have been developed in collaboration with firms from the financial services sector. The concept has been extended to the more complex environment of aerospace with Rolls-Royce's "TotalCare" programme, which provides the operator with fixed engine maintenance costs over an extended period of time. More broadly, servicing arrangements have been extended to include the possibility of reconditioning and remanufacture.

5.15 A well known example of remanufacturing is that of photocopiers made by Rank-Xerox, whose closed loop "asset recovery" programme removes its old copying machines from the waste stream and processes these for resale. Another is Caterpillar – see box below.

CASE STUDY

Business model innovation: Caterpillar and remanufacture

Caterpillar's $1 billion turnover remanufacturing division is growing at a significant rate year on year and is inherently profitable alongside its other manufacturing operations. Caterpillar's Shrewsbury plant now processes thousands of "end of first life" car, truck, plant, rail and marine engines and parts a month. Approximately 40% of these were originally built by other companies. Achieving this scale has involved customer incentives for returning worn-out products, and many advanced – and in some cases patented – technologies, including software systems to detect metal tolerance, blasters to remove dirt and paint, and metal sprayers to provide millimetre thick coatings of chrome and nickel.

Caterpillar sees particularly attractive growth prospects in Europe. Regulation, such as the EU End of Life Vehicles Directive, is expected to increase the supply of raw materials. In addition to in-house remanufacturing, Caterpillar anticipates more work providing advice on – and in some cases management of (as it already does for Land Rover) – remanufacturing services in other companies. Such aspects include redesigning 'first life' products to enable remanufacturing –examples of this are the tolerance and dimensions of components at design allowing for further manufacturing processes at end of life.[50]

50 Caterpiller, http://www.cat.com; Report for Innovation in Services project: Innovation in Environmental Services, Peter James, Jonathan Selwyn, Simon Chiva, Gareth Jones, UK Centre for Economic and Environmental Development, December 2007, http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/environmental_services_report_NESTA.pdf

5.16 Knowledge of the original production process provides a potential competitive advantage to manufacturing firms offering users with a "cradle to grave" service. However, original manufacturers cannot assume that they have an unassailable position in relation to servicing assets and, where barriers to entry are low, attempts to capitalise on spare parts and services have been undermined by the development of specialist service offerings. For example, in the office equipment industry, a burgeoning independent refilling sector competes with the original manufacturers of office printers to provide cartridge refilling services; and, in the automotive industry, firms specialising in the simple tasks of refitting exhausts and tyres have gained a significant share of this particular market.

5.17 The drivers towards extension of product life via remanufacture or recycling are likely to intensify in the years to come through a combination of economic factors – increasing material costs, customer expectations, and legislative drivers, e.g. EU Producer Responsibility legislation and the implementation of specific measures to follow up the Directive establishing a framework for setting eco-design requirements for Energy Using Products (the EUP Directive)[51]. This will catch a much wider set of consumer product families as well as capturing generically-used industrial machinery. Businesses need to build these developments into their strategic thinking.

5.18 The ability to service assets efficiently over time ultimately revolves around the effective knowledge management of the asset, just as efficient service delivery revolves around knowledge management within the firm. This is particularly the case with very long life assets, such as aircraft, ships and civil engineering projects. With distributed global value chains, the importance of open, interoperable standards as the basis for organising the explicit knowledge about the asset, and developing "log books" to monitor performance over time, is recognised by leading players in all sectors as critical to the efficient servicing of assets. For example, in the USA, the importance of inter-operable standards in promoting improvements in productivity has been recognised by the National Institute of Standards and Technology (NIST) which researched a number of value chains. Its study of the lack of inter-operability in the US capital facilities industry in 2004[52], considered that a conservative estimate of the annual cost to be $15.8 billion. Of no less importance to business success is the development of a culture of service and sharing of the tacit knowledge within the firm and, where appropriate with partners, as the experience of servicing a range of assets grows.

Measuring innovation performance in services

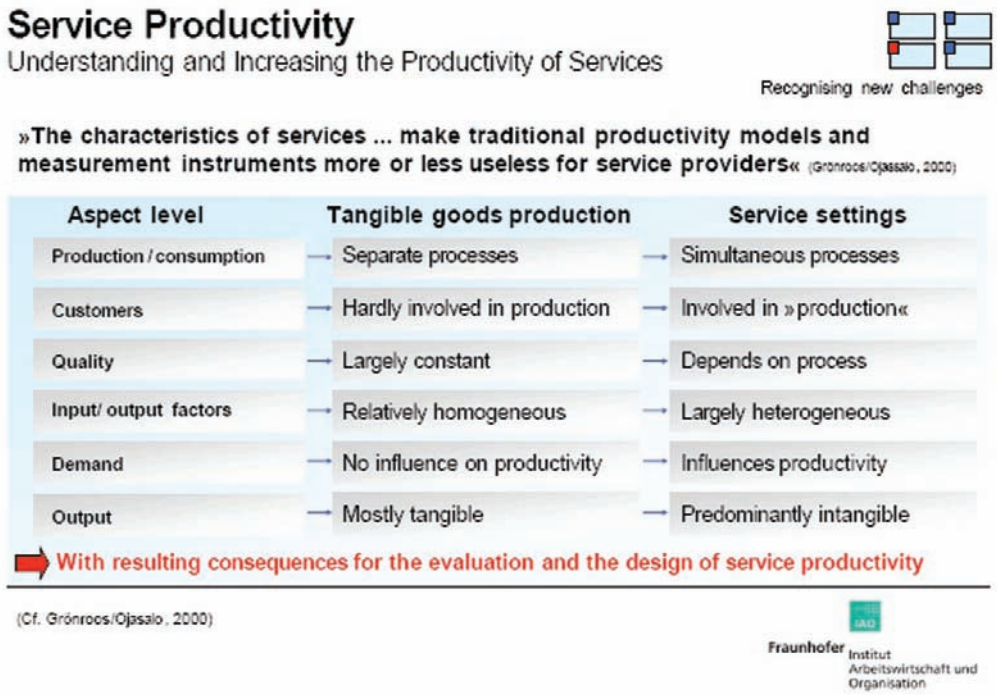
5.19 It is clear from the foregoing that innovation is critical to the success of service firms and, on the basis of the maxim that "if you can't measure it, you can't manage it" one might expect that firms would be actively managing their innovation performance. However, to adapt Robert Solow's famous remark about ICT, "innovation is everywhere but in the management statistics". This

51 http://www.berr.gov.uk/sectors/sustainability/eup/page38894.html

52 Cost Analysis of Inadequate Interoperability in the U.S. Capital Facilities Industry, August 2004, NIST

relates, at least in part, to the significant differences between services and tangible goods production, which makes it difficult to utilise traditional measures. This is summarised by Groenroos/Ojasalo and presented in the IAO Fraunhofer report[53] as follows:

Figure 5.2.



5.20 Crucially, the fact that the delivery of the service is carried out simultaneously with the consumption of the service by the customer, often individualised for each, means that the service provider is heavily dependent on the latter in improving his/her service and productivity. It is for this reason that service providers carry out considerable research into customer satisfaction, experience and behaviour in order to determine the development of services and potential for innovation, but tend to focus on their processes and financial measures in monitoring business performance.

5.21 Thus, in the internet services market, leading Job Boards carefully survey client and job seeker experience and effect the necessary changes, e.g. improving the speed of the site and accessibility of information. However, rather than focus on the capacity to innovate, they monitor regularly hard performance measures, mainly:

- Number of jobs advertised on the site
- Number of unique users coming to the site
- Number of job applications flowing from the adverts
- Monthly revenue.

53 Op cit 5

5.22 Similarly, the retail sector is keen to anticipate changes in consumer tastes and behaviours in order to respond quickly to those needs but, having developed new ideas or new lines, e.g. organic, fair-trade or local source, it then pilots those innovations and monitors performance rigorously, scaling up the successful and dropping those which do not meet established criteria, such as:

- Margins on product lines/Return on investment
- Sales/profit per sq foot
- Turnover or profit per employee
- Average spend per customer
- stock/turnover ratio

5.23 In spite of the focus on business outcomes, all the sectors analysed recognised that the key to innovation and business performance lay in the following three broad areas:

- having the information readily available about customer preferences, developments in the value chain, and their own business performance in order to capitalise on opportunities and respond to threats;
- the skills in both management and workforce to respond effectively to the opportunities and threats – in short, the ability to deliver/execute against plan and manage risk; and
- the need to work within a business model/framework based on quality, which encouraged innovation.

5.24 Thus, if Government is seeking to measure the capacity to innovate in the service sectors, the strong message from the SIGs, particularly Internet Services, is that it should focus on:

- the ability to capture and manipulate information – in broad measureable terms, investment in ICT and software[54];
- the quality of management, people skills and their development;
- the existence of quality frameworks, such as standards, and business planning/processes which encourage innovation.

5.25 However, these forward looking indicators need to be complemented by hard measures of recent business performance, which point to an ability to convert potential into commercial reality, such as:

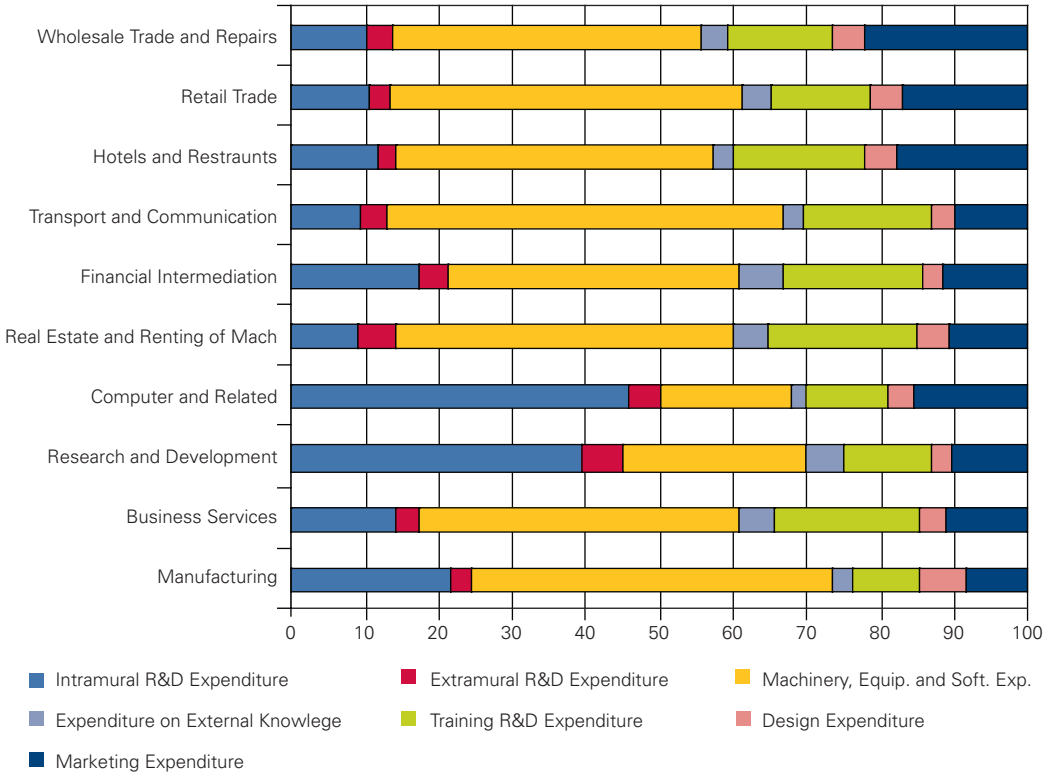
- value added per head and profit margins.

5.26 Our discussions with the service sector businesses suggested that traditional measures of R&D are not regarded as an important indicator of service

54 But given the work of van Ark, Bloom, Sadun and Van Reenen and others about the variability of business performance in capitalising on ICT investment , there are important caveats about this indicator, as there are about all input indicators, including R&D and marketing expenditures.

innovation. This, and the importance attached to ICT/software and skills is reflected in the UK contribution to the Community Innovation Survey (CIS4) shown below, where R&D only features significantly in the computer related and R&D service sectors. It is similarly reflected in the work of Marrano, Haskel and Wallis[55] who estimate that investment in intangibles by British companies is about equal to tangible investment: about half of the former relates to developing economic competencies in the form of training, consultancy, advertising and market research, around 15% on computerised information and the remainder on innovative elements such as Design and R&D.

Figure 5.3. Innovation expenditure by type and sector



Source: NESTA research report "Taking Services Seriously. How policy can stimulate the "hidden innovation" in the UK's service economy", Cambridge-MIT, May 2008. (Data from Community Innovation Survey 4).

5.27 In pursuing its remit from the Innovation Nation White Paper to develop an Innovation Index[56], NESTA will be following up the findings of this project and developing metrics for innovation in services, which should be helpful to businesses monitoring and assessing their own performances.

55 "What Happened to the Knowledge Economy? ICT, Intangible Investment and Britain's Productivity Record" Working Paper No 603 June 2007

56 Commitment to develop a new Innovation Index in the "Innovation Nation" White Paper of March 2008, http://dius.dialoguebydesign.net/rp/ScienceInnovation_web.pdf

Chapter 6
Sector Innovation Groups

Summary

The sectoral studies commissioned by NESTA for this project provide an important evidence base for this report. This chapter captures their main findings to develop a set of follow up actions, which try to address the main barriers to innovation identified by the project's business-led Sector Innovation Groups (SIGs).

For internet services the key issue raised was in relation to public re-usable data, where business argued that present terms and conditions for purchasing unrefined data from the state supported Trading Funds were a major barrier to innovation and growth. This is being addressed by the Government's review of the Trading Funds, which is considering options for maximising the contribution to the UK economy from the information which they collect for public policy purposes.

The role of strong leadership and co-ordination of Government policy was a recurring theme across the SIG discussions and it was especially prominent in the two areas of resource and waste management and logistics. In both areas, the Government has committed to new actions to secure additional positive impact by stronger coordination in its policy delivery.

In construction, BERR is working with its business partners and other Government Departments to deliver an action programme agreed by the SIG to promote innovation and raise productivity.

The retail sector, which operates at the interface between consumers and supply chains, is highly sensitised to consumer needs and concerns. The major retailers are consistently innovative. This SIG sought stronger modes of dialogue with Government on challenging issues, to improve their ability to pursue innovative solutions, especially to sustainability. BERR is implementing this.

6.1 In summary, two recurring themes across the sector studies were:

- **Policy relevance and context is critical to success:** Business feedback in this enquiry suggested that both Government and business need to keep abreast of the radical changes taking place in global value chains and networks, to address the challenges and seize the opportunities afforded

by globalisation. This will not cut across the Government's programme to simplify business support, but rather encourage a more integrated approach to policy implementation.

- **Strong leadership and co-ordination of Government policy can create additional positive impact:** Business looks to Government for strong leadership and coordination in areas where it controls important levers, in order to secure the transformation which is necessary to achieve key societal goals, e.g. in moving to a low carbon, resource efficient economic model. Business argues that cohesive delivery by Government of development of regulation and standards, support for skills, sharing of good practice in services and technology application and in public procurement, against clear objectives, could improve market development, in particular providing investment confidence, to enable innovation and achieve policy goals.

i) Internet services[57]

6.2 Information is the raw material of an "information society". According to Outsell Inc, the current global market for information is estimated to be $380 billion and anticipated to rise to $450 billion by 2010. UK organisations account for around $12 billion pa and include global players such as Reed Elsevier and Pearson, together with a myriad of smaller entrepreneurial firms. The widespread use of English on the internet, while not quite as marked as it used to be, remains a helpful factor. UK traditions of leadership and inventiveness in publishing, which carry into internet services, and the internet tradition of disruptive business models, are features of developmental activity in this sector. The SIG considered that UK organisations should seek to improve their share of the global market to 10% – a major challenge in relation to the current share of approximately 3.5%.

6.3 The key issue raised by the SIG was in relation to public re-usable data. Business argued strongly that the present terms and conditions for purchasing unrefined data from the state supported Trading Funds, were a major barrier to innovation and growth. This area has been the subject of close scrutiny:

- December 2006: OFT publish commercial use of public information (CUPI) report[58].
- June 2007: Power of Information report published[59] together with Government response to OFT and PoI reports.

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57 See Report for Innovation in Services project: Innovation in Internet Content Services, David Worlock, Kirstie Keeling, Outsell, July 2008, http://www.nesta.org.uk/assets/Uploads/pdf/Research-Reports/internet_content_services_report_NESTA.pdf

58 Office of Fair Trading Report on Commercial Use of Public Information (CUPI), published in December 2006, http://www.oft.gov.uk/advice_and_resources/resource_base/market-studies/public-information

59 Report to Government published in June 2007, http://www.cabinetoffice.gov.uk/upload/assets/www.cabinetoffice.gov.uk/strategy/power_information.pdf

- March 2008: Cambridge Study into "Models of public sector information provision by Trading Funds" published[60]. This study estimated that the overall annual net welfare benefit of a move to marginal cost pricing for a subset of data products for six of the Trading Funds would be in excess of £160 million.

6.4 Following these reports, the Government has responded by conducting an assessment of the information strategies of the Trading Funds. This assessment was announced in Budget 2008 and is being led by the Shareholder Executive. In addition, the Power of Information Taskforce, also announced in March 2008, is considering how to maximise the value of public sector information.[61]

> The Office of Fair Trading's market study into the commercial use of public information (CUPI), published in December 2006, found that more competition in public sector information could benefit the UK economy by around £500 million a year.
>
> Public sector information holders (PSIHs) are usually the only source for much of this raw data and, although some make this available to businesses for free, others charge. A number of PSIHs also compete with businesses in turning the raw information into value-added products and services.
>
> The study found that raw information was not as easily available as it might be, licensing arrangements were restrictive, prices were not always linked to costs, and PSIHs might be charging higher prices to competing businesses and giving them less attractive terms than their own value-added operations.
>
> The report also found that much of the legislation and guidance which aims to ensure equitable access to information lacks clarity and is inadequately monitored. As a result the full benefits of public sector information were not being realised.

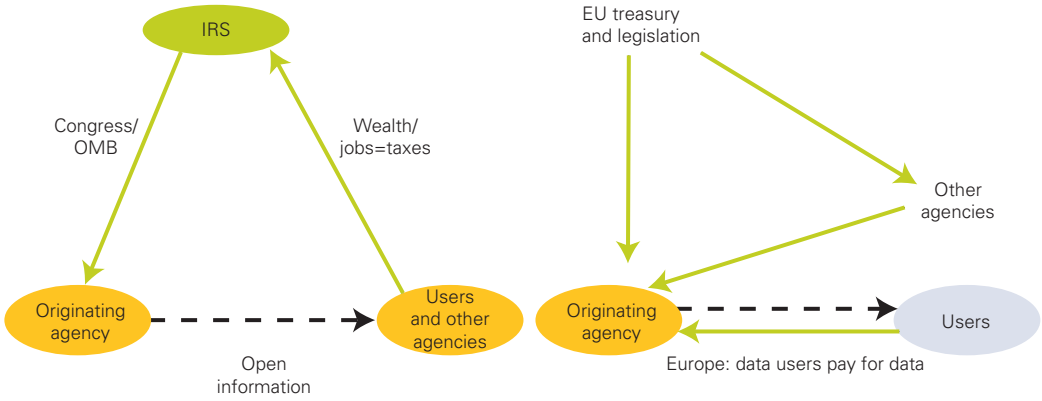
6.5 Business has argued that the approach to PSI followed in the USA offers a model for how to catalyse innovation and related market development in the UK. Businesses, particularly those operating on both sides of the Atlantic, have observed that the legal framework and culture within which American agencies work – where public re-usable data is provided free and promptly, and agencies are discouraged from marketing refined data in competition with the private sector – is more conducive to business start-up and innovation. They contrast this with the requirement placed upon the UK Trading Funds to earn a minimum return on assets which has resulted in a licensing regime which can take firms one to two years and considerable legal fees to negotiate an outcome. The difference in approach is illustrated in the schema in Figure 6.1[62]:

60 Report to HM Treasury and BERR, published in February 2008, http://www.berr.gov.uk/files/file45136.pdf.

61 http://www.cabinetoffice.gov.uk/about_the_cabinet_office/speeches/watson/080331watson.aspx

62 Peter Weiss "Borders in Cyberspace: Conflicting public Sector Information Policies and their Economic Impacts" US Dept of Commerce

Figure 6.1. Comparison of Trading Fund business models (US, EU)



Note: OMB is the Office of Management and Budget; IRS is the Internal Revenue Service

6.6 An analysis of the commercial meteorology services markets in the USA and Europe, carried out on behalf of the Commercial Weather Services Association and the Association of Environmental Data Users of Europe indicates a significant difference in the level of business activity, which Peter Weiss[63] (from the the U.S. National Oceanic and Atmospheric Administration) considers to be largely due to the difference in pricing and accessibility of data.

Table 6.1. Commercial Meteorology in the US and Europe

US$	US	Europe
Gross receipts	400-700 million	30-50 million
Number of firms	400	30
Number of employees	4000	300

Data mashing is a process of re-using information. It entails merging of different types of data to produce new products or services. "Mash ups" most commonly combine mapping data with data from other sources, e.g. maps showing incidence of urban street crime.

6.7 The evidence suggests there is further scope for new markets to form, based on UK public sector information. The Power of Information Taskforce's recent announcement of a competition of new ideas for using, representing and combining public information elicited a strong initial response. Proposals received in its first week included mapping poor air quality, bringing together data to help compile home information packs, and plotting traffic light sequence to inform journey planning.[64]

63 Op cit

64 http://www.showusabetterway.co.uk/call/2008/07/weve-launched.html

6.8 The evidence offered by business to this enquiry included:

- The Locus Assocation, a trade association of firms working with PSI, particularly with Ordnance Survey data, has reported that a recent survey of its members revealed widespread concerns about the time taken to negotiate new licences or variations to existing licences and the missed commercial opportunities arising from the present Trading Funds model.
- The Lighthill Risk Network, a not for profit organisation comprising Lloyds of London and others associated with the London insurance market, offered evidence on factors militating against an efficient market for insurance, including the assets required to cover the risk of extreme weather events.
- Risk Management Solutions (RMS), which produces computer models of the probability of losses from weather events used by the insurance industry, identified in its evidence to the Pitt enquiry, on the 2007 floods in the UK, significant shortcomings in the data available. RMS believes that, had more information been available in real time, insurance firms would have been able to make contingency arrangements and mobilise loss adjustors in areas of difficulty far more effectively, and thereby offer their customers a more active response to the crisis.

6.9 In this context, business has made the comparison with the US, contrasting the differing US and UK levels of commercial activity it sees as flowing from differing approaches to making weather and flood related PSI available. A Price Waterhouse Coopers survey of weather derivatives markets in N America and Europe, prepared on behalf of the Weather Risk Management Association, showed a significant difference in the scale of activities. The value of contracts on the Chicago Mercantile Exchange (CME) has risen dramatically since 2003/04 when it accounted for less than half of the $4.7 billion contracts to 90% of a significantly enhanced market of around $19.2 billion in 2006/07 with almost 730,000 contracts. At present, the UK market is restricted to a limited amount of over-the-counter activity. Business recognises that there may be other reasons for the CME to develop such a lead in weather derivatives contracts, for example, it may hold a first mover advantage as a global centre for wider derivatives activity. Nevertheless, it notes that there is no difference in the appetite or capacity of the financial markets here to handle derivative products, and weather is no less important to European than US businesses, and therefore suggests that freer access to UK and other European weather data could open market opportunities in London.

6.10 This enquiry has provided a timely opportunity for BERR to elicit the views of the business community on access to public re-usable data and ensure that these can be taken into account in the current Government assessment of the Trading Funds' information strategies; and also by the Power of Information Taskforce[65].

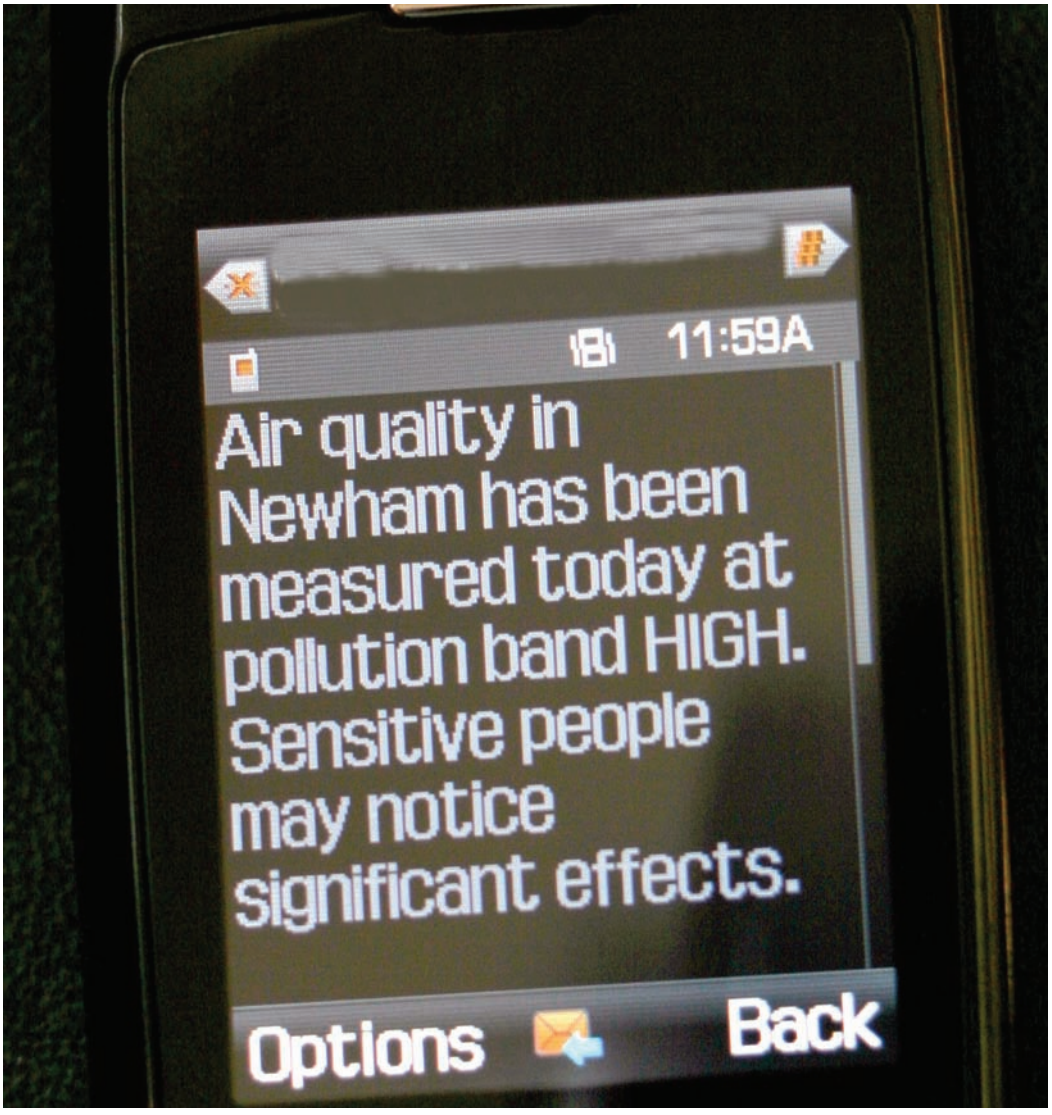
65 http://www.cabinetoffice.gov.uk/about_the_cabinet_office/speeches/watson/080331watson.aspx

Action:

The assessment of the Trading Funds models, led by the BERR Shareholder Executive, will consider the contribution which the information they collect for public policy purposes could make to the UK economy; it will examine all options, including fundamental changes to their current business and organisational models, to maximise their contribution, while assuring the long term quality of the data.

Public services

6.11 Business has also highlighted, during in this enquiry, the opportunities for releasing re-usable data to support public service delivery, including by local authorities and NHS Trusts. Newham Council's focus on efficient information management and its preparedness to work with business to develop new services provides a valuable case study in good practice.



CASE STUDY

Newham Borough Council – an innovator and leader in local government ICT

Newham is a borough in East London, which has an annual budget of £261 million, and delivers around 500 services to a population approaching 250,000 people. With over 80 main information systems in place, dealing with around 50 million paper records and over 30 million images, the borough's Mayor has identified integrated information management as a key factor in the cost effective delivery of services. As a result, the Council is seeking to develop a more corporate digitised approach to records management with a comprehensive information asset list, managed by a unified back office in Docklands. Newham's goal is to be "the leading UK centre for information and communication technologies in terms of both its commercial exploitation and its use to benefit the local community".

The council is under pressure to improve services and lower costs in this rapidly expanding and multicultural borough. An important challenge is the range of services on offer and the fact that information has tended to be collected and managed discretely by the separate service teams. While the organisation has a strong delivery culture, it has been less attuned to the value of integrated information systems in the delivery of services and using that as a basis to work with partners in offering a wider range of services. This has required not simply the introduction of new information systems but a fundamental change in culture.

The benefits have been considerable. It is estimated that organisational changes will make savings of around £25 million to be invested in priority areas such as crime and anti social behaviour. Furthermore, in addition to adopting leading e-procurement practice with every major Service enabled to buy online, Newham has introduced new services. For example, it has recently launched a service, delivered by text, that alerts users to high levels of air pollution in the borough. This enables those at risk of e.g. asthma, to manage their exposure to poor quality air. The council also runs Newham Neighbourhood Information Management System (NIMS), an online central data repository that enables local strategic partners (LSP) to share data. NIMS partners include the London Borough of Newham, Metropolitan Police, London Fire Brigade, Newham University Hospital NHS Trust, Newham Primary Care Trust, amongst others. Various users such as partnership agencies, voluntary groups, students, and businesses have also been using NIMS in their research reports and for general interest.

In addition to adopting a sharing culture around information, the Council is continuing in its quest to improve access to management information by working with Psiphon, a software firm, to introduce intelligent search of its public re-usable data – firmly in the belief that speedy access to reliable management information is one of the key factors in effective service delivery.

www.newham.gov.uk

6.12 The SIG thought that Government should have a national information strategy to promote good practice in public sector supply and use of information. The Knowledge Council, established in 2007 to promote Transformational Government, has been leading the co-ordination of work across departments to develop good practice in the management and use of government information. Outputs from the Knowledge Council are driving strategy and government policy in this area. The SIG also referred to the EU dimension on these issues. The forthcoming review of the EU Directive on the Re-Use of Public Sector Information[66] presents the chance to clarify the approach and principles which Member States' authorities apply to re-usable data.

6.13 While the Sector Innovation Group attached particular importance to PSI as a key barrier to innovation, other important factors were identified:

Technology, in the form of broadband communications, inter-enterprise computing and advanced knowledge based tools has underpinned the rapid growth of internet services. To build UK competitiveness, it will be important to ensure that UK firms, particularly SMEs, have ready access to technologies which will enable them to capitalise on the internet as it evolves. The UK is well placed, as para 4.9 has indicated, and the TSB is developing its strategy in the area of ICT, with a particular focus on software and its alignment with people and processes. However, the SIG noted a lack of awareness, even on the part of its own members, of centres of excellence in the UK (in areas such as knowledge based tools) which were globally competitive. Firms should be encouraged to participate in RDA clusters, as well as in the KTNs, including Electronics, Location and Timing, Grid Computing, Secure Networks and the newly created Creative Industries Creative Industries Technology Innovation Network, in order to keep abreast of technological developments worldwide, and the creation of new innovative applications.

Trust: the growing level of internet fraud and broader concerns over data security were considered to be a potential factor which might inhibit the growth of e-commerce in general. This is considered in the next chapter.

Regulation: As Chapter 4 has noted, the internet has brought about radical change in the delivery of services, challenging traditional channels to the customer both in terms of advertising media and the delivery of services themselves. One such market is recruitment services where the growth of online recruitment and HR services is transforming the cost and outreach of recruitment. However, during this enquiry business has identified that BERR's own regulations relating to Employment Agencies might be acting as a potential constraint on the growth of internet recruitment activities.

66 Directive 2003/98/EC on the Re-Use of Public Sector Information (implemented by the Re-Use of Public Sector Information Regulations)

Actions:

a) In the review of the EU Directive on Public Service Information (PSI), the Office of Public Sector Information will negotiate to achieve improved access to PSI across the EU with a view to creating a more open and innovative market for information services.

b) The Technology Strategy Board will continue with its Innovation Platform in network security, and engage with content providers through its work in the Creative Industries Key Applications Area so they can capitalise on the internet as it evolves.

c) In the specific area of internet recruitment, BERR will consult on options for regulating permanent recruitment via agencies, in particular online recruitment by the end of 2008. These options will ensure essential protections are in place for workers (and employers) while encouraging the development of new services with the potential to make the recruitment process more open and more efficient.

ii) Waste and resource management[67]

6.14 The specific focus of the environmental services Sector Innovation Group was on waste and resource management. In waste management, there is a major shift going on in societal and business attitudes, from landfill to eco-design, recycling of materials and energy generation. This is placing new demands on business and local authorities, but also creating opportunities for innovative firms in this new, but fragmented, value chain. The UK waste market is conservatively estimated to double in size from £8 billion in 2005 to £16 billion by 2015[68]. Veolia, a leading firm in the market, estimates the market for industrial waste in the OECD to be around $150 billion and around $120 billion for municipal waste. The scale of the market opportunities in China and the developing world is expected to be significant.

6.15 The SIG discussions also considered an increasing range of resource management services, including materials efficiency and waste minimisation, and remanufacturing activities associated with products after their first life and before their ultimate disposal. This sector is hard to define and quantify. Resource management and efficiency is emerging as a major future driver of business performance in view of economic factors, such as materials prices and constraints, societal expectations and legislation – see chapter 4.

6.16 This SIG gave a clear message that, in a developing market, business wished to see a strong lead from Government in policy to promote innovation and enable

67 See Report for Innovation in Services project: Innovation in Environmental Services, Peter James, Jonathan Selwyn, Simon Chiva, Gareth Jones, UK Centre for Economic and Environmental Development, July 2008, http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/environmental_services_report_NESTA.pdf

68 "Emerging Markets in the Environmental Sector", Jonathan Selwyn and Bill Leverett, UKCEED, November 2006, for DTI and DEFRA

improved business performance. This meant consistency in policy and cohesive delivery to provide investment certainty for business. It also meant, in the area of waste where legislation and its interpretation is key, avoiding delays in implementation of EU waste directives like the Waste Electrical and Electronic Equipment Directive, and providing clarity in interpretation of European waste legislation generally, including the definition of waste. The inference was that strong leadership from Government would:

- help business invest to deliver waste legislative and policy targets, including those in the Landfill Directive and Waste Strategy;
- position UK-based businesses to exploit the new opportunities in resource management and efficiency and waste minimisation as these become major drivers of business performance across the economy in the UK and overseas markets; and
- influence demand side sentiment across business, where transformative change is needed to move to a more sustainable pattern of economic resource usage.

6.17 These messages are broadly in line with the analysis of the Commission on Environmental Markets and Economic Performance (CEMEP). CEMEP delivered its final report to the Government in November 2007, which provided an assessment of the threats and opportunities for the UK of moving towards a low carbon, more resource efficient economy, and made a number of recommendations to Government and business to hasten this transition and maximise the benefits for the UK.[69] In particular, CEMEP noted the central importance of innovation in technologies, services and business models in achieving the transition to a low carbon resource efficient economy.

6.18 There was also feedback from the SIG on the need for stronger skills and lack of business engagement with sources of sector-specific technical support and training, such as the Energy and Utilities Sector Skills Council. Business also saw a need to develop "innovation" skills, particularly as the waste sector transitions from reactive landfilling to more proactive materials management activities; and to develop new skills to meet the growing opportunities in resource efficiency services. The SIG also referred to the critical importance of public procurement across Government, in leading demand for innovative environmental services, including local authorities' contracting for waste management services; business recommended a less prescriptive, more outcomes-based approach. In this context, the SIG thought Government should specifically address innovation in public sector procurement, including shifting the focus of specifications in municipal waste contracts more to an outcomes-based approach.

6.19 Business thought the market in the UK would function more effectively, fostering business confidence to invest in resource efficiency and exploit

69 Commission on Environmental Markets and Economic Performance, CEMEP, http://www.defra.gov.uk/environment/business/commission/index.htm

growing global markets, while helping to meet legislative and policy targets for waste, if Government would do the following things:

a. achieve greater coherence and co-ordination of policy, including across central to local Government;

b. provide opportunities to demonstrate and share emerging technology and good practice;

c. improve the quality of information available about the level and potential impact of waste streams;

d. foster development of a consistent and credible resource accounting framework or standard to enable businesses to evaluate costs and benefits of different approaches on the same basis;

e. consider the relationship between tax and resource efficiency in relation to encouraging new business opportunities and capability improvements;

f. skills to support improved waste management and resource efficiency; and

g. ensure that public procurement was less prescriptive, e.g. providing more scope for innovative solutions by being more "outcomes orientated".

CEMEP – setting policy course

The Government's response to the CEMEP report, "Building a low carbon economy: unlocking innovation and skills", published in May 2008, sets out how Government will make the UK one of the best locations in the world to develop and introduce low-carbon and resource efficient products, processes, services and business models. The response identified four main challenges for building a low carbon economy:

- A clear, consistent long-term policy framework to provide business with the confidence to invest and to enable the timely development of innovative products and services;
- Policies that positively support innovation in technologies, processes, services and business models;
- Developing the right skills by drawing on the talent and creativity of the British people;
- Fostering effective partnerships between Government, business, trade unions, higher education bodies and others.

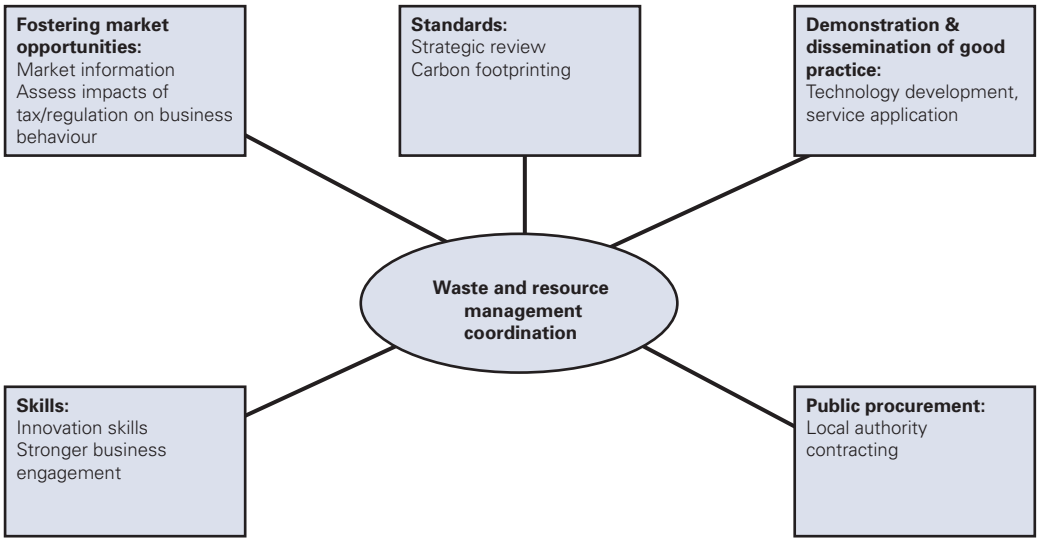
6.20 The Government's recent response to the CEMEP report,[70] underlined its commitment to building a low carbon economy and acknowledged its key leadership role in making this happen, recognising that effective partnerships with business will be essential. It referred to setting clear, long term policy goals, not least the central roles of the Climate Change Bill and the European Emissions Trading Scheme in this regard; as well as other key policy strands, including the Waste Strategy. Within this broad policy framework there is

70 http://www.defra.gov.uk/environment/business/commission/index.htm

significant existing or planned Government action to address the issues raised by this project's SIG.

6.21 The Government will act on the recommendations of the SIG. It will do so in the light of the existing activity to promote resource efficiency and good practice in waste minimisation and management. Specifically, it will draw together action in this area, as set out in Figure 6.2, to deliver cohesion across Government delivery. BERR will work with Defra, and the Technology Strategy Board to develop a strategic approach by autumn 2008 for delivery thereafter. It will engage BSI British Standards, the RDAs, the delivery agencies delivering resource efficiency and waste minimisation/management support to business and the Environment Agencies[71], in this context.

Figure 6.2. Waste and resource management – developing a strategic approach



Action

BERR will work with Defra, and the Technology Strategy Board, engaging other stakeholders, to promote resource efficiency and good practice in waste minimisation and management during autumn 2008; with specific actions to be rolled out from 2009 onwards.

6.22 **Demonstration and dissemination of good practice**: The Government, through agencies including Envirowise[72], WRAP[73] and NISP[74] already provides advice and support for businesses to improve their resource usage, minimise waste and make the most of recycling and recycled materials in their operations and products. Delivery of this support has recently been under review, with a

71 The Environment Agency, http://www.environment-agency.gov.uk/ ; the Scottish Environmental Protection Agency, http://www.sepa.org.uk/; and the Northern Ireland Environment and Heritage Service, http://www.ehsni.gov.uk/

72 Envirowise, http://www.envirowise.gov.uk/

73 Waste Resource Action Programme, http://www.wrap.org.uk/

74 National Industrial Symbiosis Programme, http://www.nisp.org.uk/

view to maximising its impacts, including in relation to influencing small and medium sized enterprises. The SIG discussions reinforced the importance of demonstration and dissemination to build confidence in new services and technologies in practical application. As part of development of a strategic approach to waste and resource management, BERR will consider with Defra and the Technology Strategy Board, and talking to other stakeholders, how best to promote further demonstration and dissemination of good practice in services in this area. This will take account of existing activity in this space and the scope for maximising outreach and impact by working with the RDAs and the two KTNS in this area to link up and use the power of business networks.

6.23 **Standards**: there is significant existing Government action in this area. BSI British Standards is working with Defra, the Carbon Trust and other stakeholders towards development of a Publicly Available Specification (PAS) for a method for measuring the embodied greenhouse gas emissions from goods and services. Many have perceived this as a key step in giving confidence to a broad swathe of business to make transformative investments in low carbon operations and products. BSI aims to publish the PAS by autumn 2008. The Environment Agency is also leading development of market-opening waste protocols, which have a key role to play in building confidence in the definition and performance of secondary raw materials streams. Building on these developments, there is scope for establishing a more strategic approach to standards making for waste and resource management, specifically with a market-opening objective. To this end, BSI will conduct a strategic review by the end of 2009. BERR will liaise with Defra, DIUS and BSI British Standards, in autumn 2008, to determine the exact scope for this.

6.24 **Fostering market opportunities**: SIG discussions identified the importance of information to catalyse development of markets in waste materials. Defra and the Environment Agency are working on a waste data strategy project to make available stronger data on waste streams, including consolidating data from regulatory activities and making it available via a central hub. In waste/materials markets, Government interventions, in particular tax instruments like the landfill escalator, can be decisive in changing business behaviours and fostering market development, and there may be scope for Government to build further its understanding of how such measures impact on business behaviour in order to inform future policy making. BERR will liaise with Defra, to consider the best way forward on this.

6.25 **Skills, procurement:** The Government recognises that developing the skills that will be needed for the transition to a low carbon, resource efficient economy, and to take the opportunities offered by the growing market for low carbon technology will require a strategic approach, as well as a rapid supply side response based on cutting edge employer practice. In June 2008, DIUS held a consultation event at Windsor involving lead employers, Sector Skills Councils, and experts in the field, which advised that the UK Commission for Employment and Skills should play a central role in coordinating that effort; and that Sector Skills Councils should work collaboratively on the generic skills which are needed for a low carbon economy as well as focussing on the specialist skills needs of their own sectors. Those present also saw an

important role for National Skills Academies and other specialist networks of training providers not only in providing skills and qualifications, but in transferring knowledge to businesses and driving innovation – something to which commitment has already been signalled in the Innovation Nation White Paper. On procurement, the Innovation Nation White Paper committed DIUS to work with the Office of Government Commerce, the Technology Strategy Board and Government Departments to promote innovation through procurement and Budget 2008 announced plans for a "centre of expertise in sustainable procurement". As part of development of a new strategic approach to waste and resource management, BERR will work with Defra and DIUS, consulting the Technology Strategy Board and other stakeholders, to consider new actions in the light of the project's SIG discussion, including exploring the scope for optimising local authority waste management contracting for innovation.

(iii) Construction[75]

6.26 The industry is an important sector in the UK economy, not only in terms of its economic impact, but also the broader benefits resulting from creating a built environment which is sustainable. The UK industry has a strong reputation for design excellence and its problem solving capacity – seven of the top ten architectural practices in Europe are British. According to a report commissioned by UKTI on the construction industry[76], exports of services exceed £2.3 billion, over 80% of which relate to consulting, design and architectural services. During this project, the industry highlighted the important role of Government as a procurer of its services and in promoting the industry's Accelerating Change agenda[77]:

- In the UK, public procurement accounts for up to 40% of construction. Much of this is one-off activity which means it is difficult to transfer the lessons learned from one project to the next or, indeed, from one Department to another. BERR's Construction Sector Unit has developed a "virtual" network to help ensure Departments are aware of best private sector practice in offsite construction; and has brought together DCSF[78] and the Department of Health so that the benefits of the latter's LIFT programme (innovation and knowledge transfer in primary health care)[79] can be replicated in the Building Schools for the Future programme[80].

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75 See Report for Innovation in Services project: Innovation in Construction Services, http://www.berr.gov.uk/files/file47438.pdf

76 The Particular Strengths, Capabilities and Unique Selling Points of the UK Construction Sector by British Expertise March 2007

77 The Strategic Forum for Construction brings together the umbrella bodies of the industry to take forward the vision established by "Accelerating Change" in 2002. This vision was "for the UK construction industry to realize maximum value for all clients, end users and stakeholders and exceed their expectations through the consistent delivery of world class products." http://www.strategicforum.org.uk/pdf/report_sept02.pdf

78 DCSF, the Department for Children, Schools and the Family. http://www.dfes.gov.uk/

79 LIFT, the NHS Local Improvement Finance Trust, http://www.dh.gov.uk/en/Procurementandproposals/Publicprivatepartnership/NHSLIFT/index.htm

80 Building Schools for the Future, http://www.p4s.org.uk/

- Sustainability of construction plays an increasingly influential role. On 11 June 2008 BERR recently launched a Strategy for Sustainable Construction, containing stretching and realistic targets, supported by the industry and by all the relevant Government Departments[81].
- The industry is continuing to make strides in innovative ways of working and improving performance under the Accelerating Change agenda.
- New practices to promote better integration of the design, procurement, construction and facilities management elements of the value chain are emerging, which would not only improve the efficiency of the design and build but also provide a better understanding of the performance of the building over its life. This project's enquiry revealed that important Government bodies in the USA and Scandinavia were playing an active role in promoting the adoption of advanced ICT techniques, such as building information modelling and interoperability standards. These draw on good practice in the aerospace, automotive and shipbuilding industries to enhance innovation and productivity down the value chain. There is the potential of significant benefit, provided issues of software capability, skills and context (integrated teams rather than adversarial relationships) can be addressed. An effective integrated supply chain for building services must ensure close and early collaboration between subcontractors, designer/ consultants and product suppliers allowing the lead organisation to be fully effective.

6.27 BERR is working with its business partners and other Government Departments to deliver an action programme agreed by the Sector Innovation Group, to promote innovation and raise productivity. Government will continue to promote the Accelerating Change agenda in the industry through a number of ways, and there is the opportunity to work with the industry to explore the value of the advanced ICT techniques, in particular Building Information Modelling (BIM).

81 The Strategy for Sustainable Construction is at www.tinyurl.com/yua68g At this same event the Strategic Forum launched a number of targets for the industry to achieve to 2012, based on the Construction Commitments which represent the principles which it is intended will underpin all construction projects in order to achieve a better industry and exceed current best practice. See www.strategicforum.org.uk

CASE STUDY

Building Information Modelling

Bridge Academy, located in the London Borough of Hackney, is part of a national government initiative to build state of the art schools in the country's most deprived areas. The mission is to inspire learning, whilst also regenerating urban sites and under-privileged communities.

The constrained brownfield site on Regent's Canal posed a major challenge and drove a vertical solution. The design for Bridge is similar to a piece of origami, with elements folded over each other, providing a building of 10,000 square metres on a site of only 6,500 square metres. Building Design Partnership's (BDP) structural engineers came up with a unique structural design, using a giant 'hoop' to hang the inner edge of the 7-storey main building and create a column free space.

Building Information Modelling (BIM) was critical to realising this complex design. The benefits of BIM included: more efficient drawing production; the ability to test and verify the structural solution; a fuller understanding of the steelwork connections; early detection of potential discrepancies with architecture and building services; enhanced communication of the construction methodology; and testing of the routing of services around the building.

BDP was able to provide the structural model to the steel fabricator. This made fabrication drawings redundant, and it brought time and cost savings in the review of contractor's information. Also, the 3D model played a significant part in reassuring the local planning authority of the setting of the building in its context.

Michelle McDowell, Chair of Civil & Structural Engineering at BDP, said, "BIM gives us edge in concept forming, analysis and design. It adds value for our clients and to the supply chain. An unexpected result of using BIM was a change in the traditional workflow, with the structural engineers taking ownership of the setting out of the building form, an aspect normally driven by the architect. As the structural model took the lead in the design development, the architectural and services schemes were wrapped around and through the building model to ensure best fit."

Michelle McDowell also noted, "The overwhelming benefits have meant that in our London studio all of our new-build projects are delivered using BIM." [82,83]

82 Building Design Partnership, http://www.bdp.co.uk/html/index.asp

83 Constructing Excellence Demonstration Programme, http://www.constructingexcellence.org.uk/default.jsp

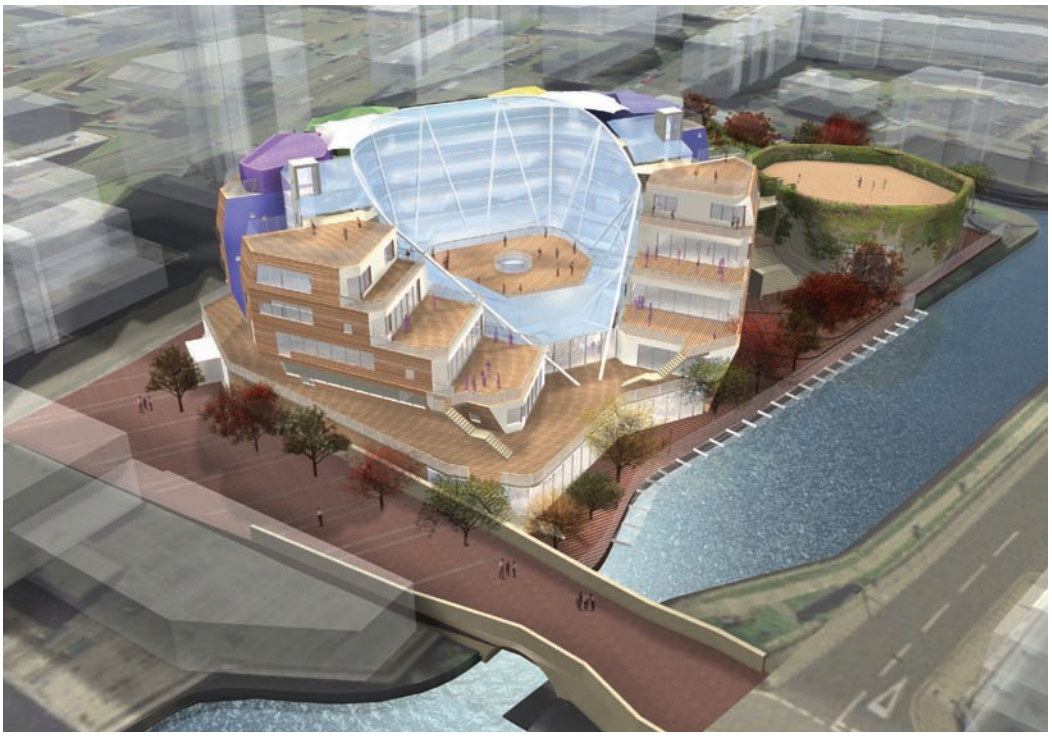

Image courtesy of Building Design Partnership.

Actions:

BERR will

a) take forward delivery of the Strategic Forum for Construction targets and the joint industry/government Strategy for Sustainable Construction, launched in June 2008

b) promote increased use of integrated teams to meet the new Strategic Forum targets for 2012 which were launched in 2008

c) work with the industry to explore and disseminate the potential benefits of advanced ICT techniques, including Building Information Modelling by (i) helping industry to document results of BIM application by developing 3 project case studies by March 2009; and (ii) working with industry to develop a business case and strategy for the adoption of BIM techniques by May 2009.

(iv) Logistics[84]

6.28 The UK logistics sector is fragmented, with an estimated 80,000 businesses operating[85]. Major players like DHL, Wincanton, Christian Salveson, TNT and Kuehne & Nagel tend to dominate the UK market and offer the most sophisticated and innovative services. A large number of small and medium sized businesses service niche markets or provide commodity services such as transport.

6.29 It is estimated that over two thirds of all companies in the sector have a turnover of less than £250,000 per year[86]. With the growth in world trade, the gross value added of the storage and warehousing industry alone has increased some 150% over the seven year period to 2004 to exceed £3 billion pa. Road freight increased 16% between 1990 and 2004 while the number of vehicles declined 6.5%. Logistics firms are developing much closer relationships with partners in the value chain. Innovation, both organisational and technological, has played an important role in improving the performance of this sector.

6.30 There are a number of programmes which are helping to improve business performance. Firms which have worked with the Sector Skills Council, Skills for Logistics[87], to develop their capabilities have secured demonstrable returns; the R&D tax credit regime[88] is particularly helpful to small firms; the EU is giving a focus to transport in the 7th Framework Programme[89]; the Technology Strategy Board has invested in the development of an Innovation Platform to promote intelligent transport systems and services[90], and it has also invested in the development of business led KTNs to promote wider dissemination; and DfT[91] has supported a Freight Best Practice programme[92] which has generated significant savings in costs and emissions. The SIG report suggested, however, that there is scope to strengthen businesses' awareness of the opportunities on offer and build further the innovation capacity of the industry.

6.31 Nevertheless, there is a wide range of capability and the growth of the industry is putting considerable pressure on communities. To minimise the impact and promote sustainability, business believes that greater focus needs to be given to a range of policy instruments:

a. While there are examples of good practice in a number of value chains e.g. in the automotive industry, much greater attention needs to be given to more effective supply chain integration. Given the global nature of the

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84 See Report for Innovation in Services project: Innovation in Logistics Services, Carlos Mena, Martin Christopher, Mark Johnson, Fu Jia, Cranfield University School of Management, July 2008, http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/logistics_services_report_NESTA.pdf

85 Market Review 2007, Distribution Industry, edited by Dominic Fenn

86 Review 2007, Distribution Industry, edited by Dominic Fenn, 2007

87 Skills for Logistics is the Sector Skills Council, http://www.skillsforlogistics.org/en/

88 Research and Development Tax Credits, http://www.hmrc.gov.uk/randd/

89 The EU Seventh Framework Programme, http://www.berr.gov.uk/dius/science/int/euro-programmes/fp7/page8390.html. http://ec.europa.eu/research/fp7/index_en.cfm

90 Intelligent Transport Systems Innovation Platform, http://www.innovateuk.org/ourstrategy/innovationplatforms.ashx

91 DfT, the Department for Transport. http://www.dft.gov.uk/

92 The Freight Best Practice Programme, http://www.freightbestpractice.org.uk/

supply chains, there is a need for further internationally agreed, interoperable standards to facilitate that closer integration[93] This particularly relates to the information systems to enable accurate tracking and management of goods in the supply chain, in order to promote "Just in Time" principles and minimise the risk of disruption and missed sales opportunities;

b. The existing and growing complexity of the challenges faced, and the organisational and technological innovation required to cope with these challenges, requires a considerable improvement in skills. This is made difficult by the highly fragmented nature of the industry.

c. Technology has underpinned the improvements in the performance of this sector and there are several Government initiatives related to good practice, technology development and improving knowledge transfer in the industry. Attention might be given to how to join these up where possible and appropriate and give them a higher profile to engage a fragmented industry.

d. The SIG also raised the question of whether there might be scope in the planning process to give more attention to logistics requirements to meet the needs of new communities which would minimise adverse environmental and economic impacts.

6.32 BSI has been active in the development of standards in relation to logistics, but the logistics Sector Innovation Group suggested that standards development might benefit from greater strategic oversight, not only to identify potential gaps, but also to ensure that UK firms can benefit from the development of international standards. BSI has agreed to undertake a strategic review of standards development for logistics.

6.33 There is the opportunity for BERR, together with the Technology Strategy Board, RDAs and the DfT, to co-ordinate their efforts to raise awareness and encourage greater business participation in programmes designed to improve business performance.

6.34 A key objective should be to promote an increase in the numbers of logistics businesses engaging with Government programmes to improve their performance. The programmes and delivery mechanisms are already in place, but there may be scope in co-ordination of programmes relating to skills, good practice, international standards and new technologies, and by establishing better links with RDAs, for the combination of learning opportunities and outreach to business to have far greater impact than hitherto. It will be important, in this context, for the lead organisations to monitor levels of uptake and assess impact, both to evaluate their own activities and communicate the benefits more effectively to business. The benefits of this approach will lie in improving the capability and competitiveness of the UK logistics sector. This approach will also contribute positively towards the vision of a comprehensive and high-performing transport network identified by the Eddington transport

93 Economic Impact of Inadequate Infrastructure for Supply Chain Integration, May 2004, NIST

study[94] as playing a pivotal role in enhancing productivity, in particular by addressing the difficulties and rising costs associated with forecast future congestion.

6.35 The Eddington report's proposals for reform of major infrastructure planning echoed concerns expressed in the Barker Review of Land Use Planning[95] about the planning process and how it impinges on vital new infrastructure. The Government is acting on this. The Planning White Paper "Planning for a Sustainable Future" set out detailed proposals for reform of the planning system, which were consulted on during summer 2007. The Government took account of this consultation in the Planning Bill, which was introduced by the Department for Communities and Local Government in November 2007. The Bill would introduce a new system for nationally significant infrastructure planning, alongside further reforms to the town and country planning system.

6.36 The Government proposes to produce National Policy Statements for key infrastructure sectors, including road, rail, aviation and ports, which will set out the need for infrastructure and explain how this relates to other issues including considerations of economic and environmental sustainability. By setting out the Government's strategic, long term approach to infrastructure development, National Policy Statements will provide far greater clarity and certainty for developers, planners and communities. These Statements will over time be aligned with the overarching transport strategy now under development, reflecting the approach recommended by Eddington, in order to ensure a consistent analytical and policy framework. DfT's discussion document "Towards a Sustainable Transport System"[96], published in October 2007, sets out how it proposes to develop this strategy, working with transport users and other stakeholders over the period to 2012.

Actions:

a) BERR will work with DfT, the Technology Strategy Board and RDAs, to raise participation in programmes to strengthen logistics business performance. BERR will consult the above parties and stakeholders to develop an action plan for this by end 2008, for implementation thereafter. There is the opportunity to pursue a similar, "coalition" model of coordination to that proposed above for waste and resource management.

b) As part of this coordinated approach, BSI British Standards will undertake a strategic review of logistics standards development by end 2009.

94 The Eddington Transport Study. The case for action: Sir Rod Eddington's advice to Government, December 2006, http://www.dft.gov.uk/162259/187604/206711/executivesummary

95 Barker Review of Land Use Planning, Kate Barker, December 2006, http://www.hm-treasury.gov.uk/media/3/A/barker_finalreport051206.pdf

96 "Towards a Sustainable Transport System", DfT, October 2007, http://www.dft.gov.uk/about/strategy/transportstrategy/hmtlsustaintranssys

(v) Retail[97]

6.37 Retail is a key sector of the UK economy. It employs around 10% of the UK labour force and accounts for 7% of gross value added in the UK economy. Retail is the eighth biggest sector of the world economy in terms of total market value and leading UK retailers are making their presence felt on the international stage. Businesses such as Tesco and Kingfisher have a proven international expansion track record and continue to develop outlets overseas. Internationalisation has brought with it international sourcing, international operations and, not least, internationalisation of management ideas.

6.38 Significant in its own right, the sector's impact, particularly the policies of the larger retailers, is felt across the whole UK economy. Sitting, as it does, at the interface between consumers and supply chains, the sector is acutely aware of consumer needs and concerns, responsive to both short term fashion and longer term trends, and ready to deploy new technology when its capability is proven. Thus, from being a relatively passive conduit for manufacturers' products, major retailers have become highly innovative.

6.39 Consumer choice and experience, including ease of access, collection and payment, are important factors which drive competition. New business models and customer engagement have developed to meet consumers' changing habits, their access to digital media, and changing work/life balance. For example, internet retailing has become a significant part of the landscape, not only in books and music. Furthermore, the collection of data on customer tastes and behaviour has also developed apace, but even the most technologically advanced firms are only on the cusp of realising its potential in terms of better targeted marketing and improved customer relationships. Consumers' growing price sensitivity, fuelled by the growth of price information availability via the internet, and their non-price concerns over environmental and social responsibility have led major retailers to introduce "value" formats, e.g. in groceries, and to use environmental or social sustainability as a differentiator in their marketing.

6.40 Indeed with growing societal concerns about the sustainability of consumption and production, retailers are key players in the drive to reduce the carbon footprint of consumption and in addressing the challenge of waste management and have already demonstrated a willingness to play their part. However, a key message from this enquiry is the importance they attached to clear communication of Government policy in this area, preferably through a single channel. The retail Sector Innovation Group also considered that clearer signals from Government would be matched by innovative solutions down their value chains. Like others, it has emphasised the importance of standards and metrics in this context.

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97 See Report for Innovation in Services project: Innovation in the UK Retail Sector, Jonathan Reynolds and Latchezar Hristov, Oxford Institute of Retail Management, December 2007, http://www.nesta.org.uk/assets/Uploads/pdf/Research-Report/environmental_services_report_NESTA.pdf

6.41 The growing complexity of the retail environment placed a premium on skills and the need for companies to innovate in order to prosper. Smaller companies needed better access to good practice guidance, information on market trends and the showcasing of new approaches, particularly in relation to sustainable retailing.

6.42 In considering the scope for effective Government intervention, this report recognises the role which the regulatory/standards framework plays in shaping the direction of many retail innovations. In working with stakeholders to develop a more authoritative basis for assessing the life cycle impact of greenhouse gas emissions of goods and services (standards specification PAS 2050)[98] BSI, the Carbon Trust and DEFRA are consulting with the retail industry over this specification which will impact upon the industry and its supply chain. By providing widely accepted, objective tools for assessment, this could drive the concept of sustainability down the retail supply chains. A number of major retailers have, under the auspices of the British Retail Consortium, signalled their recognition of the key part the sector can play in helping to respond to the threats of climate change, both in their own operations and by supporting suppliers and customers to reduce their greenhouse gas emissions.[99]

6.43 Retailers have referred to their desire to strengthen their modes of dialogue with Government on challenging issues, to improve their ability to pursue innovative solutions, especially to sustainability. The objective should be to promote a "one stop shop" in Government which engages a wider set of retailers more effectively in conducting an exchange of views on new Government policy as well as regulation, especially in key developing areas like sustainability. In this context, the Retail Policy Forum[100] has already responded positively to a BERR proposal to expand its industry/Government discussions beyond just regulatory issues, to provide a forum for identifying opportunities to promote innovation in the retail sector, particularly as it relates to sustainability. It is also proposed to involve the Technology Strategy Board, where appropriate, in future Retail Policy Forum discussions. Looking beyond this established forum, the SIG discussions suggested that there was significant scope to widen retail sector awareness of key developments in Government policy, including in sustainability.

6.44 There should also be an objective to encourage significantly larger numbers of retailers than hitherto to engage with the business-led Sector Skills Council. BERR should liaise with the Sector Skills Council to develop an action plan to do this, taking account of the SIGs perception of the areas of training need, e.g. skills for sustainability.

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98 http://www.bsi-global.com/en/Standards-and-Publications/How-we-can-help-you/Professional-Standards-Service/PAS-2050/

99 "A Better Retailing Climate", British Retail Consortium, http://www.brc.org.uk/policymaster04.asp?id=589&sPolicy=A+BETTER+RETAILING+CLIMATE

100 Retail Policy Forum, http://www.berr.gov.uk/sectors/retail/index.html

Actions:

BERR will

a) **in consultation with the existing Retail Policy Forum in summer 2008, broaden the Forum's remit to provide opportunities for debate between Government and industry on key emerging issues, looking beyond its current focus on regulatory matters;**

b) **pilot during summer 2008 an e-newsletter on key emerging policy issues to widen awareness of policy developments across the retail sector; and**

c) **work with the Sector Skills Council[101] and the industry to promote upskilling, particularly among smaller retailers. It will develop an action plan by end 2008 for this.**

101 Skillsmart, http://www.skillsmartretail.com/

Chapter 7

Broad barriers to innovation and the role of Government

Summary

This chapter discusses common themes to emerge from the project and the role of Government in addressing them to help improve business performance. The main broad barriers to innovation identified by the project can be summarised under the following headings:

- **Transparency and openness of markets:** the entry of small firms bringing new ideas and new business models can be blocked when markets lack transparency and openness to competition. Government has a key role in supporting openness and transparency in markets, including promoting development of international outcome based standards, to enable SMEs to enter global value chains with new innovative products and services which meet the accepted requirements;
- **Coordination and communication of Government interventions:** Government interventions in the market (through regulation and procurement) need clear objectives, without being prescriptive, in order to send strong signals of the need for change through innovation;
- **Awareness of new developments, improving uptake of technology and promoting a culture of change:** a need to overcome lack of awareness of technology developments and emerging applications, and a culture which is resistant to change, particularly on the part of users of services**;**
- **Trust in the internet as a platform for business:** problems of trust in a world of e-commerce, where the ability to establish identity unconditionally is critical to creating relationships on a reliable basis; and
- **Access to finance for growing, innovative businesses**.

7.1 These issues are discussed below in turn.

Transparency and openness of markets

7.2 As the drive to develop better performance of products and services becomes ever more urgent, and developments in ICT permit greater specialisation of tasks, so value chains and networks are becoming ever more complex. Innovation is increasingly being driven by small firms with unique solutions to the challenges faced. In such an environment it is manifestly important that Governments ensure that markets remain as open and flexible as possible, including facilitating new entry – especially as new businesses are seen widely as a key driver of innovations – and accord this a high priority. Our enquiry has opened up two important aspects:

7.3 **The role of standards:** all of the SIGs have pointed to the role which standards can play in developing a common understanding of the service being offered by developing terms and definitions, by setting minimum standards and by ensuring that information which enters the value chain can be handled automatically without recourse to further manual intervention i.e. that standards are inter-operable. The importance of inter-operable standards in promoting improvements in productivity has been recognised by the United States National Institute of Standards and Technology (NIST) which researched a number of value chains and identified that inter-operable standards could improve productivity by almost 1.2% of the value of shipments in each industry examined[102]. Its study of the lack of inter-operability in the US capital facilities industry in 2004[103], considered that a conservative estimate of the annual cost to be $15.8 billion. On the basis of these studies, a reasonable "guesstimate" for the UK construction industry would be around £1 billion. Supported by DIUS, BSI has recently reconstituted its Construction Panel and given a focus to inter-operability in the standards process. But the level of activity and support for Building Information Modelling (BIM) and interoperable standards is far higher in the USA, Germany, France, Denmark and the Scandinavian countries in relation to public procurement and the development of a community of expertise. For example, the US Property Services Agency and DoD agencies have adopted the standards approach and are driving it across their estates. A spin off for Scandinavia is the growth of small innovative specialist construction software firms: a classic example of standards creating the innovation opportunity.

7.4 Standards are also important in the very creation of markets. For example, without reliable evidence of the tangible benefits to be derived from investment in sustainable solutions, the environmental services sector is finding it difficult to make headway. However, as already mentioned, growing interest in the concept of a "carbon footprint" has brought about the collaboration between DEFRA, BSI and the Carbon Trust over agreed approaches and definitions, in the form of PAS 2050: Specification for the assessment of the life cycle of

102 Economic Impact of Inadequate Infrastructure for Supply Chain Integration, May 2004, NIST
103 Cost Analysis of Inadequate Interoperability in the U.S. Capital Facilities Industry, August 2004, NIST

greenhouse gas emissions of goods and services, which is due to be published later this year. This sets out a framework (see Annex C) to enable firms to measure and reduce greenhouse gas emissions, to voluntarily offset emissions and provide an accepted means for making claims about the carbon neutrality of their operations. BSI will be working to identify the need for further standardisation within this framework. The importance of this work should not be underestimated: the creation of a single authoritative method of calculating Greenhouse Gas Emissions will allow comparability and this will enable innovations to be costed and the benefits measured – there is a market in the making.

7.5 A key conclusion from this element of this project is that because standards are widely perceived to be an important part of the institutional framework for promoting service definition and market flexibility, there is the opportunity to develop the UK's strategy for the development of standards in the service sectors. For example, the logistics SIG counted 176 standards relevant to their sector but there is no Logistics Panel at the BSI. Similarly, the new Construction Panel identified some 3,000 standards for the construction industry but only 200 were in active use. Standards development in these sectors seems to have been in response to immediate market needs and opportunities.

7.6 It is also important to recognise that, in a world of global supply chains, standards development needs to be made at the European and international level. The Commission and other member states accept this and are in common cause[104]. It is also a priority for our leading competitors who appear to use standards as a means of forcing the pace of innovation. But for the UK to play an active role in the process and to ensure that standards development is genuinely open, UK firms need to co-ordinate their efforts and determine where to focus them in the international fora.

7.7 A recent development here has been the announcement in the Innovation Nation White Paper that BSI will undertake a strategic review of standards for services. It will be important that Departments which share a policy interest in standards development play a strong role in the process.

7.8 **The role of competition agencies:** As the recent Treasury/BERR report[105] on productivity emphasised, competition policy is an important policy tool in maintaining the openness of markets. However, the speed of developments in service markets, relative to the semi-judicial process of developing the case for investigation, undertaking the enquiry and then implementation, means that firms consider bringing the competition authorities into play to open up markets is very much a last resort, albeit a critical lever of last resort.

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104 Commission Communication: "Towards an increased contribution from standardisation to innovation in Europe", COM (2008) 133 Final.

105 Productivity in the UK 7: Securing long-term prosperity, November 2007, http://www.hm-treasury.gov.uk/documents/enterprise_and_productivity/the_evidence/ent_prod7_index.cfm

Actions:

a) In view of other countries' focus on standards, the strategic review of standards for services by BSI will take account of how major overseas competitors develop and disseminate standards.

b) In the discussion of strengthening the competitiveness of services in the EU after 2010 ("Lisbon 2"), BERR will pursue as a priority the development of standards as a means of improving the efficiency and openness of European markets, and enabling European firms to participate in global value chains.

Coordination and communication of Government interventions

7.9 Businesses have emphasised the risky nature of innovation: there is, and business expects there to be, a high failure rate. They have stressed the importance for Government to recognise that the way it implements policy, either in the form of procurement or regulation, acts as a signal of its support for innovation: procurement processes which focus on price and the wholesale transfer of risk to the contractor constrain innovation; similarly, regulation which is too prescriptive can favour incumbents or traditional practices at the expense of innovation. But perhaps most of all, innovation by business involves investment and putting shareholders' funds at risk. Where Government intervention impacts significantly on the market, then any perceived lack of commitment to, or consistency of, Government policy will inevitably impact upon market risk and investment. The report has addressed this issue in relation to the specific sectors studied in the previous chapter.

Raising awareness of developments, improving uptake of technology and promoting a culture of change

7.10 Chapter 5 highlighted the changing nature of value chains/networks and the need for agility when market developments are so rapid. The growth of the UK service sector and its performance in world markets suggests that the UK is well placed but the study also suggests a need to strengthen its capability and the interaction among businesses with related interests.

7.11 **Awareness of new developments:** Because of the fragmented and changing nature of value chains, and the increasing role of innovative SMEs, several SIGs e.g. environmental services and internet services saw the need for activities which helped foster links between organisations with potentially common interests. For example, the internet services SIG considered that UK service providers were insufficiently aware of UK centres of excellence in advanced knowledge based tools and associated areas of search and semantic web development. The Technology Strategy Board is supporting Knowledge Transfer Networks in a number of the relevant areas – Modern Built Environment, Intelligent Transport Systems (and Location and Timing), Resource Efficiency

and the Environment and the Creative Industries. However, a number of issues need to be addressed:

- As the UK comes to rely more on its knowledge intensive SMEs, and where innovation is increasingly undertaken in a collaborative or "open" manner, so Knowledge Transfer Networks and the activities of regional networks and clusters take on a greater importance.
- Given that value chains are increasingly global, and that competition in knowledge based services is international, KTNs need to develop a strong global outlook and develop closer relations with UKTI and the Science and Innovation Network located in UK embassies overseas.
- While the Technology Strategy Board inevitably places a focus on the technology aspects of knowledge transfer, successful innovation is multifaceted as Chapter 5 has indicated. As a result, there would be advantage in securing greater synergy and co-operation with other networks central to the innovation agenda, particularly standards and skills, as the report illustrates in chapter 6.

CASE STUDY

An example of a Knowledge Transfer Network in action: Resource Efficiency

106 Resource Efficiency KTN. for more information see www.resource-efficiency.org

As business changes its attitude to external collaboration, so service providers have to innovate in their support to business. Knowledge Transfer Networks (KTNs) have been established by the Technology Strategy Board to identify opportunities for member businesses. They bring together businesses, universities, research, finance, and technology organisations to stimulate innovation through knowledge transfer and sharing of ideas.

"KTNs bring the concept of open innovation to reality," says Arnold Black, Director of the Resource Efficiency KTN (RE KTN), "and we help entrepreneurs and innovators 'play on a fairer surface' by informing policy makers of developments and business needs."

RE KTN is a typical KTN in that its themes and activities are guided by a business led steering group. According to Arnold Black, "We are run by business for business." The concept has proved attractive; in the last two years RE KTN alone has grown from a legacy community of a few hundred to over three and a half thousand members. Leading centres of research and both large and small firms are actively involved, and the network boasts a research portfolio of over £32 million.

KTNs help firms understand new market and technology developments; developing technology roadmaps which, also inform funding bodies and policy makers of emerging needs and barriers. As well as face to face events, RE KTN uses Web 2.0 technology to promote community debate and collaboration. Examples include

- Several online applicant guidance sessions for UK (Technology Programme Zero Emissions Enterprise) and European (Intelligent Energy Europe) collaborative R&D programmes;
- Featured content such as an exclusive interview with P&G's Global V-P of Open Innovation Jeff Weedman;
- Open and closed special interest group communities.

'The Glycerol Challenge' project for instance, is investigating adding-value to by-product glycerol from biodiesel production. A project webinar through RE KTN attracted over forty participants from around the globe. According to project lead Dr. Keith Simons "Without RE KTN assistance we would have been unlikely to attract the quality of industrial partners we ultimately achieved."[106]

Action:

In developing its new strategy, the Technology Strategy Board will aim to expand participation of service firms in its activities and attach particular importance to KTNs as a means of promoting further knowledge sharing about technological and global market developments.

7.12 **Uptake of new technology:** as the earlier analysis has indicated, the ability of firms to capture information, and make best use of it, is a critical factor in their agility and competitiveness. The chapter on service innovation identified the need for the UK to be at the leading edge of modelling, network and search technologies. But the effective use of ICT is a core competence for all firms, not only the most innovative. Thus, the Information Age Partnership[107] and the academic literature have given focus to the ability of UK business to maximise the use of, and return from, investment in ICT.

7.13 A recent survey by Capgemini of the FTSE 350[108] emphasises the loss to British business of poor information management. It estimated that the failure of these leading firms to manage and exploit the information within their organisations effectively amounted to a loss of earnings of £44 billion pa. The scope to improve customer relationships, together with the information necessary to strengthen operational efficiency, were cited by leading executives as areas with particular scope for improvement. This report is complemented by a considerable body of evidence to suggest that US companies generate higher productivity from investment in ICT than UK and other non-US firms.[109] [110]

7.14 Furthermore, if customer focus and an understanding of business processes are critical to innovation, then the 2006 ONS survey of e-commerce in business, see Tables 7.1 and 7.2 below[111], suggests that UK firms have not invested adequately in key areas of information management, e.g. the uptake of Enterprise Resource Planning and Customer Relationship Management software – even by the largest companies.

Enterprise Resource Planning (ERP) software is an integrated suite of software applications typically handling the manufacturing, logistics, distribution, inventory, shipping, and invoicing.

Implementation of ERP software can deliver lower stock and other, e.g. transportation, production, costs, and savings from using less land, plant, machinery and staff to maintain the same level of operation.

107 Unlocking the Potential of Information and Communication Technology (ICT), IAP/DTI, June 2007
108 The Information Opportunity Report 2008
109 Information Technology and Productivity, Sadun and Van Reenen, EDS/LSE, October 2005
110 O'Mahony and Van Ark "EU Productivity and Competitiveness: An Industry Perspective" 2003
111 http://www.statistics.gov.uk/downloads/theme_economy/ecommerce_report_2006.pdf

Customer Relationship Management (CRM) is about acquiring and retaining customers, improving customer loyalty, gaining customer insight, and implementing customer-focused strategies. To manage the relationship with the customer a business needs to collect the right information about its customers and organise it for proper analysis and action.

7.15 The survey also reveals a significant difference in the extent to which SMEs and large firms have linked business process systems, for example, automatically linking electronic systems for placing or receiving orders with other activities.

Table 7.1. Businesses' use of software, by size of business, 2006

Employment size	10–49	50–249	250–999	1000+	All sizebands
Per cent					
Enterprise Resource Planning Software (ERP)	3.8	17.0	27.4	37.2	6.5
Free or open source operating system	4.6	12.6	19.3	29.4	6.3
Customer Relationship Management (CRM) Software to:					
Capture and share information about customers with other internal business functions	8.8	20.4	28.0	42.4	11.1
Analyse information about customers for marketing purposes	8.4	21.0	26.7	41.9	10.9

Base: UK businesses with 10 or more employment
Source ONS e-commerce survey, 2006

Table 7.2. Businesses with software applications for placing/receiving orders, by size of business, 2006

Employment size	10–49	50–249	250–999	1000+	All sizebands
Per cent					
Business with software applications to manage placing/receiving orders	34.4	58.7	70.7	81.5	39.1
Type of automatically linked software application					
Production, service operations logistics or delivery systems	15.1	34.1	43.7	59.1	18.8
Invoicing or payment systems	20.2	39.7	50.7	67.0	24.0
Suppliers' ordering or business systems	10.3	16.8	26.0	44.3	11.8
Customers' ordering or business systems	9.8	17.9	26.4	36.9	11.5
Internal system for re-ordering replacement supplies	11.3	23.3	34.1	47.3	13.8

Base: UK non-financial sector businesses with 10 or more employment
Source ONS e-commerce survey, 2006

7.16 The evidence suggests that there is a considerable task of awareness and education to be carried out about the effective deployment of ICTs. RDAs recognise the importance and scale of the challenge. BERR has undertaken a feasibility study to develop an ICT Business Process Centre of Excellence to enable UK firms to re-engineer their business processes through an enhanced capability in the use of ICT. The Department is now discussing with Advantage West Midlands and the Warwick Manufacturing Group how best to establish a pilot, which would link into the Business Link infrastructure, in order to target the SME community.

Encouraging use of ICT in business processes to add value

Advantage West Midlands is piloting an IT Advisory Service (ITAS) as a specialist service of Business Link West Midlands. This is to address the economic potential of improved productivity and increased GVA from the use of Information and Communication Technology (ICT) which in the West Midlands could increase the region's output by £3bn. A key factor in achieving this has been identified as the quality and accessibility of trusted independent advice for businesses. The pilot will evaluate alterative delivery methods for the delivery of this service and also how the service might be scaled up to impact some 10,000 SMEs per year over a 3 year period which is the scale of intervention required to make a difference in the region.

The ITAS service will be available region wide across all market sectors but will focus on those sectors which are likely to yield the greater economic return including service sectors. This work is closely aligned with the proposed Business Process Centre of Excellence, and Advantage West Midlands together with the National B2B Centre based at Warwick University are supporting the concept by developing a pilot.[112]

7.17 **Skills and service development:** Related to the above, a number of leading service firms with global operations consider that there is a skill-set, combining systems thinking, technology awareness, customer focus, creativity and people management, which is critical to the successful development of new services. Members of the SIGs have also recognised the need to develop people with a range of capabilities, based on core specific skills. This goes to the heart of where leading service firms will locate their operations and, in the USA, Congress is sufficiently concerned about the nature of skills in a complex service environment to be funding research into the topic (see Annex D on International Policy Developments). Given the importance of services to the economy, BERR and DIUS will monitor developments in the USA.

7.18 **A culture of change:** But there is a more difficult and fundamental question and that is whether UK businesses – particularly medium to large sized firms, with the aspiration and capability to grow – have the leadership and management skills to develop a culture which enables the organisation to cope with endemic change, what Prof Gary Hamel calls "management innovation". A recent study by Prof Nick Bloom on behalf of McKinsey [113] of 4,000 firms across the globe has

112 Advantage West Midlands http://www.advantagewm.co.uk/

113 Management Practice and Productivity: Why they Matter. Prof Nick Bloom et al Centre for Economic Performance and McKinsey &Company July 2007.

confirmed the importance of business ownership and management practices to business performance. Family owned and family managed business models displayed lower productivity compared to dispersed shareholder models with professional management teams. But perhaps the key finding is that, while the UK has one of the most flexible labour markets in the world, the report concludes that the relatively low proportion of managers with graduate qualifications is leading to poor management performance compared to global competitors. BERR Economics Paper No1[114] considers the evidence relating to UK leadership and management skills and the implications for raising UK business performance.

7.19 The evidence from this project suggests something of a paradox: that business is aware of the importance of management and workforce skills in improving business performance but many are failing to invest sufficiently in those skills. For example, a study by Mabey and Ramirez[115] found that UK organisations spent only one third of the amount on management training as German organisations and significantly less than organisations in France or Spain. It suggests a need to raise the profile of management training and skills with the business community and to communicate more effectively the value of the programmes on offer in terms of raising business performance. Government has already begun to address this issue: DIUS's revised Train to Gain strategy is giving greater priority to the management and leadership skills of SMEs. The Train to Gain investment in leadership and management skills has risen to £30m this year from £4m previously. However, more needs to be done.

7.20 These management of change skills also encompass consideration of workforce skills. Leading services providers give attention to their core workforce skills to ensure a customer focus and optimise their performance. DHL Aviation (UK) Limited provides an example of this approach paying dividends.

114 BERR Economics Paper No1 February 2008.

115 "Developing Managers: a European Perspective" Mabey and Ramirez, Chartered Institute of Management , 2004

CASE STUDY

Maths and English Skills saved DHL £400,000

DHL Aviation (UK) Ltd, which is part of the Deutsche Post World Net Group, is a leading freight logistics operator, employing 800 in the UK. In a service industry where the customer is king, it is constantly looking for new ways of being competitive. It is keen to attract, retain and develop its workforce, recognising the links between a happy workforce and a healthy and successful business. Senior management looked at some key areas to help improve business performance: productivity; absence; turnover; progressing the workforce from temporary to permanent contracts; promotion and continuous professional development; and morale.

To help attract, retain and train employees, it was identified that improved levels of literacy and numeracy (Skills for Life) would be beneficial in all these areas, and DHL Aviation decided that the best approach would be to fully integrate key skills into the workplace. They came up with a strategy to improve basic skills across the organisation which covers English – defined as speaking and listening, reading and writing, and Maths – defined as numbers, measures, shapes and space, and handling data. The numeracy and literacy requirements of all job roles were identified and mapped to the relevant areas of the adult education curriculum. This process helped to highlight exactly what skills were required for each role and enabled tailored training plans to be developed for each employee. The training was then delivered through a combination of on and off-site facilities with employers given paid time off to learn, and was supported by a network of workplace learning champions.

The results have been:

Employees have fully bought into the programme

- The accident rate amongst learners is 50% lower than the company average
- Employee turnover has fallen significantly, saving over £400,000 in recruiting and temporary staffing costs
- The absenteeism rate amongst learners is 0.86%, the company average is 5.3% representing an annual saving of £120,000
- Employee surveying shows they are more satisfied working for DHL
- Supervisors are championing employee development
  Since the launch of the basic skills programme productivity has increased by 12%
- The programme is fully embedded within the organisation and continues to deliver successful results.[116] [117]

116 DHL Aviation (UK) Limited, http://www.dhl.co.uk/publish/gb/en/eshipping/dhlitnow.high.html?gclid=CIj39b6F8ZMCFQ4YQgodHCqkzA

117 Skills for Logistics, http://www.skillsforlogistics.org/en/

Actions:

BERR and DIUS, working with the RDAs, will strengthen business engagement with provision of learning opportunities and leading practice, e.g. via the Train to Gain Strategy, and raise awareness of the Technology Strategy Board's Innovation Climate work and the ability to enhance workforce skills through the Sector Skills Councils.

BERR and DIUS will explore with the Advanced Institute of Management how to disseminate more effectively the research findings and management insights, which lie within its network of higher education institutions, to the business community, including SMEs

BERR is considering a pilot in the West Midlands, to transform business processes through the innovative application of information and communications technology, in order to identify the benefits to SME performance, the barriers to wider uptake, and the case for developing a wider network of expertise.

7.21 These actions will promote a step change in business engagement with sources of learning and leading practice. It is proposed that, as a next step, BERR should liaise with DIUS and the RDAs, Technology Strategy Board, Skills Councils and the Advanced Institute of Management – as well as consulting business and representative bodies such as the CBI – to strengthen business awareness of learning opportunities, not least in the key areas covered in this report, e.g. managing innovation and change, and managing information and the firm's intangible assets.

7.22 It is also important that management development programmes have access to management metrics which are meaningful to the target business audience. As the section on Measuring Innovation Performance indicated, innovation capacity in the service sector would appear to be more closely related to ICT, people and standards frameworks, with value added and profit margins an important check on the trend of past performance. As NESTA takes forward work on developing an Innovation Index, it will wish to ensure that the outcomes are metrics which inform business and policymakers' strategic thinking.

Trust in the Internet

7.23 Trust and confidence are vital to making the UK the best place for e-business. The internet services SIG reflected this. Internet security issues are of increasing concern to business. Broadband has allowed companies to increasingly use the internet to reach their customers. The threats to online business – in particular issues around identity theft and the loss of confidential information – remain.

7.24 BERR's 2008 Information Breaches Survey, published in April, indicated that there were several areas of improvement:

- Numbers of security incidents have fallen overall and overall costs of security incidents have also fallen (35% down from 2006 figures)
- Decline in virus infections (back to the levels of 2000).

7.25 However, there is still significant concern that confidential information is at greater risk than before, especially in large businesses, and many companies are not doing enough to protect themselves and their customers' information:

- Unauthorised access by outsiders (hacking) is four times the level seen in 2002
- Although breaches are fewer in number, the average incident is now more serious than in previous years
- More investment in staff awareness training.

7.26 Government is working collaboratively to protect businesses and individuals from internet security threats. On the domestic policy front, Get Safe Online (www.getsafeonline.org) brings together Government, industry and law enforcement in a partnership to resource a campaign to give people the advice, guidance and the tools they need to be safe online.

7.27 In addition, the Technology Strategy Board has recognised the importance of trust and confidence in e-business through its support of the Network Security Innovation Platform. The Cyber Security KTN is also engaged in a sustained programme involving the examination of privacy and privacy enhancing technologies, and has made funds available for a number of combined public, private and academic working groups in the related areas of human vulnerabilities, trusted computing, security of service oriented architectures, e-crime prevention and off-shored operations.

7.28 It is important for Government to command public confidence and to be able to demonstrate that information is safely stored and protected. Following on from the Cabinet Office review of data storage across Government various measures are being put in place which amount to a new set of minimum standards and involve:

- core measures to protect personal data and other information across Government
- a culture that properly values, protects and uses information
- stronger accountability mechanisms within Departments
- stronger scrutiny of performance.

7.29 Government is also active in developing and influencing domestic and international policy to embed good security practice within the UK business community – BERR has worked with British Standards and industry to develop and promote standards on information security management. In addition,

Government supports the establishment of an industry led partnership – the Internet Crime and Disorder Reduction Partnership – which will complement the work of the fraud and central e-crime unit. Work has already been undertaken within the context of the UK Internet Governance Forum, led by Alun Michael MP and involving business, Parliament and civil society as well as Government Departments and the Police. Government would like to develop, as part of the National Fraud Reporting Centre, an integrated response to electronic crime. BERR supported the 2007 launch of the Institute of Information Security Professionals – an accreditation authority for the industry. Recognising quality professionals working in the industry will allow for more security about advice, services and products they provide.

7.30 As part of the European Commission's proposals for the Review of the Regulatory Framework for Electronic Communications, the Commission is examining the need for a more formal approach to setting recognised security standards for information technology. This area has yet to be formally debated and negotiated, and BERR is currently inviting comments from stakeholders in a consultation[118].

Access to Finance for growing, innovative businesses

7.31 Innovation not only needs new ideas and skilled teams, but also funding. In common with the Sainsbury Report, several SIGs have noted the difficulty of good projects raising equity capital below £2 million. In some cases this may be that sources of finance find it difficult to assess the risk and potential rewards associated with potentially disruptive innovation, for example where the new service is based on a different business model.

7.32 This report does not look in detail at the issue of access to finance, as this is being addressed in other work. The recent Enterprise Strategy[119] is a key component and an important catalyst for helping innovative and high growth sectors to access the finance they need. The Strategy announced the launch of a third round of Enterprise Capital Funds aimed at high growth early stage sectors, with around £50 million available to invest and a further £100 million available to commit in two subsequent rounds. It also committed BERR to work with NESTA, RDAs, and other stakeholders to improve access to finance for business through, for example, establishment of a National Investment Readiness Framework including the provision of mentoring, management and skills to business. It is expected that the availability of this Framework across the RDAs will be announced in early 2009. BERR is sharing its research objectives, and seeking to collaborate where possible. Using the platform of Business Support Simplification, the overarching aim is to streamline the environment of business support, so that businesses see all potential finance

118 Consultation on EU Proposals for a revised regulatory framework for electronic communications networks and services: http://www.berr.gov.uk/sectors/telecoms/2006review/page26449.html . Responses are invited by 2 September 2008.

119 Enterprise Strategy, published in March 2008, http://www.berr.gov.uk/bbf/enterprise-smes/enterprise-framework/index.html

possibilities together with associated support measures, such as mentoring, to enable the best chance of success.

7.33 BERR will also collaborate with DIUS, NESTA and other partners to describe and promote an integrated "escalator of support" which reflects the integration of business support and funding at all stages of a business's development and growth. This will be taken forward in a joint BERR / DIUS research project during 2008/09 which will investigate the equity gap and the extent that private and public sector interventions meet the financing needs of early stage, high technology and innovative businesses.

Chapter 8
The Regional dimension

Summary

The project's analysis has been considered with the nine Regional Development Agencies for the English regions, who have been supportive. The RDAs are working in support of performance and growth in the service economy in their respective regions, including operating with business clusters impinging on the service sectors considered in this project report. They are well placed to contribute, through their lead in simplifying and delivering business support and networking activities, towards efforts to achieve stronger cohesion in Government policy delivery, to which the project's Sector Innovation Groups attach priority.

8.1 The project's analysis has been considered with the nine Regional Development Agencies for the English regions. The issues addressed in this report are crucial to the RDAs in their primary role as the strategic drivers of regional economic development in the English regions. Indeed, these issues go to the heart of the RDAs' statutory purposes, which include promotion of business efficiency and competitiveness, enhancement of employee skills and contribution to sustainable development within their regions.[120] It is also clear that the RDAs are well placed to contribute, through their lead in simplifying and delivering business support and networking activities, towards efforts to achieve stronger cohesion in Government delivery. They engage and work with a wide range of regional stakeholders. They can also access small and medium-sized businesses more effectively than Central Government.

8.2 The English RDAs' agenda in relation to business performance and growth is shared by the arms of the Devolved Administrations responsible for driving economic development in Scotland, Wales and Northern Ireland: respectively, the Enterprise, Energy and Tourism Directorate of the Scottish Government; the Northern Ireland Department for Enterprise, Trade and Investment (DETI); the Welsh Assembly Government's Department of Economy and Transport. They

120 Under the Regional Development Agencies Act 1998, each of the English RDAs has five statutory purposes, which are:

- To further economic development and regeneration
- To promote business efficiency, investment and competitiveness
- To promote employment
- To enhance development and application of skill relevant to employment
- To contribute to sustainable development

are also taking account of the trends towards "servicisation" of manufacturing and the growth of service sectors in their territorial economies. In this context, for example, in Northern Ireland, DETI recently commissioned a report reviewing sector innovation in its territory, including a sample of service sectors. This report was published for consultation in April 2008.[121] DETI's intention is to consider a strategic approach to its administration's interventions in support of service sector innovation in Northern Ireland.

Table 8.1. England Regional Development Agencies – economic cluster activities related to the Innovation in Services project sectors

	Retail	Logistics	Environmental Services	Construction	Internet services
North East					*
North West			*		*
Yorks and Humberside		*	*		
East Midlands					
West Midlands		*	*	*	
East of England		*	*	*	
South East		*	*	*	
South West			*		
London		*	*	*	*

8.3 The RDAs are working with service sector businesses in their regions. This includes support for business clusters which impinge on the service sectors considered in this project. A number of them have indicated their interest in the analysis undertaken for this project. It can inform and contribute towards their work in this context, not least in the context of the 2008-10 roll out of the rationalised portfolio of business support products under the Business Support Simplification Programme[122]. RDAs are active in relation to key issues, both generic and sector-specific, covered in this report:

- **Business networks:** This project has underlined the value of networks as a mechanism, not only for disseminating new ideas about the uptake of technology and good practice, but also to help service providers, especially SMES, to identify commercial partners to compose new service offerings. There is a strong case for exploring with the RDAs additional ways to build stronger linkages between the networks and service sector clusters in their

121 "Innovation in Northern Ireland Tradeable Services", Roper, Hewitt-Dundas and Love, April 2008, http://www.detini.gov.uk/cgi-bin/get_builder_page?page=3813&site=4&parent=126&prevpage=1407

122 Business Support Simplification Programme, http://www.berr.gov.uk/bbf/simplifying-business-support/page44805.html

regions and the Knowledge Transfer Networks of the Technology Strategy Board, to raise awareness of market and technology developments. In discussion, a number of them also agreed that it would be useful to reorientate the KTNs to emphasise more strongly the interests of the service economy, without sacrificing their continuing engagement with manufacturing; and to strengthen the networks' role in communicating latest international market and technology developments.

CASE STUDY

Making creative connections

The Technology Strategy Board has recognised the growing importance of Creative Industries as a driver of growth and innovation across UK industry with the establishment of the Creative Industries Technology Innovation Network. Unlike other knowledge transfer networks, which operate within a particular technology or supply chain, the CITIN operates across all sub-sectors of creative industries. Therefore its remit addresses a host of digital technology areas and markets outside the creative industries as it seeks to drive innovation in the sector across domains of content and user experience, services and technology.

For this reason, no single organisation presented itself as an obvious host for CITIN. In consultation with industry and stakeholders, including RDAs, it was agreed to establish a competitive process to appoint a management organisation.

NWDA was selected to represent the 9 English regions on the selection panel which assessed 13 applications, eventually appointing a consortium led by University of the Arts London and including Imperial College, computer games trade association TIGA, and the Royal Institute of British Architects.

NWDA remains on the Steering Group of CITIN as it moves forward.[123]

123 Northwest Regional Development Agency, http://www.nwda.co.uk/

CASE STUDY

Delivering logistics

Reva Industries Limited is the fourth largest manufacturer of acrylic baths in the UK, based in Hull. Currently operating across Western Europe, Reva is looking to grow its market share and provide a wider range of products to its customers. The company has worked with several schemes aimed at business improvements, including now the Logistics Institute, based at Hull University Business School, which is part-supported by Yorkshire Forward.

Reva is going through a period of change throughout all areas of the business, and wished to see how its logistics activities could be improved to support this and ensure all new developments were successful. With the Logistics Institute positioned locally, it was a natural choice for assistance in this area. The Logistics Institute agreed the following objectives for a three year plan of work with Reva Industries: to identify efficient supply routes for Reva; to determine solutions for both short and long term issues; to examine key operational, contractual and service level requirements; and develop an implementation plan. A project-based approach allowed Reva to benefit from high calibre specialists being employed to complete the work Unforeseen benefits identified in the process mapping exercise are already providing additional costs savings, which are in effect likely to fund the exercise before the main parts of the project in start. As a result of the work carried out, Reva can now be assured that any logistical change that goes ahead will be as effective as possible from the outset and that this will improve greatly the chances of successful growth of the business. Gary Stevens, Managing Director, said "The work undertaken by our team at the Logistics Institute has been a real eye opener. Not only has this work identified and realised cost savings for us in the initial phase, their professional approach to the project gave me great confidence in achieving our objectives."[124]

- **Fostering "management of innovation skills" across the service sectors:** RDAs recognise the view from the SIGs that the leadership and high level management skills in leading firms in the service sectors are not widespread in the business community. RDAs are working in various ways with business to help service businesses in their regions focus on this agenda. They are promoting the development of management and workforce skills. They are also raising awareness of the strategic role of ICT in underpinning business processes for innovation in service offerings.
- **Sustainability:** There is a major challenge to develop the significant new infrastructure needed to deliver a more sustainable model of waste management, and to continue moving away from the historic reliance on landfill. The evolution of waste management into resource management, and the use of the Private Finance Initiative in increasingly large scale waste management schemes, are turning waste into more of a regional

124 Yorkshire Forward, http://www.yorkshire-forward.com/www/index.asp; Logistics Institute, Hull University Business School, www.uhli.org

issue and a resource to be managed across a regional economy. The RDAs are active in supporting development of industry capabilities and infrastructure. Considerations of sustainability and sustainable communities and economic development are now central to major generation projects in which RDAs are playing key delivery roles. For example, the delivery plan for the Thames Gateway initiative, for which the three Greater South East RDAs are key partners, aims to develop the area as the UK's first "eco-region": a low carbon region and to develop it as a new model for the management of waste and water resources[125].

CASE STUDY

New markets for recyclable products

Merseyside has been chosen by the Government to host a flagship New Technologies Demonstrator Project. The scheme is a partnership between Merseyside Waste Disposal Authority, the Department for Environment, Food and Rural Affairs (Defra) and Northwest Regional Development Agency (NWDA) and its subsidiary Envirolink Northwest.

The new generation technology has been developed by Orchid Environmental Limited and can be used to treat 50,000/80000 tonnes a year of mixed municipal waste. This prestigious national pilot project will convert non-hazardous household waste to a high quality green fuel using a patented process called Mechanical Heat Treatment (MHT). The process uses hot air and is seen as an environmentally-friendly alternative to traditional incineration and landfill options. It can recover a range of recyclable materials which would otherwise be landfilled.

The NWDA through Envirolink Northwest and its recycling and waste team, will promote the project and help to develop markets for recyclable products produced by the process as well as monitoring its technical and economic success. Envirolink is also working closely with Orchid to promote supply chain opportunities in the construction and operation of the demonstrator plant.

The plant will initially process 50,000 tonnes of municipal waste a year. Having recovered readily recycled products such as plastics, metals, glass and aggregates, it then converts the remaining waste into refined biomass fuel products to supply energy use markets off-site.[125] [126]

125 Thames Gateway Delivery Plan, DCLG, November 2007, http://www.communities.gov.uk/documents/thamesgateway/pdf/565039

126 Northwest Regional Development Agency, http://www.nwda.co.uk/

127 Orchid Environmental Limited, http://www.orchid-environmental.co.uk/

8.4 The project team is exploring with the RDAs how to integrate them strongly in implementation of the project's action plan, taking account of the Business Support Simplification Programme. The RDAs are potent delivery agents for Central Government across the English regions and there is a real opportunity to integrate them closely in the implementation plans.

Chapter 9
Action Plan

This table sets out the action plan to implement the findings and recommendations of the Innovation in Services report.

Recommendations for Action (Report paragraph references)	Who will deliver this action ?	Working with…	Timescale for action
1. Information, internet content			
The assessment of the Trading Funds models, led by the BERR Shareholder Executive, will consider the contribution which the information they collect for public policy purposes could make to the UK economy; it will examine all options, including fundamental changes to their current business and organisational models, to maximise their contribution, while assuring the long term quality of the data. (Paragraph 6.10)	The Shareholder Executive	Office of Public Sector Information, HM Treasury, Cabinet Office, Trading Funds; business and other interested parties	Outcome of Trading Funds assessment to be reported to Ministers in autumn 2008
In the review of the EU Directive on Public Service Information (PSI), the Office of Public Sector Information will negotiate to achieve improved access to PSI across the EU with a view to creating a more open and innovative market for information services. (Paragraph 6.13)	OPSI	Public sector organisations, business; European Commission, other Member States	The European Commission is to review this Directive and report to Member States by July 2008. OPSI will work with other Member States to consider any proposals for modification.
The Technology Strategy Board will continue with its Innovation Platform in network security, and engage with content providers through their work in the Creative Industries Key Applications Area so they can capitalise on the internet as it evolves. (Paragraph 6.13)	Technology Strategy Board	Business, other stakeholders	Ongoing

Recommendations for Action (Report paragraph references)	Who will deliver this action ?	Working with…	Timescale for action
In the specific area of internet recruitment, BERR will consult on options for regulating permanent recruitment via agencies, in particular online recruitment, by the end of 2008. These options will ensure essential protections are in place for workers (and employers) while encouraging the development of new services with the potential to make the recruitment process more open and more efficient. (Paragraph 6.13)	BERR	Business, other stakeholders	BERR to consult by end 2008
2. Waste and resource management services BERR will work with Defra, and the Technology Strategy Board, engaging other stakeholders, to promote resource efficiency and good practice in waste minimisation and management during autumn 2008; with specific actions to be rolled out from 2009 onwards. (Paragraph 6.21)	BERR, Defra, Technology Strategy Board	Business community, local government, DIUS, Devolved Administrations, Regional Development Agencies, BSI British Standards, Resource Efficiency and Environmental Knowledge Transfer Networks, Envirowise, WRAP, NISP, Carbon Trust, Energy and Utilities Sector Skills Council, Commission for Employment & Skills, Environment Agencies	Scope, develop during autumn 2008; roll out in 2009

Recommendations for Action (Report paragraph references)	Who will deliver this action ?	Working with…	Timescale for action
3. Construction services BERR will			
a) take forward delivery of the Strategic Forum for Construction targets and the joint industry/government Strategy for Sustainable Construction, launched in June 2008	BERR	Strategic Forum for Construction, business	Strategy launch in June 2008
b) promote increased use of integrated teams to meet the new Strategic Forum targets for 2012, which were launched in 2008			Deliver targets for 2012
c) work with the industry to explore and disseminate the potential benefits of advanced ICT techniques, including Building Information Modelling by (i) helping industry to document results of BIM application by developing 3 project case studies by March 2009; and (ii) working with industry to develop a business case and strategy for the adoption of BIM techniques by May 2009.			i) Develop 3 project case studies by March 2009 ii) Develop business case by May 2009
(Paragraph 6.27)			
4. Logistics			
a) BERR will work with DfT, the Technology Strategy Board and RDAs, to raise participation in programmes to strengthen logistics business performance. BERR will consult the above parties and stakeholders to develop an action plan for this by end 2008; for implementation thereafter. There is the opportunity to pursue a similar, "coalition" model of coordination to that proposed above for waste and resource management.	BERR, DfT	RDAs, business, Technology Strategy Board	Establish action plan by end 2008
b) As part of this coordinated approach, BSI British Standards will undertake a strategic review of logistics standards development by end 2009.	BSI	BERR, DfT, DIUS, business	Complete review by end 2009
(Paragraph 6.36)			

Recommendations for Action (Report paragraph references)	Who will deliver this action ?	Working with…	Timescale for action
5. Retail BERR will			
a) in consultation with the existing Retail Policy Forum in summer 2008, broaden the Forum's remit to provide opportunities for debate between Government and industry on key emerging issues, looking beyond its current focus on regulatory matters;	BERR	Retail Policy Forum	Summer 2008
b) pilot during summer 2008 an e-newsletter on key emerging policy issues to widen awareness of policy developments across the retail sector; and	BERR	Business	Summer 2008
c) work with the Sector Skills Council and the industry to promote upskilling, particularly among smaller retailers. It will develop an action plan by end 2008 for this. (Paragraph 6.44)	BERR	Skillsmart, business	Establish action plan by end 2008
6. Transparency and openness of markets			
a) In view of other countries' focus on standards, the strategic review of standards for services by BSI will take account of how major overseas competitors develop and disseminate standards. (Paragraph 7.8)	BSI	Business and other stakeholders, DIUS and other Government Departments	Strategic review to be completed by autumn 2009
b) In the discussion of strengthening the competitiveness of services in the EU after 2010 ("Lisbon 2"), BERR will pursue as a priority the development of standards as a means of improving the efficiency and openness of European markets, and enabling European firms to participate in global value chains. (Paragraph 7.8)	BERR, DIUS	European Commission, other Member States, BSI, European standards bodies	The European Commission is expected to publish a Communication on a European Services Strategy during 2008. The UK should work with the Commission and other Member States' in considering next steps and the role of standards

Recommendations for Action (Report paragraph references)	Who will deliver this action ?	Working with…	Timescale for action
7. Raising awareness of developments, improving uptake of technology and promoting a culture of change			
In developing its new strategy, the Technology Strategy Board will aim to expand participation of service firms in its activities and attach particular importance to KTNs as a means of promoting further knowledge sharing about technological and global market developments. (Paragraph 7.11)	Technology Strategy Board BERR, DIUS	KTNs, RDAs	The Technology Strategy Board is currently reviewing its KTNs
BERR and DIUS, working with the RDAs, will strengthen business engagement with provision of learning opportunities and leading practice, e.g. via the Train to Gain Strategy, and raise awareness of the Technology Strategy Board's Innovation Climate work and the ability to enhance workforce skills through the Sector Skills Councils. (Paragraph 7.20)	BERR, DIUS	RDAs. Skills Council, Technology Strategy Board	Establish programme by end 2008
BERR and DIUS will explore with the Advanced Institute of Management how to disseminate more effectively the research findings and management insights, which lie within its network of higher education institutions, to the business community, including SMEs. (Paragraph 7.20)	BERR and the Advanced Institute of Management	RDAs, Skills Councils, Technology Strategy Board, business	Develop action plan in autumn 2008
BERR is considering a pilot in the West Midlands, to transform business processes through the innovative application of information and communications technology, in order to identify the benefits to SME performance of improved processes by the exploitation of ICT, the barriers to wider uptake, and the case for developing a wider network of expertise. (Paragraph 7.20)	BERR, Advantage West Midlands, Warwick Manufacturing Group	Other RDAs, business	BERR to review outcomes of this initiative; and explore with RDAs scope for establishing a wider network.

Glossary

Accelerating Change
Accelerating Change, published in September 2002 under the auspices of the Strategic Forum for Construction, set out an improvement agenda for everyone involved with the construction industry.
http://www.strategicforum.org.uk/pdf/report_sept02.pdf.

Advanced Apprenticeships
Occupational training frameworks in a programme under the auspices of the Learning and Skills council, http://www.apprenticeships.org.uk/

Advanced Institute for Management (AIM)
AIM develops and delivers management research, including trying to identify actions which enhance UK international competitiveness. It is funded by two research councils, the Economic and Social Research Council and the Engineering and Physical Sciences Research Council,
http://www.aimresearch.org/

BIM
Building Information Modelling

BSI
The BSI Group includes British Standards, which, as the national standards body of the UK, develops and sells standards and standardisation solutions to meet the needs of business and society. http://www.bsi-global.com/.

Building Schools for the Future
Building Schools for the Future is the school buildings investment programme, being delivered by Partnerships for Schools. http://www.p4s.org.uk/

Business Link
The Business Link network provides, at local level, information, advice and support on how to start, maintain and grow a business,
www.**businesslink**.gov.uk/

Business Support Simplification Programme
The Government's Business Support Simplification Programme (BSSP) aims to make it easier for companies and entrepreneurs to understand and access government funded grants, subsidies and advice with which to start and grow their businesses. BSSP is streamlining the system by reducing the number of support schemes from over 3000 to 100 or less, alongside making Business link the main channel by which businesses can access government support.
http://www.berr.gov.uk/bbf/simplifying-business-support/page44805.html

Cambridge University Report into the pricing strategies of Trading Funds

The Report "Models of Public Sector Information Provision via Trading Funds" by Professor David Newberry, Professor Lionel Bently and Dr Rufus Pollock was commissioned jointly by HM Treasury and BERR in July 2007 and published on 26 February 2008. http://www.berr.gov.uk/files/file45136.pdf.

Carbon Trust

The Carbon Trust is an independent company set up by Government in 2001, with a mission to accelerate the move to a low carbon economy by working with organisations to reduce carbon emissions and develop commercial low carbon technologies. http://www.carbontrust.co.uk/default.ct

Centre for Remanufacturing and Reuse

The Centre for Remanufacturing and Reuse has been developed to promote, where appropriate, the activities of remanufacturing and reuse. The Centre is funded through the Business Resource Efficiency and Waste programme, which is part of DEFRA. http://www.remanufacturing.org.uk/index.lasso

Commission on Environmental Markets and Economic Performance (CEMEP)

CEMEP was set up in November 2006 with a remit to advise Government on how the UK could make the most of the potential economic benefits of the transition to a low carbon, sustainable economy. CEMEP's report, published in November 2007, set out analysis of environmental markets, and made recommendations for Government policy development and on how business should respond. The Government's response, "Building a Low Carbon Economy: unlocking innovation and skills", setting out actions being taken to address the recommendations of CEMEP, was published in May 2008. http://www.defra.gov.uk/environment/business/commission/index.htm

Energy Using Products (EuP)

The EuP Directive 2005/32/EC establishes a framework for the setting of eco-design requirements for energy-using products aims to improve the environmental performance of products throughout the life-cycle, by systematic integration of environmental aspects at a very early stage in the product design. http://www.berr.gov.uk/sectors/sustainability/eup/page38894.html

Enterprise Strategy

On 12 March 2008, the Government launched a new Enterprise Strategy. The Strategy's central vision is to make the UK the most enterprising economy in the world and the best place to start and grow a business. It is designed to unlock the nation's entrepreneurial talents; boost enterprise skills and knowledge; help new and existing business get funding to start up and grow; and ease the burden of regulation – particularly on small firms which feel its impacts most. The Strategy may be viewed at: http://www.berr.gov.uk/files/file44992.pdf

EU Seventh Framework Programme (FP7)

FP7 is the European Union's current main instrument for the funding of research and development in science, engineering and technology, running from 2007 to 2013.
http://www.berr.gov.uk/dius/science/int/euro-programmes/fp7/page8390.html
http://ec.europa.eu/research/fp7/index_en.cfm

Freight Best Practice Programme

This programme is funded by the Department for Transport to promote operational efficiency within freight operations in England. http://www.freightbestpractice.org.uk/

GVA – Gross Value Added

GVA measures the contribution to the economy of each individual producer, industry or sector in the United Kingdom.

Information Age Partnership (IAP)

IAP is a forum to provide leadership in the UK, to help take maximum global advantage of the technological, economic and political developments that characterise the Information Age. It promotes uptake of information and communications techonlogies to support innovation and growth in economic productivity. http://www.iapuk.org/

Innovation Index

As follow up to the "Innovation Nation" White Paper of March 2008, NESTA will lead work to develop a new Innovation Index to measure the UK's performance as an innovation nation. A pilot index will be published in 2009 with a fuller system in place for 2010. (http://dius.dialoguebydesign.net/rp/ScienceInnovation_web.pdf)

"Innovation Nation" White Paper

In "Innovation Nation", published in March 2008, the Government looks at how it can invest in innovation through: people and knowledge, unlocking talent at all levels; research and exploitation of knowledge; and regulation, public procurement and public services shaping the market for innovative solutions. (http://dius.dialoguebydesign.net/rp/ScienceInnovation_web.pdf)

Intelligent Transport Systems Innovation Platform (ITS IP)

ITS IP is one of the first two pilot Innovation Platforms being driven by the Technology Strategy Board. The concept is to pull together policy, business, government procurement and research perspectives and resources to generate innovative solutions to the challenge of developing a more efficient transport system. http://www.innovateuk.org/ourstrategy/innovationplatforms.ashx

Knowledge Transfer Networks (KTNs)

KTNs are a family of national networks, funded primarily by the Technology Strategy Board, each focused on a specific field of technology or business application, which brings together people from businesses, universities, research, finance and technology organisations in order to stimulate innovation through knowledge transfer and sharing of ideas.
http://www.ktnetworks.co.uk/epicentric_portal/site/KTN/?mode=0

Leitch Review

The Leitch Review was commissioned by the Government as an independent assessment of the UK's long term skills needs. The Review published its final report in December 2006. It set out a vision for how the UK should build its skills base at all levels and recommended that it should commit to becoming a world leader in skills by 2020.
http://www.hm-treasury.gov.uk/media/6/4/leitch_finalreport051206.pdf

LIFT

LIFT is the NHS Local Improvement Finance Trust, which aims to develop a new market for investment in primary care and community-based facilities and services. http://www.dh.gov.uk/en/Procurementandproposals/Publicprivatepartnership/NHSLIFT/index.htm

National Endowment for Science, Technology and the Arts (NESTA)

NESTA has partnered BERR on the Innovation in Services project. NESTA is the largest single endowment devoted exclusively to supporting talent, innovation and creativity in the UK. Its mission is to transform the UK's capacity for innovation. It invests in early stage companies, inform innovation policy and encourage a culture which supports innovation. http://www.nesta.org.uk/

The National Institute of Economic and Social Research (NIESR)

NIESR is Britain's longest established independent economic research institute with over sixty years experience of applying academic excellence to the needs of business and policy makers. http://www.niesr.ac.uk/

Office of Fair Trading Report on Commercial Use of Public Information (CUPI)

This OFT market study of the commercial use of public information, published in December 2006, found that more competition in public sector information could benefit the UK economy. http://www.oft.gov.uk/advice_and_resources/resource_base/market-studies/public-information.

Office of Public Sector Information (OPSI)

Operating from within the National Archives, OPSI plays a central role in information policy, setting standards, delivering access and encouraging the re-use of public sector information. OPSI also delivers a wide range of services to the public, information industry, government and the wider public sector relating to finding, using, sharing and trading information.
http://www.opsi.gov.uk/

Power of Information Report
In January 2007, the Government commissioned a review from Tom Steinberg and Ed Mayo to "explore new developments in the use and communication of citizen and State generated public information in the UK, and to present an analysis and recommendations to the Cabinet Office Minister as part of the Policy Review." The review was published on 07 June 2007: http://www.cabinetoffice.gov.uk/upload/assets/www.cabinetoffice.gov.uk/strategy/power_information.pdf

PFI
Private Finance Initiative
http://www.hm-treasury.gov.uk./documents/public_private_partnerships/ppp_index.cfm

Regional Development Agencies (RDAs)
The nine RDAs in England coordinate regional economic development and regeneration. http://www.englandsrdas.com/
http://www.berr.gov.uk/regional/regional-dev-agencies/index.html,

Research and Development Tax Credits
Research and Development Tax Credits are a company tax relief which can either reduce a company's tax bill or, for some small or medium sized companies, provide a cash sum. The aim of the tax credits is to encourage greater R&D spending in order to promote investment in innovation.
http://www.hmrc.gov.uk/randd/

Retail Environmental Sustainability Expert Group (RESEG)
RESEG is a consultative group drawn from the retail industry run by BERR. It aims to encourage innovation and good practice on environmental sustainability issues within the retail trade.
http://www.berr.gov.uk/sectors/retail/index.html

Retail Policy Forum (RPF)
The RPF enables a representative cross-section of retailers to talk to Government Departments and EU officials about regulation. It aims to help both retailers and policymakers by minimising the burdens on retail, looking for alternatives to regulations and making any regulations and enforcement as practical and sensible as possible. There is also a virtual RPF of UK retailers, retail trade associations and others who receive communications mainly by email. http://www.berr.gov.uk/sectors/retail/index.html

Re-use of Public Sector Information Regulations 2005 (Statutory Instrument No. 1515)
The Regulations implement the European Directive on the re-use of public sector information. The Regulations aim to encourage the re-use of public sector information by removing obstacles that stand in the way of re-use.
http://www.opsi.gov.uk/advice/psi-regulations/index.htm.

Sainsbury Review

Lord Sainsbury of Turville's review of the UK science and innovation system was commissioned by the Chancellor of the Exchequer in November 2006. His remit was to examine the role of science and innovation in ensuring the UK remains competitive in our increasingly globalised economy. Lord Sainsbury's review report was published in October 2007. http://www.hm-treasury.gov.uk/independent_reviews/sainsbury_review/sainsbury_index.cfm

Sector Innovation Groups (SIGs)

The SIGs are the small, business-led groups which BERR convened in autumn 2007 for each of the five service areas considered in the Innovation in Services Project. See Annexes A and B.

Sector Skills Councils

Sector Skills Councils are employer-driven organisations that, together, articulate the voice of 89% of the UK's employers on how to improve workforce skills. http://www.sscalliance.org/web/site/home/home.asp

Skills for Logistics

Skills for Logistics is the Sector Skills Council which works alongside companies involved in moving, handling or storing goods.
http://www.skillsforlogistics.org/en/

Skillsmart

Skillsmart is the Sector Skills Council with a mission to develop and promote retail skills. http://www.skillsmartretail.com/

Technology Strategy Board (TSB)

TSB has a mission is to stimulate technology-enabled innovation in the areas which offer the greatest scope for boosting UK growth and productivity. It is an executive non-departmental public body established by the Government in July 2007. The TSB manages a range of programmes and delivery mechanisms to drive innovation: collaborative research and development, Knowledge Transfer Networks, Knowledge Transfer Partnerships. http://www.innovateuk.org/

Train to Gain

Train to Gain is a service offered by the Learning and Skills Council.
It provides impartial independent advice on training to businesses.
http://www.traintogain.gov.uk/

Annex A

Membership of the Sector Innovation Groups

Construction

Mike Murray (chair) Chief Executive, Skanska Design
Richard Deacon, MD Highways & Transportation, Atkins
Bob White, Chairman, Constructing Excellence
Graham Watts, Chief Execurtive, Construction Industry Council (CIC)
Richard Saxon, Chair CIC Forum for Research, Innovation and Knowledge
Trevor Hursthouse, Chairman, Goodmarriott & Hursthouse
Chris Ward-Brown, East Midlands RDA
Turlough O'Brien, Director, Arup
Dr Michael Harris, NESTA
Keith Clarke, Chief Executive, Atkins
Zara Lamont, Director Carillion
Steve Vickers, Birmingham City Council
Peter Barratt, Pro-Vice-Chancellor, University of Salford
Paul Glinn, Programme Manager, Marks and Spencers

Logistics

Ian Cramb (Chair of SIG), Business Director, DHL, Exel Europe Ltd
Mark Parsons (Deputy SIG Chair), Development Director, Retail and Consumer DHL
Dr Carlos Mena, Senior Research Fellow, Centre for Logistics and Supply Chain Management, Cranfield School of Management – research
Andy Haines, President, Freight Trade Association/Tate & Lyle
Theo de Pencier (Director General, FTA), Freight Transport Association
Craig Sears-Black, Isotrak Ltd
Greville Coe, Isotrak
Tarun Patel, Head of Supply Chain, Institute of Grocery Distribution (IGD)
Richard Ellithorne, Logistics Policy Manager, Chartered Institute of Logistics and Transport (UK)
Dr Michael Harris, NESTA
Paul Browne, Head of Property & Transport, British Retail Consortium
Nicholas Morley, Director of Sustainable Innovation, Oakdene Hollins Ltd
Jack Semple, Director of Policy, Road Haulage Association
Duncan Buchanan, Head of Sustainability, Department for Transport

Environmental Services

Peter Jones, Director, Biffa Waste Services – chair
Professor Peter James, Bradford University, UK Centre for Environment and Economic Development (UKCEED) – research
Jonathan Selwyn, Chief Executive, UKCEED – research
Simon Chiva, UKCEED – research
Gareth Jones, UKCEED – research
Arnold Black, Operations Director, Resource Efficiency KTN; CTech Innovation
Alistair Fulton, Director, Strategy, Environmental Resources Management
Arthur Ready, Recycling Manager, Greenstar
Peter Murphy, Managing Director, AXR Limited
Jonathan Davies, Partner, Enviros/Philippa Marshall, consultant, Enviros
Doug Morton, Strategy Director, Entec/Dave Scott, consultant, Entec
Bob Lisney (MD, LRL Consultancy Services; previously Director, Natural Resource Management, Hampshire County Council)
Nick Morley, Director of Sustainable Innovation, Oakdene Hollins Liimited
Phil Conran, National Recycling Manager, Biffa
Dr Michael Harris, NESTA
Dr Trudie Mansfield, Manufacturing, Materials and Environment, BERR
Jonathan Thomas, Sustianable Development, BERR

Internet Services

David Worlock, Chief Research Fellow, Outsell – chair and research
Kirstie Keeling, Associate Consultant, Outsell – research
Gehan Talwatte, CEO, Ascend Aerospace
David Brown, Head of Scholarly Communication and Innovation Support, British Library
Stella Dutton, CEO, British Medical Journal
Peter McKay, Publishing Director, British Standards
Stephen Warshaw, Chairman, CHKS
Chris Pilling, CEO, Complinet
Jonathan Turpin, Strategy Director, Digital EMAP Radio
Adrian Alsop, Deputy Director, ESRC
John Thornton, Director, E-ssential Resources
Phil Cotter, Managing Director, Information Solutions, Experian
Stephen Stout, Group Managing Director, Landmark Information
Josh Bottomley, CEO, Lexis-Nexis
John Sheridan, Head of e-Services, Information Policy and Services Directorate, National Archives
Adrian Norman, Chairman, Psiphon
Jerry Gosney, Managing Director, RBI Research B2B
Peter de Monnink, Strategy Director, Reed Business
Donal Smith, UK CEO, Thomson Financial
Robin Sutton, Managing Director, WARC
Dr Michael Harris, NESTA

Retail

Dr Kevin Hawkins, OBE, British Retail Consortium – chair
Dr Jonathan Reynolds, Said Business School, Oxford – research
Latchezar Hristov, Said Business School, Oxford – research
Keith Inglis, Arcadia
Bernard Hughes, Asda
James Lowman, Association of Convenience Stores
Mark Walmsley, Association of Cycle Traders
James Stafford, Avery Dennison
Ian Candelet, County House Retail
Clare Brine, DSG International
Anne Bugler, Halfords
Charlie Browne, Ikea
Tony Ginty, Marks & Spencer
Ian Ferguson, Partnerships for Better Business
Kenneth Parsons, Rural Shops Alliance
Ken McMeikan, Sainsbury's
Erica Zimmer, Sainsbury's
Ian Wheeler, Skillsmart Retail
Steve Griffin, Society of Independent Brewers
Lucy Neville-Rolfe, CMG, Tesco
Emma Reynolds, Tesco
Dan Clayton, Urban Mines
Dr Michael Harris, NESTA

Annex B

Innovation in Services: A structured approach

While the five different sectors had different characteristics, it was important to collect evidence in support of Government intervention in a structured way in order to be able to make cross sectoral comparisons and to draw general conclusions. The aim was not to constrain analysis but to facilitate it; nor was it to collect "interesting" data on sectors, but rather to understand the process of innovation better, what is driving change in different sectors and the scope for effective Government intervention.

Key questions

The research work underpinning the groups responded to the following key questions:

- What is the 'innovation that matters' in each sector (or selected vertical value chains within each sector)?
- What is driving this innovation?
- What are the barriers to further innovation?
- How is this innovation evidenced within the sector, and how might this inform the development of new metrics and tools for benchmarking innovation performance?
- Is there a role for Government in supporting these forms and systems of innovation (including by adjusting existing policy) to create greater economic and social value?

Key data

In order to respond to these questions, each sectoral researcher and business group collated similar data, including:

Definition of the sector/area: composition, including relevant sub sectors or description of the supply chain.

Size, Growth (from 2000) Market Structure and Tradeability: GVA, employment indicators, size distribution of the sector, import/export data, wider impacts on the economy.

Drivers of Change/Competition: Factors impacting upon the sector, i.e. to what pressures was it responding? How were the five sectors affected by drivers of change such as:

- Demographics;
- globalisation;
- environmental/sustainability issues and the regulatory consequences;
- technology; and
- security/organised crime

How are UK firms performing and what are the barriers to innovation and growth? The evidence collected reflected some of the selection criteria:

- Evidence from the Community Innovation Survey;
- skill levels (management and workforce) in relation to international competitors;
- investment in technology/intellectual property relative to leading international benchmarks/competitors;
- anti-competitive market conditions and behaviours; and
- Regulatory barriers to innovation.

What is the scope for effective Government intervention?

Regulation and anticompetitive behaviour were mentioned in advance as areas, where Government has an important role to play. However, to focus on these alone would have been restrictive. Further areas explored with business in the course of this enquiry were:

- Was the standards infrastructure helping to promote innovation in their sector ?
- If there was no reliable evidence to some of the questions above, then was there a *bona fide* case for considering whether Government could help the market operate more effectively by working with business to develop reliable indicators/benchmarks to inform the market ?
- Consideration of information programmes which enable companies to learn from each other. The role of the Advanced Institute of Management, studies by Business Schools;
- Collaboration with the TSB, to report on the scope for enhanced technology development/uptake to foster innovation and on whether knowledge transfer networks are facilitating the transfer of knowledge within and between sectors; and
- UK capability in overseas markets.

Outputs/Outcomes

The targeted main outcome was to develop a better understanding of how Government can promote innovation in a service oriented economy, including the "servicisation" of manufacturing. Specifically, the intention was to report on the scope for intervention in a range of sectors with recommendations for action in each, as appropriate. It was also borne in mind that the enquiry, and the way it was conducted, might also offer insights into how Government could respond quickly to the changing needs of a service environment.

Methodology and timescales

Phase 1 – During the first phase of work, initial responses to the key questions identified above and suggestions for evidence were collected as part of the discussions with industry representatives and other sector experts. This initial evidence was also used to determine whether work in each sector should continue.

Phase 2 – Following the first phase, for each of the chosen sectors, a researcher with a strong track record of investigating the sector (and extensive industry contacts within the sector) was commissioned to collate and analyse existing research and data relating to the key questions.

Phase 3 – Reports based on this work were delivered in time for the third phase of the work (report writing, recommendation development and Whitehall engagement).

Annex C

Standards development: greenhouse gas (GHG) emissions: PAS 2050 and related standardisation activities

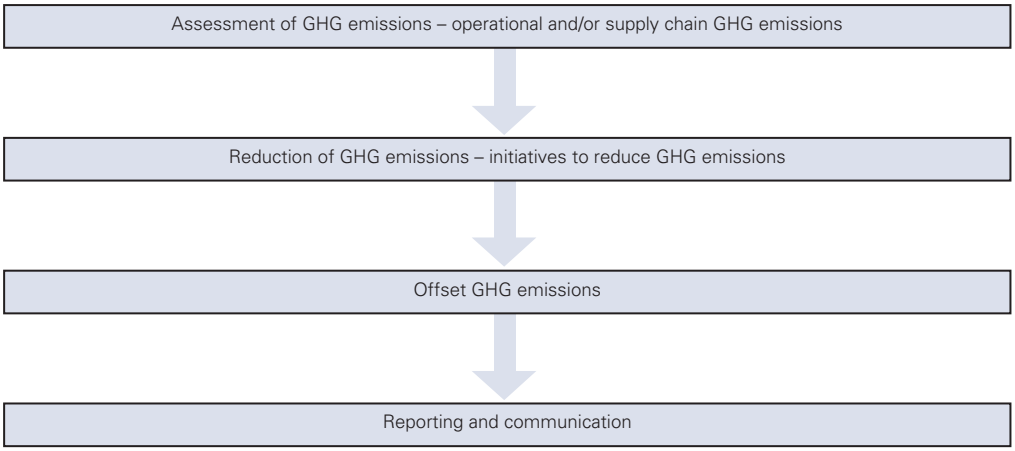
PAS 2050

BSI British Standards is due to publish PAS 2050: *Specification for the assessment of the life cycle greenhouse gas emissions of goods and services* in 2008. The development of this specification has been sponsored by the Carbon Trust and the Department for Environment, Food and Rural Affairs (DEFRA). This specification will provide a common methodology for the assessment of life cycle GHG emissions and will help organizations improve their understanding of GHG emissions arising from their supply chains. PAS 2050 will also provide a common basis for the comparison and communication of results.

The views of stakeholders have been gathered through two broad consultations. The first-round stakeholder consultation, which targeted a wide range of industry, government, academic and NGO stakeholders, was conducted during October 2007; the second-round consultation ended in March and sought views from over 800 stakeholders, from both within the UK and internationally.

Managing GHG emissions – the wider context

There are a number of approaches an organisation may take to voluntary reducing GHG emissions; one approach is as follows.



At each stage, the use of a standard approach and widely-accepted robust methodology will ensure credibility, comparability and consistency. PAS 2050, along with the International Standards ISO 14064, parts 1 to 3 provides a common approach for some of these four activities. However, there are some aspects that require further standardization activity, either because of the absence of any standards (formal or informal) or because of a proliferation of approaches. BSI British Standards is currently engaging key partners in order to develop consensus in these areas and therefore provide a practical, easily-accessible framework within which organisations can act to reduce GHG emissions and make credible claims about the extent to which their activities are carbon neutral.

International developments

The International Organization for Standardization (ISO) Technical Committee on greenhouse gas management and related activities (ISO TC207/SC7) has initiated work to identify the need for new International Standards in this area. A new working group has been established by this Technical Committee to explore the need for new standards to promote GHG management within the value or supply chain. As the UK's National Standards Body and member of ISO, BSI British Standards will facilitate UK input to these discussions in order to support the development of International Standards (ISOs) in this area.

Annex D

International Policy Developments

1. This Annex summarises discussions with EU officials and inputs on policy developments overseas provided by the network of S&I attaches based in UK embassies overseas.

2. **EU:** The Commission aims to develop a European-level strategy for innovation in services in advance of Member States' implementation of the Services Directive[128]. It published a Communication on Innovation in Services in February 2008[129] and circulated a Working Paper for public consultation[130]. The analysis in the Commission paper rests on statistical evidence from business surveys (the Community Innovation Survey) [131] and existing metrics; it extrapolates in relation to services. This is in contrast to this report's bottom up approach of consulting business directly. There are important points of agreement and difference which have been discussed with Commission officials at a workshop organised in London on 27 November. In particular, the importance of standards in promoting innovation through open markets across the EU, and the emphasis on the capacity of firms to organise resources – developing staff skills, and investing in ICT and software – feature strongly in both reports. However, the Commission continues to stress the importance of R&D to a much greater degree than has been reported by the SIGs. Furthermore, while both reports recognise the challenge of raising small sums of equity capital for start-ups, the Commission places considerable focus on supporting fast growing firms or "gazelles" – a group whose rapid growth usually stems from being market based and independent of funding from Government sources.

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128 http://www.berr.gov.uk/europeandtrade/europe/services-directive/page9583.html

129 Towards a European Strategy in Support of Innovation in Services : Challenges and Key Issues for Future Action. EU Commission Sec 1059 27 July (2007http://www.europe-innova.org/index.jsp?type=page&lg=en&from=child&classificationId=6331&classificationName=Publications&cid=6334&parentClassificationId=6329&parentClassificationName=Innovation%20@:@%20Services&parentContentId=6344

130 Report on Open Consultation on Innovation in Services.EU Commission Final Rev 2008 http://www.europe-innova.org/index.jsp?type=page&lg=en&from=child&classificationId=6331&classificationName=Publications&cid=6334&parentClassificationId=6329&parentClassificationName=Innovation%20@:@%20Services&parentContentId=6344

131 Fourth Community Innovation Survey 2006. http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/science/inn/inn_cis4&language=en&product=EU_MAIN_TREE&root=EU_MAIN_TREE&scrollto=333

3. There are important policy developments underway in service innovation and the Government needs to take a leading role in influencing them. In this context, BERR, with support from DIUS, should continue to share the findings of research and business consultation with the Commission and other Member States.

4. **USA:** In contrast to its support for basic science and technological research, the US federal and state mechanisms have not focused on innovation in the service sector. Nevertheless, there is a considerable body of academic research developing around new business models, innovation management, and global supply chains. Furthermore, the leading business schools provide the service sectors with a cadre of highly skilled managers which explain, in part, the capacity for US firms to innovate and manage the process well. But there are three strands of activity of potential importance to this report:

   - On August 9th, 2007 President Bush signed into law, *The America Creating Opportunities to Meaningfully Promote Excellence in Technology* (America COMPETES Act). [132] This Act authorises $43 billion in new federal spending for maths and science education, and federal research agencies over the next three years. It would double the budgets of the National Science Foundation (NSF), Department of Energy (DOE) Office of Science, and the National Institute of Standards and Technology (NIST) laboratory activities. But, it directed the Office of Science and Technology Policy (OSTP) to work with the National Academy of Sciences to conduct a study within one year of enactment on how the federal government should support through research, education and training, the discipline of Service Science. This reflects the view of Jim Spohrer (IBM), and one shared by BT and HP Labs here in UK, that the UK should focus on the skill sets for developing and managing complex service offerings, which is borne in part from the experience of developing services for public sector clients.

   - The National Institute for Standards and Technology has played a leading role in the development of inter-operable standards and in disseminating the benefits.[133] The US Property Services Agency and DoD agencies have readily adopted the BIM and interoperable standards approach and are driving it across their estates. NIST has expressed a strong interest in the Innovation in Services project and there may be advantage in developing a shared perspective.

   - The Department of Commerce (DOC) is the US agency with comparable missions to BERR and parts of DIUS. In February 2007, Carlos Gutierrez (Commerce Secretary) established an Advisory Committee on Measuring Innovation in the 21st Century Economy, identifying innovation as one of the key inputs for national competitiveness. It has recently published its findings and the report, "Innovation Measurement: Tracking the State of Innovation in the American Economy"[134].

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132 America Competes Act http://science.house.gov/legislation/leg_highlights_detail.aspx?NewsID=1938

133 See Cost analysis of Inadequate Interoperability in the US Capital Facilities Industry; US National Institute of Standards and Technology August 2004. http://www.bfrl.nist.gov/oae/publications/gcrs/04867.pdf

134 Report available at www.innovationmetrics.gov.

5. **Germany:** The BMBF's "Innovation with Services" programme[135] worth 70 million Euros over the next five years, forms part of the High-Tech Initiative.[136] It seeks to raise awareness for standardisation of services – to date rarely used. Working closely with the DIN (German Standards Institute), VDI (Association of Engineers) and other organisations, BMBF consider they are pioneering the topic within Europe – a view shared by BSI British Standards.

6. The programme promotes research into services innovation. It seeks to involve large companies (e.g. Daimler on health services at work and SAP), as these are major drivers of new developments, but it also targets SMEs, particularly in manufacturing. The view is that these companies need to think far beyond the goods they produce, and include related services in their value propositions. Thus problems at the interfaces could be minimised, which occur when services are engineered and provided separately. The aim of the innovation with services funding programme is to find out how innovation in services develops (e.g. by co-development with customers / clients) and to find out the nature of the barriers and incentives. Priorities are:

   - **Promoting "servicisation" to manufacturers of capital goods** (e.g. machine tools), a particular strength of German industry, especially SMEs. Capital goods related services are an important topic in Germany, given the large number of machine tools and equipment manufacturers. In view of their global reputation, policy makers consider the service related activities to have great economic potential.
   - **Health and fitness services**, including issues related to demographic change (assisted independent living, multi-generation residences)
   - **Logistics**
   - **Cross-cutting issues** relevant to all services (i.e. obstacles for and drivers of services innovation; service engineering)
   - **Skills for services** – so far services employ a workforce with either low levels of skills or university degrees. The range of people with good vocational skills is still under-represented.
   - **Organisation of work**, performance management, staff training and development related to services.

7. **Sweden:** Swedish policy is implemented by the Swedish Agency for Innovation Systems, VINNOVA. Activities are focused on the following areas:

   - **Services Innovation**[137] – a new programme, launched in 2007, aimed at new methods and product developments which can be used in the service sector, including travel, healthcare, consultancy, experiences, financial sector or the production industry. The focus is that the customer/end-user should be involved in the development work.

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135 See website http://www.hightech-strategie.de/en/250.php

136 See website http://www.bmbf.de/en/6608.php

137 http://www.vinnova.se/In-English/Activities/Services-and-IT-Implementation-/

- **Services and IT Implementation**[138] **–** VINNOVA's objective for its activities in the field of Services and IT is to set up interdisciplinary projects in new areas and to revitalise thinking about, for example, the use of IT in the service sector. VINNOVA should act as a catalyst and gather researchers and users together to address various themes. VINNOVA should also play an active role in the development and follow-up of R&D projects so that they achieve the radical renewal desired. Topics include:
  - E-services in Public Administration
  - IT in Home Healthcare
  - ICT Implementation
  - Living Labs
  - eGOVERNET
  - eTEN
  - eContentplus
- **Transport:** VINNOVA's operations in the transport field[139] aim to develop the transport system and its infrastructure so that they promote sustainable growth and help to achieve the objectives of Sweden's transport policy. Specific work is in the fields of:
  - Innovative Vehicles for Different Transport Modes
  - Innovative Logistics and Freight Transport

  Apart from R&D players, the field also covers all those who purchase, co-ordinate or conduct transport using different modes of transport. VINNOVA focuses its activities in the field of knowledge development and the improvement of innovation environments. The ambition is to develop knowledge that is generic for all modes of transport and to initiate or improve those innovation environments that are interdisciplinary and that relate to commercial and industrial supply networks, logistical structures and transport systems.
  - Infrastructure and Efficient Transport Systems
  - Maritime Safety
  - The Vehicle IT and Telematics Programme
- **Working Life:** There is a current research programme about innovative ways of ensuring that skilled & competent workers are able to access relevant jobs in SMEs in particular[140]. There is also interest in User-driven development of IT in working life.

138 http://www.vinnova.se/In-English/Activities/Services-and-IT-Implementation-/
139 http://www.vinnova.se/In-English/Activities/Transportation/
140 http://www.vinnova.se/In-English/Activities/Working-Life-/

8. **Finland:** The Finnish technology agency, Tekes, has been active in researching the topic of innovation in services and has developed a 100 million Euro programme (50% funded with participating companies) aimed at the development of innovative service concepts.[141] Its objectives are to:

   - renew service offerings through innovative service concepts;
   - stimulate demand for services;
   - create sufficiently diverse and interdisciplinary skills to support the development of services;
   - strengthen service related policies in Finland.

9. The target sectors are:[142]

   - Business services, especially knowledge intensive business services (KIBS) and real estate;
   - Trade
   - Logistics
   - Finance and insurance
   - Industrial services.

10. **Ireland:** Forfas**,** the Irish innovation agency, has been giving a focus to service innovation for some time. In September 2006 it published a report prepared by CM International, "Services Innovation in Ireland"[143] and in November 2007 Forfas organised its third Innovation in Services Conference.[144] It also announced the establishment of a Service Strategy Group (SSG), chaired by Tony Keohane, CEO, Tesco Ireland.[145] Specifically, the SSG will formulate a vision and strategy on how to achieve a sustainable and competitive service sector in Ireland. As well as promoting an efficient domestic market for services, the SSG will also examine the potential for Irish service providers to compete in foreign markets, whether through enhanced export capability or through increased levels of outward direct investment. It also intended to outline the public policy steps required to support the SSG vision for services.

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141 http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/Serve/en/etusivu.html
http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/Serve/en/ohjelmankuvaus.html

142 http://akseli.tekes.fi/opencms/opencms/OhjelmaPortaali/ohjelmat/Serve/en/ohjelmankuvaus.
htmlhttp://www.forfas.com/publications/forfas060928/forfas060928_services_innovation_full_report_webopt.pdf

143 http://www.forfas.ie/publications/show/pub242.html

144 http://www.forfas.ie/events/innovationconference/pdf/christine_kurjan.pdf

145 http://www.forfas.ie/events/servicesstrategy/index.html

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