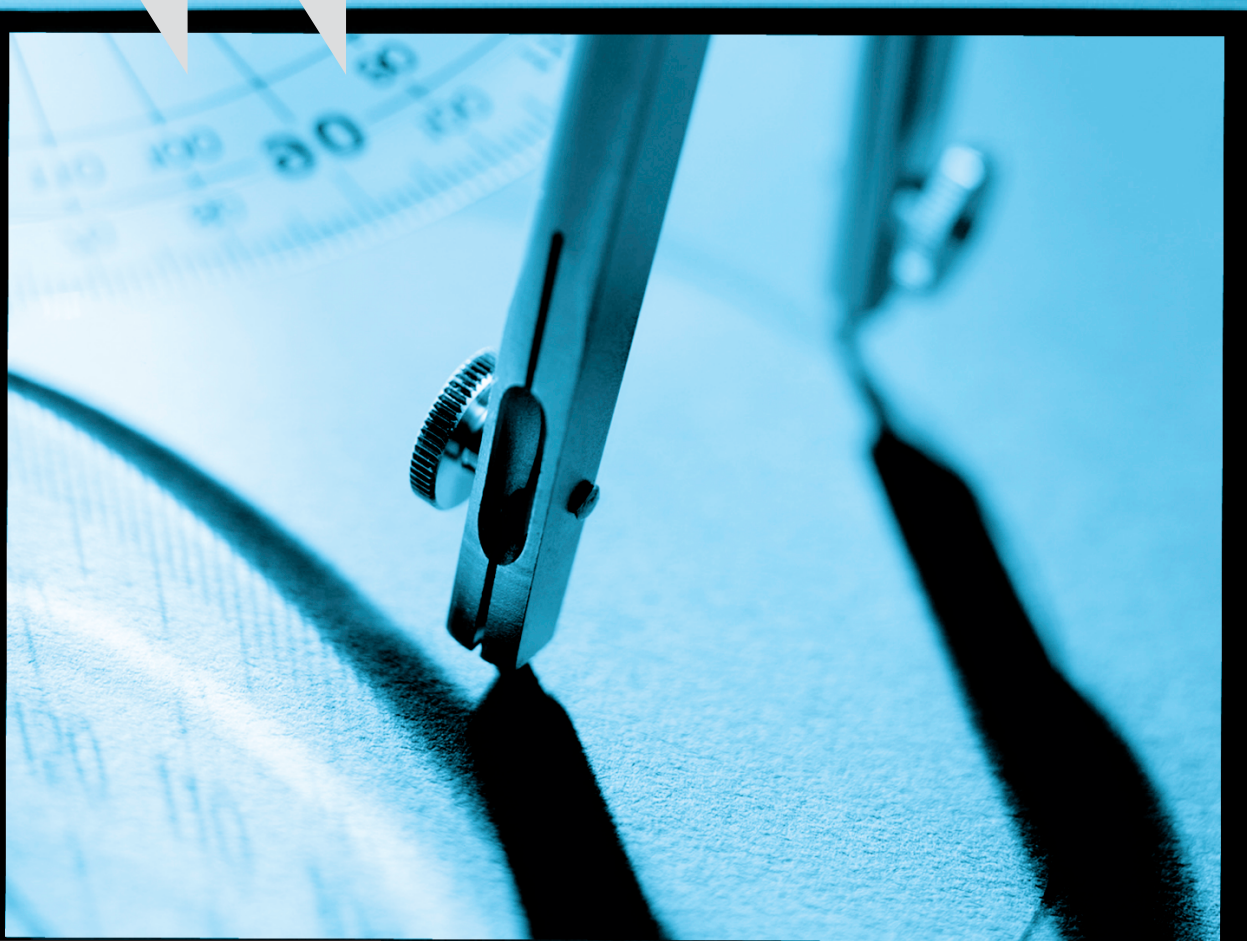


Innovation and Productivity in Services

INDUSTRY, SERVICES AND TRADE



OECD



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Innovation and Productivity in Services



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FOREWORD

A joint OECD-Australia Workshop on Innovation and Productivity in Services was held in Sydney, Australia, on 1-2 November 2000. It brought together policy makers and representatives of industry and academia from around the world. The objectives of the workshop were: *i*) to define the role of innovation in services and its linkages to productivity; *ii*) to define opportunities for, and impediments to, innovation in the services economy; and *iii*) to identify the role that governments could play to increase innovation and productivity in services.

The idea for the workshop evolved from the conclusions of an OECD forum held in September 1999, "Realising the Potential of the Service Economy: Facilitating Growth, Innovation and Competition". A principal conclusion of that forum was that government regulations and misguided policies can stifle innovation in services. The workshop proposed to seek a more specific understanding of the characteristics of innovation in services and of how government policy can facilitate greater innovation and productivity. It sought to do so by creating an informal atmosphere conducive to in-depth, focused discussion that would not only increase the understanding of the issues but also stimulate the expression of new ideas. A number of the presentations are included in the present volume.

They were supplemented by the workshop sessions, in which there was in-depth discussion of specific services issues: education, networking/clustering, the role of new technology, responding to globalisation and international competition, the role of business services, strengthening the interface between innovative services and traditional sectors, regulatory reform and competition and generic or sector-specific policies for services. The papers presented and the subsequent discussions brought out new ideas about innovation in services which challenged traditional views on these issues. These included ideas about the characteristics of innovation and productivity and the potential policy actions governments could take to facilitate higher levels of innovation and productivity in services.

The discussions underscored the increasing importance of services in terms of both output and employment in OECD economies. A range of factors have contributed to the increased dynamism of services in economic activity, including changing consumer demand, regulatory reform, increased competition and exposure to international developments, the growing tradability of services and higher levels of investment in and application of information and communications technology (ICT). Services are increasingly integrated with the manufacturing, resources and agricultural sectors, and the services sectors themselves are strongly integrated. Services related to ICT and business and professional services are playing a direct role in spurring productivity and growth throughout the global economy.

In terms of policy, there was consensus that governments should ensure the effective and comprehensive inclusion of services in policy development, because a more integrated approach to policy is essential if growth opportunities in the "new economy" environment are to be fully captured. Although services now play the largest role in OECD economies, they remain neglected in statistics, analysis and policy development, as policies for research and innovation, for example, are still largely geared to manufacturing. Therefore, a major reorientation is needed so that governments pay sufficient attention to the needs of the services economy.

Recommendations from the OECD/Australia Workshop include:

- Improvement of statistics and statistical definitions for services.
- Regulation of services which promotes competition, access to knowledge and growth.
- Policies for skills and education designed in consultation with industry to ensure the supply of an appropriately skilled and educated workforce for services.
- Innovation policies that move away from the traditional emphasis on research and development (R&D) to policies that also facilitate innovation in services.
- Further investigation into the effectiveness of current intellectual property regimes for services.
- Development of an effective and comprehensive framework for services policies and their implementation.

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Chapter 1

MAJOR TRENDS AND ISSUES

by

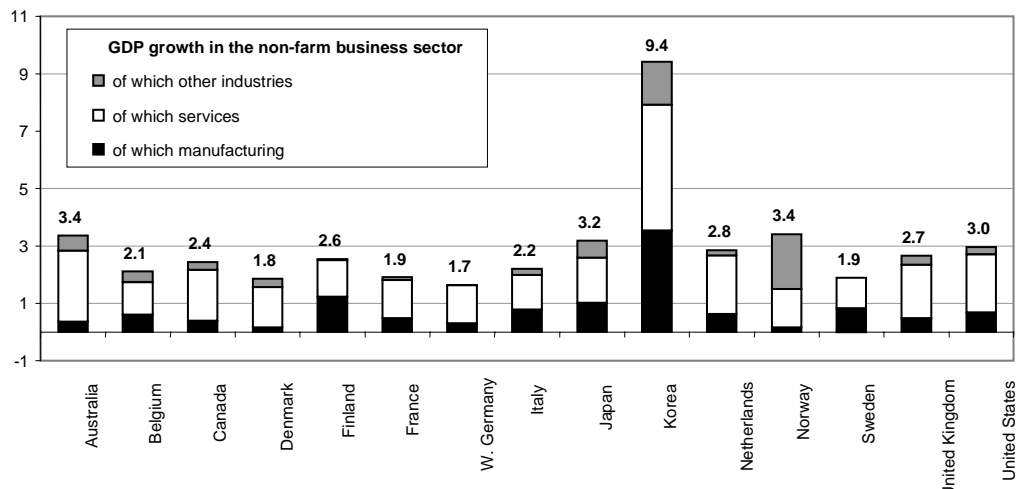
Mike Edwards and Michelle Croker
Services and Emerging Industries Division
Department of Industry, Science and Resources, Australia

Trends

Growth

Service industries have become increasingly important in terms of both output and employment in OECD economies. Between 1985 and 1997, around two-thirds of GDP growth in the OECD business sector resulted from growth in the services sector. Most employment growth was also in services. Figure 1 shows the contribution of services to GDP growth in a number of OECD countries.

Figure 1. The role of services in OECD economies 1985-97
Annual average growth rates



Source: OECD.

Some of the sources of the growth in services relative to the primary and secondary sectors are:
i) consumer demand, with an emphasis on quality, design, convenience, environment, culture and

recreation; *ii*) increased demand for business services (Box 1); *iii*) slow productivity growth in some services; and *iv*) outsourcing and reclassification of some manufacturing activities as services.

Box 1. Business services

What are business services?

- They are business-to-business services such as consultancy, legal services and accountancy.

Why are they important?

- They are among the fastest-growing sectors in the economy.
- They act as a catalyst for change and competitiveness in other sectors of the economy.

Why are they growing?

- Increased investment in intangible activities and growing importance of knowledge management.
- Outsourcing of activities.
- Growing need to use external service providers.

A role for government

- Government can set appropriate framework conditions for business services, including regulatory, fiscal and competition conditions, and for developing an appropriately skilled workforce.
- Government can make it easier for business services to realise their full growth potential.
- Business services are an important factor in overall economic performance and competitiveness, particularly for small and medium-sized enterprises (SMEs).

Challenges for policy makers

- Business services are diverse.
- They do not see themselves as a cohesive sector.
- Government-industry dialogue needs to be strengthened.
- Statistics are poor.

Productivity

Service sectors have traditionally been characterised by poor productivity growth and low levels of innovation. However, this may not be entirely accurate. Services such as transport, distribution and communications, for example, experienced significant increases in productivity over the period 1990-97, primarily because of the uptake of ICT (Table 1). Over the same period, however, sectors such as community, social and personal services, which are less automated and have less scope for productivity improvements, experienced slow productivity growth. In any case, productivity measurements for services are generally poor and incomplete. Common problems include a general lack of data, poor definitions and a lack of accurate market pricing.

Innovation

OECD data show that services account for an increasing share of total business R&D. In some countries, services account for one-third of total business R&D, while in others they play only a minor role. The increasing share of services R&D can be attributed to a number of factors, including better

measurement of R&D in services, more research being undertaken by services companies and increased business and government outsourcing. Generally, the R&D intensity of services is lower than that of manufacturing, but, as for productivity, it varies greatly across sectors. For example, R&D intensity is very high for telecommunications and software development, while it is low in sectors such as social and personal services.

Table 1. Labour productivity growth in the services sector
Percentage changes, 1979-89 and 1990-97

	Australia		Canada		Finland		France		Italy	
	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97
6000 Wholesale & retail trade, restaurants and hotels	0.1	1.0	0.7	1.6	2.5	0.9	1.2	0.3	0.4	1.4
6120 Wholesale and retail trade	-	-	1.6	2.3	2.6	0.7	1.6	0.6	0.5	1.5
6300 Restaurants and hotels	-	-	-2.4	-0.9	1.7	2.0	-0.6	-1.0	-0.4	0.8
7000 Transport, storage and communications	3.6	5.4	3.1	2.2	3.1	4.7	3.8	2.7	2.0	4.8
7100 Transport and storage	2.1	3.5	2.5	0.5	2.3	3.8	1.7	1.4	1.3	2.6
7200 Communication services	7.5	8.6	3.7	5.0	5.8	7.0	7.4	4.8	4.6	10.9
8000 Finance, insurance, real estate & business services	-0.6	0.6	0.2	0.5	0.2	2.9	0.1	0.1	0.0	2.5
8120 Finance and insurance	-	-	-0.4	1.7	3.9	6.1	0.2	-1.8	-	-
8300 Real estate and business services	-	-	2.3	0.1	-1.8	1.6	-0.3	0.4	-	-
Total non-farm business sector	1.4	2.0	1.2	1.6	3.1	4.1	2.2	1.7	1.8	2.3
	Japan		Netherlands		Sweden		United States		West Germany	
	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97
6000 Wholesale & retail trade, restaurants and hotels	4.4	1.0	1.6	0.3	1.6	3.2	1.3	3.1	0.9	0.4
6120 Wholesale and retail trade	-	-	3.0	0.5	2.4	3.3	1.4	3.0	1.2	0.7
6300 Restaurants and hotels	-	-	2.2	-0.7	-3.5	2.3	-0.4	4.3	-0.9	-3.2
7000 Transport, storage and communications	4.1	0.5	2.6	2.5	3.8	2.1	1.6	2.0	3.1	3.9
7100 Transport and storage	-	-	3.5	2.5	3.2	0.2	0.2	1.9	2.0	2.0
7200 Communication services	-	-	3.7	3.1	5.2	7.5	3.9	2.7	4.9	7.2
8000 Finance, insurance, real estate & business services	2.3	1.8	0.7	-0.9	-1.4	3.0	-1.1	-0.4	1.6	2.8
8120 Finance and insurance	-	-	0.3	-0.4	3.1	4.2	-0.4	1.3	-	-
8300 Real estate and business services	-	-	0.4	-1.3	-2.9	2.5	-1.8	-1.2	-	-
Total non-farm business sector	3.6	1.0	3.0	1.0	1.7	4.1	1.2	1.6	1.5	2.1

Source: OECD, calculations based on the Intersectoral Database (ISDB).

As for productivity, poor statistical data make it difficult to draw an accurate picture of the amount of innovation in services. This is due in part to the characteristics of innovation in services. Most service innovations are not technical and involve small and incremental changes in processes and procedures which do not require significant amounts of R&D. Traditional measurements of R&D such as patents do not capture these non-technical innovations very effectively.

Regulatory reform, increased exposure of service activities to international competition, the growing tradability of services and higher levels of investment in and application of ICT are contributing to an increase in innovative capacity. Because domestic service companies now have greater access to foreign markets, they have increased their levels of innovation and have grown in an effort to capture new markets. At the same time, they face greater competition at home from foreign competitors and must innovate and raise their efficiency to respond to this new source of competition.

An important driver of innovation has been the acquisition by services firms of technology, particularly information and computing technology, from the manufacturing sector. This has been the case, for example, for financial services, communication and public administration services. It has, however, been a two-way process. Since services are frequently the main clients for these new technologies, their demands for more innovative ways of doing business have provided an important boost to technology development. Nonetheless, while the impact of increased levels of globalisation and investment in ICT has been significant, other factors that affect services firms also play a role: investment in human capital, networking opportunities, organisational change, intellectual property rights, incentives to innovate and appropriate competition and regulatory frameworks.

Despite their diversity and the significant changes undergone by services in the 1990s, small firms continue to predominate in the services sector. While this may be a source of strength, such as the flexibility to exploit innovation and develop new products and market niches, it also creates weaknesses and policy challenges. These include difficulties for fully exploiting innovation in the absence of adequate debt and equity finance, limitations on managerial capability, lack of access to international markets and a higher regulatory burden.

Issues

Improving definitions and statistics

Better statistics and definitions for service activities and improved techniques for measuring innovation in services are required. In general, the availability and the quality of data for services are inadequate, especially as compared with the data available for the manufacturing, resources and agricultural sectors. In particular, data for measuring innovation in services that would permit meaningful comparisons across countries are severely lacking. The issue is of concern to governments, academia and industry because without such data, it is impossible to gain a solid understanding of trends in services or to construct robust services policies.

Services statistics may need to be redefined. In a sophisticated economy, separate sectoral definitions of manufacturing and services are no longer useful. Industry statistics should cross traditional sectoral boundaries to focus on the interaction among firms and with other areas of the economy. A new paradigm is needed, which recognises the degree of integration of manufacturing and services and the trend towards service encapsulation.

Innovation in services, because it is frequently non-technical in nature, also poses measurement problems. Measurements such as patent activity, formal R&D and physical artefacts may be of limited

use for non-technical innovation. Innovation in services may involve, for example, organisational change or incremental improvements. It may also cross sectoral boundaries within services or boundaries between services and other sectors of the economy, such as manufacturing and resources. Industry statistics need to take account of these trends.

The measurement of intangibles, such as the intellectual capital within an organisation, is also an issue. These intangibles have relatively high value in many service firms. While some countries measure intangibles, they often do so on an *ad hoc* basis. Further progress in reporting on intellectual capital and in measuring intangible investments should be encouraged.

Reforming regulations

Regulatory reform is of prime importance for enhancing innovation and productivity in services. For governments, it means understanding the nature of both the economic and social issues that require attention, assessing the available options for dealing with the issues (including getting the balance between regulation and deregulation right) and then choosing and implementing the most effective solutions. The effects of regulatory reform may be direct and confined to one sector, but they can also be indirect and affect other aspects of the economy as well as international dimensions of services such as trade. Regulatory reform requires good data, information, analysis and communications. All of these issues present significant challenges for government and for more innovative approaches to services.

Effective domestic regulation is crucial to services performance. Over the past two decades, many services markets in OECD economies have undergone extensive deregulation. Areas where there was previously considerable monopoly power, such as public utilities and broadcasting, have been strongly affected. Deregulation has opened these and other sectors to greater market discipline and competitive pressure, resulting in efficiencies and higher levels of investment. Economic growth appears to be strongest in those economies where deregulation has been most pronounced. However, more can be done. ICT is a priority area for further reform owing to remaining obstacles and given the importance of ICT as a provider of underlying infrastructure and as a facilitator for innovation in services generally. Administrative barriers for small start-up firms are also a priority area given the effects of these barriers on activities in many services sectors.

Transparent regulations and a policy environment that is stable and facilitates investment are also important. Regulations must be flexible enough to adapt to change. Regulatory lags, when combined with rapid technological change, can be barriers to innovation in services, especially where it is unclear what is being regulated or where there is a comparatively short history for regulators to draw upon.

Market access is important for increasing innovation and productivity in services and investment. It opens new markets for services and exposes domestic firms to greater levels of competition. In the absence of international competition, some sectors and the firms within them remain sheltered from market pressures and have little incentive to innovate. Foreign investment may be inhibited. This can lead to lower than optimal levels of productivity, higher costs and prices, a misallocation of resources and less investment in innovation. Market access also promotes the diffusion of knowledge, new technologies and innovative concepts across national boundaries. The current process of multilateral trade liberalisation is of great importance to services and should continue to be given high priority by governments.

Box 2. The globalisation of services

Increased competition from globalisation

- Globalisation leads to increased competition, especially in sectors that have been sheltered from global competition, as it exposes them to innovative ideas and concepts as well as market pressures.

Globalisation may lead to higher levels of innovation

- Because global competition produces a need to monitor at world scale the product supply chain, marketing, etc., it may facilitate knowledge transfer and innovation.
- Some services cannot deliver at a distance and therefore seek innovative ways to supply their services.
- Domestic firms become more innovative as they respond to multinational demands.
- Firms dealing in foreign markets become more flexible, thereby generating innovative behaviour.
- Contact with overseas investors increases exposure to new ideas and may lead to increased innovation.
- There is a strong interrelationship between new technology and globalisation. New technology is often the answer to the question of how to deal with firms at a distance.

Globalisation may also inhibit innovation

- In some markets, international competition may encourage standardisation which may, in turn, inhibit innovation.
- Intellectual property rights may not always be available in international markets.
- A lack of strategic momentum can be a barrier if globalised firms choose not to respond to challenges or to do what they have always done.

What is the role for government?

- Governments have a clear role in multilateral trade agreements, in setting common standards, in developing skills and training, in attracting foreign investment and in establishing and enforcing legal frameworks to protect intellectual property.
- When developing policies, governments need to consider aspects such as firm size and the specifics of dealing with individual sectors and countries.
- Government might be involved in benchmarking and standards, training and education, identifying champions and role models.

Enhancing skills and education

Innovation in services relies heavily on an appropriately skilled workforce. Indeed, it might be argued that reliance on high-quality human capital is relatively greater in services than in other sectors of the economy such as manufacturing. The growth in service activity, with its shift away from low-skilled jobs and towards more knowledge-intensive professions, has raised concerns that skill shortages are becoming a barrier to innovation in services. This is highlighted by problems of labour supply, recruitment and retention in the computer services sectors in a number of OECD economies. Unless these issues are successfully addressed, current growth rates in these sectors will not be able to be sustained.

Governments might approach the potential lack of skilled labour by addressing the issue of the mobility of personnel across national boundaries. The World Trade Organization's General Agreement on Trade in Services (WTO GATS) provides one vehicle for doing so. Appropriate education, skills upgrading and human resource management policies can also facilitate innovation, productivity and growth. A broad education policy which builds on basic education to incorporate lifelong learning and

a multidisciplinary approach is needed in an environment marked by rapid technological, social and economic change. Creative thinking tools also need to be included in general education.

Also of importance is the need to strengthen communication between industry and government. This will help to ensure that education policies are designed to match the education and training infrastructure to emerging skills needs and to allow for the development of new, as yet unforeseen, service activities and innovation. In general, high-quality human capital is essential to innovation and productivity in services. Shortages are becoming apparent in certain sectors and may act as barriers to growth and innovation. Skills and education policies need to be designed and developed in consultation with industry to ensure the supply of an appropriately skilled and educated workforce.

Facilitating innovation

Government policies have traditionally focused on facilitating R&D and technology diffusion in sectors such as manufacturing and in larger firms. Given the significant differences between the process of innovation in services and other sectors, governments need to remain aware of these differences and of the characteristics of services when designing and implementing policy instruments. However, policies to facilitate innovation in services should only be developed and implemented if there is a market or systemic failure that prevents optimal levels of expenditure on innovation.

There is some debate about whether current innovation policies need to be adjusted to remove biases against services. The argument for current alternatives has been based on assumptions that services are primarily reactive or, at best, facilitators of “real” innovation that takes place elsewhere in the economy. Governments, however, cannot continue to rely on technical R&D alone as the basis for economic growth and development. Non-technical innovation, particularly in the knowledge-intensive business services sector, is increasingly dynamic and central to the competitive advantage of all firms and nations. Networking and clustering were viewed as one tool that would be particularly effective for promoting innovation in services.

The effectiveness of current policies in protecting intellectual property rights is also important. Patents are little used by services industries because they are designed primarily for technical products. Services industries are more likely to utilise trademarks, copyright, protection of trade secrets or simply a first-to-market strategy. It is not clear whether current intellectual property protection regimes constrain or facilitate innovation in services.

Developing framework policies

One of the most challenging issues concerns the most effective way to develop and implement policies for services. Current services policy is being developed and implemented in a fragmented manner, and a more comprehensive approach is needed. A more integrated framework would encourage greater consistency and credibility in policy making, be a better basis for obtaining more accurate data and for regulatory reform. In terms of policy design, governments should focus primarily on areas of market or systemic failure, that is, areas where there are insufficient incentives for innovation, growth and productivity in services and where it can be demonstrated that government intervention would be beneficial and more effective than private sector undertakings. Governments need to work closely with industry, users and consumers of services to formulate effective policies and programmes.

Whether to develop and implement generic or sectoral services policy is also an issue (Box 3). A generic perspective offers many benefits, as such policies can provide vision and encompass factors with universal application such as structural reform to improve the business climate, skills development and training, well-functioning capital markets and competition policy. Such a perspective can also cover broad-based industrial policies that facilitate investment, networking, co-operation between industry and science, policies to improve intellectual property rights and bilateral policies to encourage the adoption of new ideas and technologies from other countries. On the other hand, the importance of targeted approaches should not be underestimated, as they can offer practicable solutions. ICT, for example, plays a major role in encouraging innovation, growth and productivity performance and should be examined in this context.

Box 3. Generic or sector specific policies for services?

Both generic and sector-specific policies for services

- Both generic and sector-specific policies for services are needed.
- Broad generic policies provide vision and set the general business operating environment.
- Sector-specific policies allow for the development and implementation of focused industry programmes.
- In either case, regular review of policies and programmes is essential if they are to be flexible and responsive.

Policy design

- Should be based on a solid economic rationale.
- Should be based on close co-operation between government and business.
- Should be based on a real demand for policy initiatives/programmes.
- Government needs to become more flexible in terms of co-ordinating issues, such as innovation in services, where many cross-portfolio issues exist.

The role for government in services policy

- Provision of a comprehensive vision and leadership.
- Provision of information to industry regarding global value chains and how they fit into the “bigger picture”. Diffusion of information, including statistics, international markets, trends and investment.
- Provision of enabling infrastructure, including education and skills, broadband telecommunications and intellectual property rights.
- Bringing together industry, unions and stakeholders to achieve policy consensus.

Developing a policy framework to encourage innovation and productivity in services is affected by the sector’s current low political and bureaucratic profile compared with other major economic sectors. High-level backing within OECD governments is a key step towards introducing more effective frameworks. A minister for services is one option that would raise the profile of services issues and promote an innovative culture. However, this may not be the most effective means to deal with such a heterogeneous sector. Other options include the establishment of institutions, such as high-level boards or advisory councils, which could link government and private sectors views and push more forcefully for consistency and credibility in services policy.

Future directions

The workshop underscored the central importance of innovation to growth and productivity in services. It highlighted the importance for governments of ensuring that services are effectively and comprehensively included in policy development. Services are increasingly integrated with the manufacturing, resources and agriculture sectors, and the services sectors themselves are strongly integrated. Sectors such as ICT and business and professional services, for example, play a direct role in enabling other economic sectors to become more innovative and in raising productivity. A more integrated approach to capturing growth opportunities in the new economy environment is therefore essential.

Discussions at the OECD/Australia Workshop on Innovation and Productivity in Services represent a significant step towards a better understanding of this complex but increasingly important sector and towards developing policies to ensure its continued growth. While it is difficult to provide a comprehensive or definitive set of future directions at this early stage, the workshop outcomes deserve consideration by the OECD and OECD Member countries. Some specific future directions for consideration are:

- Statistics for services are poor, in terms both of quantity and quality. Their improvement is a priority area. Sound analysis and policy development require robust statistics. A longer-term issue is the adequacy of statistical definitions of services and innovation. A move from traditional sectoral approaches to definitions that better capture the interaction of services with other industries and the characteristics of innovation in services appears to be required.
- Effective and well-balanced regulation is crucial to promoting competition. This agenda should be driven through relevant multilateral bodies and processes, such as the WTO GATS, and by domestic regulatory reform aimed at promoting competition. The development and implementation of regulation of services should be transparent and flexible.
- Education policies need to be designed in consultation with industry to ensure the supply of an appropriately skilled and educated workforce for services sectors.
- Policy makers should consider existing policies and programmes and address any implicit biases against services in domestic R&D and innovation policies. If innovation in services is to be more effectively supported, a move away from the traditional emphasis on R&D to incorporate the range of innovation strategies that better reflect opportunities and developments in the current industrial paradigm will be necessary.
- Further analysis is needed of the effectiveness for services of current intellectual property rights regimes.
- There is a need for a comprehensive framework for services policy development and implementation. Governments should evaluate current services policy frameworks or implement new frameworks to facilitate innovation, productivity and growth in services.

Chapter 2

INNOVATION AND PRODUCTIVITY IN SERVICES: STATE OF THE ART

by

Dirk Pilat

Directorate for Science, Technology and Industry, OECD

Executive summary

Traditionally, it was thought that services were characterised by low productivity growth and a low level of innovation. Were this the case, the transition to a service-led economy could mean lower growth and lower rates of technological progress. This chapter examines the recent evidence on the performance of the services sector and finds that services are an increasingly dynamic part of the economy. Many experience rapid productivity growth, several are innovative and new jobs in the services sector increasingly require skilled personnel. Services are also becoming more tradable and are increasingly exposed to competition, which forces improvements in performance. Productivity-enhancing investment in information and communication technology (ICT), regulatory reform and the growing tradability of services are among the main factors explaining stronger performance.

ICT, in particular, enables productivity improvements in many sectors, including transport, communications, wholesale and retail trade and finance and business services, although official data often obscure their impact because of measurement problems. To be effective, investment in ICT needs to be accompanied by upskilling of workers, organisational change and a competitive business climate. Knowledge-intensive services, such as R&D, computing and consultant services have experienced very rapid growth and are important sources of innovation. Many other services have become more innovative as a result of the implementation of ICT in service delivery, the competition-enhancing effects of regulatory reform and the increased role of networking and co-operation in the innovation process.

Innovation surveys suggest that obstacles to growth and innovation in services are generally no different than in manufacturing. Insufficient access to finance and risk capital, lack of internal capacity to innovate, insufficient expertise in applying ICT and high risk are typically the main barriers to innovation in both sectors. If the barriers to innovation are similar, there may be no need for specific policies aimed at innovation and growth in services. However, some elements of policy must take better account of the needs and main characteristics of the services sector if they are to promote growth and innovation. Such policies also need to account for the large variety in the services sector. These policies include:

- Regulatory reform to ease access and reduce costs of services-relevant ICT, *e.g.* high-capacity broadband communications, and attention to ICT skills and the development of

ICT-related business services. Regulatory frameworks and standards for the development of electronic commerce are also essential.

- Further reform of regulatory structures to promote competition and innovation and to reduce barriers and administrative rules for new entrants and start-ups.
- Reduction of trade and foreign investment barriers in services to strengthen competition and promote the diffusion of innovative ideas and concepts across countries.
- Redesign of some instruments of government policy, such as the scope of R&D support and technology diffusion programmes, to remove implicit policy biases against services.
- Greater attention to service-related skills in education and training policies, since people and their knowledge and their client and communication skills are drivers of service performance.
- Promotion of an innovative culture in services through stronger competition, improved access to finance and risk capital and removal of barriers to entrepreneurship and risk-taking.
- Attention to intellectual property rights (IPR) in services exposed to high levels of international competition to ensure that business continues to innovate.
- Promotion of innovative behaviour in areas where government is an important provider or purchaser of services, *e.g.* construction, education and health.
- Closer co-operation with business to improve policy design and delivery.
- Better and more comprehensive data, to increase our understanding of processes that drive service innovation.

Introduction¹

This paper aims to contribute to policy makers' understanding of the driving forces behind performance in the services sector. It brings together much of the existing empirical evidence on innovation and economic performance in the services sector and examines it to assess whether policy is sufficiently geared towards growth and innovation in services. It is intended as a follow-up to recent OECD analysis of innovation policy (OECD, 1998*a*; 1999*a*) and is closely linked to recent OECD work on economic growth and the new economy (see OECD, 2000*b*).² However, it focuses on problems specific to the services sector, which has been ignored in much previous work on innovation and is of growing importance for economy-wide performance.

Services make an increasing contribution to economic growth and now account for 60-70% of business sector GDP in the broad OECD areas. Growth and innovation in services are therefore increasingly crucial to economic performance and are thus important for policy. However, services sector performance remains poorly understood. The traditional view has been that services are not very dynamic, that any jobs created are poorly paid, that services experience little or no productivity growth and that they do not innovate. A lack of statistics and measurement problems for many parts of the services sector are partly to blame for this view.

Measurement is not the only issue, however. Services sector performance remains poorly understood, often because analysis has been too much based on the experience of manufacturing industries. While many drivers of service performance are similar to those of manufacturing, their role may differ. For instance, innovation and technological change in services are only partly due to R&D and are typically more dependent on acquired technology, organisational change and human capital.

Innovation in services may be almost independent of technological change. It is often more closely linked to consumer demand than innovation in industry and draws less directly on scientific research.

The services sector is very diverse

A recent definition of services states that “services deliver help, utility or care, and experience, information or other intellectual content – and the majority of the value is intangible rather than residing in any physical product” (Department of Industry, Science and Resources, 1999). The services sector is thus a highly diversified part of the economy. It ranges from technology- and skills-intensive sectors such as software, computer and business services, to the low-technology and low-skill sectors that make up a large part of personal services. The traditional industrial classification of services does not fully reflect the sector’s increasing complexity, and even recent industrial classifications (NACE Revision 1 and ISIC Revision 3) create groups of services that are in fact quite heterogeneous.³ Recently, attempts have been made to develop taxonomies of services that have a more analytical basis and are more closely tied to the market structure prevailing in the sector.

Evangelista and Savona (1998) have developed a particularly useful taxonomy. They use factor analysis of the 1993-95 Italian innovation survey to distinguish four categories of services. The first consists of S&T-based sectors such as R&D services and engineering and computing. These are highly innovative and interact closely with manufacturing suppliers. The second consists of technology users and includes sectors such as land and sea transport, legal, travel and retail services, as well as certain business services, including security and cleaning. This group is generally not very innovative but interacts closely with technology suppliers. The third consists of services such as banks, insurance, trade and repair of motor vehicles and hotels. Again, these services are not very innovative and mainly rely on tacit and internal sources for their innovative activities. They tend to have strong relations with suppliers and clients. The fourth category consists of consultant services, which are highly innovative, mainly rely on internal and tacit sources of innovation and have strong links with suppliers and clients. Postal and telecommunication services were rated as average for both innovative intensity and interaction and thus difficult to place in any category.

These taxonomies – and others – indicate that services’ market structure and drivers of performance differ. For example, in social services such as education, the market plays a limited, but increasing, role and the public sector continues to produce much of the final output. In contrast, many producer services are faced with sophisticated business demand for quality, low costs and efficient delivery. In telecommunications, regulatory reform and technological change have significantly altered the drivers of performance. Services also differ greatly in their degree of standardisation, which affects market size and the type of innovation (Tether *et al.*, 1999). Standardised services, such as large food retailers, are more likely to focus on process innovation.

Policy will need to take account of the variety of the services sector. Differences in market structure and competition in the various services indicate that the approach taken to regulation and competition should reflect their differences; telecommunications and other network industries require a different approach from retailing and road transport. The following sections discuss some of the main trends in services performance. While they mainly address the dynamics of the services sector as a whole, the text and tables demonstrate the great variety of the sector and the need for more detailed analysis of services performance and of the appropriate policy tools.

The differences between services and manufacturing should not be exaggerated. There is as much variety among manufacturing industries as between services such as computer and household services. In some ways, manufacturing is becoming more like services, as it increasingly bundles services with manufactured products, while many services are becoming more like manufacturing, more

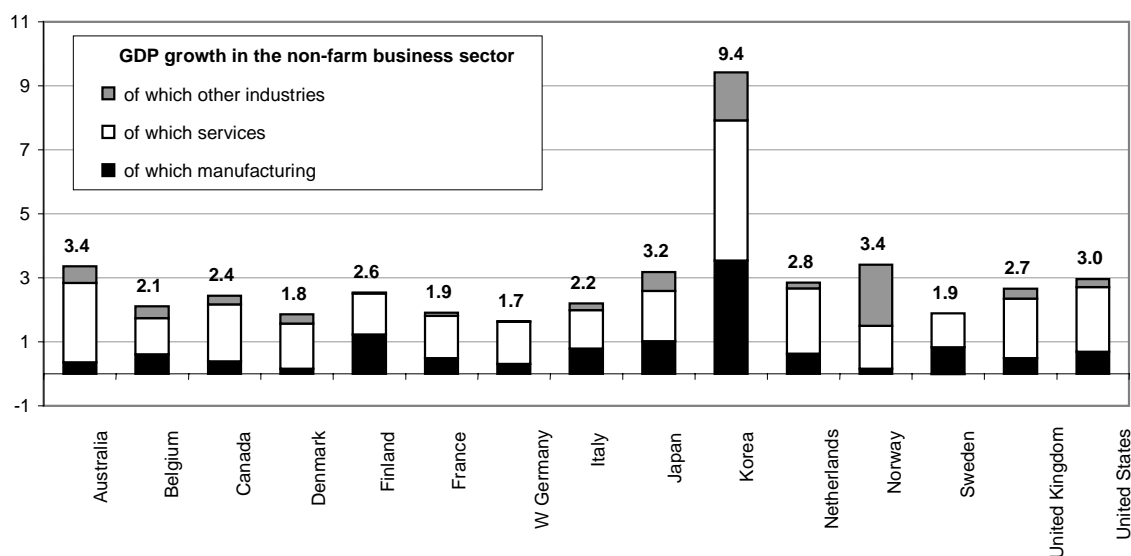
standardised and suited for mass production. The distinction between services and manufacturing is thus increasingly irrelevant, and it is difficult to examine the role of services in isolation from that of manufacturing. However, this distinction still orients popular debate and thus affects the policy-making process. This chapter first covers major trends and certain measurement issues and then analyses the main drivers of services sector performance. The following section discusses the main policy concerns and the measures that may be taken to address them. A final section sums up.

Trends in service performance

Services are increasingly the drivers of economic growth and job creation

The rising share of services in the economies of OECD countries is a familiar phenomenon. Services have become more important in terms of employment and increasingly also of total output (Table 1). In terms of growth, their contribution is increasing. Between 1985 and 1997, around two-thirds of GDP growth in the OECD business sector resulted from growth in the services sector (Figure 1). Most employment growth was also in services.

Figure 1. The contribution of services to GDP growth, 1985-97
Annual average growth rates over the period



Source: OECD calculations based on the Intersectoral Database (ISDB).

The greater role of services reflects a shift in consumer demand, which is linked to the high income elasticity of services, increased business demand, relatively slow productivity growth in some services, as well as some outsourcing – and reclassification – of manufacturing to specialised services. Changing consumer demand is linked to an emphasis on quality and design, convenience, culture and recreation and the environment (Department of Trade and Industry, 1999a). While some studies have attributed the growth in services to outsourcing, empirical studies for Germany and the United States suggest that this only explains a small part (Austrian Federal Ministry for Economic Affairs, 1998). Outsourcing aside, there has been an increase within manufacturing firms of (mainly white-collar) workers who undertake functions that are also being performed by specialised services firms. However, many service functions now provided by the latter are entirely new and were not previously performed by manufacturing firms.

Over the 1990-97 period, wholesale and retail trade, and finance, insurance, real estate and business services made large contributions to GDP growth (Scarpetta *et al.*, 2000). They generated over half of output growth in the 1990-97 period in Australia, Canada, the Netherlands, the United Kingdom, the United States and Western Germany. Their large contribution is partly due to their size but also to sharp rises in output in several countries. Growth in business services has been particularly fast in many countries (OECD, 1999b). Because of its limited size, transport and communication made a smaller contribution to overall output growth in most countries, although communication services grew very rapidly in almost all OECD countries.

Table 1. The role of services in OECD economies

	Share in gross domestic product (%)			Share in civilian employment (%)			Trade in services, 1996				
							% of GDP			% of current account	
	1987	1997	Change	1987	1997	Change	Credit	Debit	Net	Current receipts	Current expenditures
Australia	64.9	70.6	5.7	68.1	72.7	4.6	4.7	4.7	0.0	21.2	17.9
Austria	64.1	68.2	4.1	53.7	63.8	10.1	15.9	12.7	3.2	33.3	25.7
Belgium	68.6	71.3	2.7	68.2	71.4	3.2	12.7	11.8	0.9	14.0	13.8
Canada	66.8	71.6	4.8	70.0	73.0	3.0	4.9	6.1	-1.1	11.4	14.2
Czech Republic	50.5	58.4	7.9	40.5	52.5	12.0	14.5	11.2	3.4	25.8	17.4
Denmark	71.6	72.1	0.5	66.0	69.5	3.5	..	..	..	..	..
Finland	61.6	66.3	4.7	58.4	65.5	7.1	5.8	7.0	-1.2	14.1	18.7
France	66.9	71.5	4.6	62.2	69.9	7.7	5.4	4.4	1.1	19.2	16.2
Germany	64.0	69.9	5.9	55.4	60.2	4.8	3.6	5.5	-1.9	12.1	18.0
Greece	61.1	67.9	6.8	45.0	56.9	11.9	10.7	3.4	7.3	50.3	14.7
Hungary	..	..	..	..	57.0	..	11.2	7.8	3.4	22.0	14.3
Iceland	64.2	69.0	4.8	57.6	65.5	7.9	11.0	9.6	1.4	27.7	25.5
Ireland	57.0	55.6	-1.4	57.0	61.7	4.7	7.9	18.6	-10.7	9.0	21.6
Italy	61.9	66.9	5.0	56.8	61.2	4.4	5.8	5.6	0.2	18.8	20.5
Japan	56.8	60.2	3.4	57.9	61.6	3.7	1.5	2.8	-1.4	9.7	20.5
Korea	47.2	51.4	4.2	45.5	57.7	12.2	4.8	6.1	-1.3	14.5	16.1
Luxembourg	66.9	75.0	8.1	62.7	71.8	9.1	12.7	11.8	0.9	14.0	13.8
Mexico	63.3	68.4	5.1	..	54.1	..	3.3	3.3	0.0	9.4	9.2
Netherlands	67.8	69.8	2.0	68.3	74.1	5.8	12.5	11.6	1.0	18.7	19.1
New Zealand	65.1	66.6	1.5	62.2	67.6	5.4	7.2	7.6	-0.5	21.5	20.5
Norway	66.0	65.9	-0.1	66.3	71.6	5.3	8.9	8.5	0.4	20.1	22.6
Poland	..	..	..	..	47.5	..	7.3	4.8	2.5	23.6	14.3
Portugal	56.1	60.9	4.8	42.9	54.8	11.9	7.5	6.3	1.2	17.6	14.2
Spain	59.3	70.9	11.6	52.5	61.7	9.2	7.6	4.2	3.4	25.7	14.3
Sweden	66.3	70.5	4.2	66.3	71.3	5.0	6.9	7.7	-0.8	14.6	17.1
Switzerland	60.8	63.5	2.7	57.5	68.6	11.1	8.9	4.7	4.2	18.1	11.2
Turkey	49.1	54.2	5.1	31.0	34.7	3.7	7.2	3.5	3.7	25.3	11.9
United Kingdom	66.1	70.8	4.7	64.8	71.3	6.5	7.1	6.1	1.0	16.4	14.1
United States	68.3	71.4	3.1	69.9	73.4	3.5	3.2	2.0	1.1	22.1	12.6

Source: Share in GDP from OECD National Accounts 1985-97; share in employment from OECD Labour Force Statistics 1977-97; trade in services from OECD, Services: Statistics on International Transactions 1987-96.

Several services show rapid productivity growth

In terms of productivity growth, sectoral patterns differ somewhat. Manufacturing plays a more important role, owing to its limited or negative contribution to employment growth. Around half of productivity growth over the 1990-97 period in the non-farm business sectors of Finland, France, Italy, Japan, the United States and Western Germany was attributable to manufacturing (Scarpetta *et al.*, 2000). Compared to its size, the services sector makes a relatively small contribution. While certain services contributed significantly in some OECD Member countries, *e.g.* transport and communications in Australia, Finland and Italy and wholesale and retail trade in Finland and the United States, market services generally made quite a limited contribution to labour productivity growth (Table 2).⁴

Table 2. Labour productivity growth in the services sector
Percentage changes, 1979-89 and 1990-97

	Australia		Canada		Finland		France		Italy	
	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97
6000 Wholesale & retail trade, restaurants and hotels	0.1	1.0	0.7	1.6	2.5	0.9	1.2	0.3	0.4	1.4
6120 Wholesale and retail trade	-	-	1.6	2.3	2.6	0.7	1.6	0.6	0.5	1.5
6300 Restaurants and hotels	-	-	-2.4	-0.9	1.7	2.0	-0.6	-1.0	-0.4	0.8
7000 Transport, storage and communications	3.6	5.4	3.1	2.2	3.1	4.7	3.8	2.7	2.0	4.8
7100 Transport and storage	2.1	3.5	2.5	0.5	2.3	3.8	1.7	1.4	1.3	2.6
7200 Communication services	7.5	8.6	3.7	5.0	5.8	7.0	7.4	4.8	4.6	10.9
8000 Finance, insurance, real estate & business services	-0.6	0.6	0.2	0.5	0.2	2.9	0.1	0.1	0.0	2.5
8120 Finance and insurance	-	-	-0.4	1.7	3.9	6.1	0.2	-1.8	-	-
8300 Real estate and business services	-	-	2.3	0.1	-1.8	1.6	-0.3	0.4	-	-
Total non-farm business sector	1.4	2.0	1.2	1.6	3.1	4.1	2.2	1.7	1.8	2.3
	Japan		Netherlands		Sweden		United States		West Germany	
	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97	79-89	90-97
6000 Wholesale & retail trade, restaurants and hotels	4.4	1.0	1.6	0.3	1.6	3.2	1.3	3.1	0.9	0.4
6120 Wholesale and retail trade	-	-	3.0	0.5	2.4	3.3	1.4	3.0	1.2	0.7
6300 Restaurants and hotels	-	-	2.2	-0.7	-3.5	2.3	-0.4	4.3	-0.9	-3.2
7000 Transport, storage and communications	4.1	0.5	2.6	2.5	3.8	2.1	1.6	2.0	3.1	3.9
7100 Transport and storage	-	-	3.5	2.5	3.2	0.2	0.2	1.9	2.0	2.0
7200 Communication services	-	-	3.7	3.1	5.2	7.5	3.9	2.7	4.9	7.2
8000 Finance, insurance, real estate & business services	2.3	1.8	0.7	-0.9	-1.4	3.0	-1.1	-0.4	1.6	2.8
8120 Finance and insurance	-	-	0.3	-0.4	3.1	4.2	-0.4	1.3	-	-
8300 Real estate and business services	-	-	0.4	-1.3	-2.9	2.5	-1.8	-1.2	-	-
Total non-farm business sector	3.6	1.0	3.0	1.0	1.7	4.1	1.2	1.6	1.5	2.1

Source: OECD, calculations on the basis of the Intersectoral Database (ISDB).

However, slow productivity growth in services masks a wide variety of experiences and is affected by measurement problems. In some services, technological change has led to notable improvements in productivity, which are not always reflected in official productivity statistics. In the distribution sector, productivity has been positively affected by the use of ICT (scanning, inventory management systems) and by closer integration of manufacturers and retailers. Productivity in transport and communication has risen rapidly over the past decades. In telecommunications, annual productivity growth rates of up to 8% were achieved in some countries. Some countries also performed well in transport, with annual productivity growth of close to 3%.

In other services – notably community, social and personal services – productivity growth has been more sluggish. Although this may partly reflect measurement problems, many of these services are also less easily automated or less affected by technological improvements. Some services may have little scope for productivity growth. In certain cases, it may be difficult to reduce labour input (for example, the live performance of a piece of classical music) or the service may be customised (*e.g.* specialised legal advice) (Baumol *et al.*, 1989). For some of these services, use of ICT may eventually lead to more standardisation and to faster productivity growth.⁵

Measurement problems may also obscure actual productivity gains (Gullickson and Harper, 1999). For many parts of the services sector, output measures are of dubious quality, partly because of the lack of basic data. However, measurement problems also arise because services output is often difficult to define (Dean, 1999). There is little agreement, for example, on the output of banking, insurance, medical care and retailing. In addition, it is difficult to separate service output from the consumer's role in eliciting the output. Such difficulties indicate that the volume and price of services – and changes in their quality – are harder to measure than those of goods. In addition, some services are not sold in the market, so that it is not easy to establish prices. In practice, these constraints mean that output in some services is measured on the basis of crude indicators. Several series are deflated by wages or consumer prices or extrapolated from changes in employment, sometimes with explicit adjustment for labour productivity changes. Given these difficulties, adjusting for quality is even more difficult.

With better measurement, productivity gains may be considerable. Fixler and Zieschang (1999), for example, derive new output measures for the US financial services industry (depository institutions). They introduce quality adjustments to capture the effects of improved service characteristics, such as easier and more convenient transactions, *e.g.* use of ATMs, and better intermediation. Their output index grows by 7.4% a year between 1977 and 1994, well above the official measure for this sector of only 1.3% a year on average.⁶ The recent revisions of GDP growth for the United States incorporate improved estimates of the real value of non-priced banking services, which better capture productivity growth in this industry (Moulton *et al.*, 1999).

Measurement problems are particularly large for non-market services and the public sector, where measured productivity growth tends to be very low.⁷ However, there may in fact be productivity gains in these sectors, as a study for the US federal government suggests (Fisk and Forte, 1997). The study is based on a wide range of indicators of physical counts or quantities of services provided by different parts of the federal government. For this “measured part”, a small but steady increase in labour productivity was found, with a slowdown in productivity from the mid-1980s. The highest rates of productivity growth were observed for federal services dealing with finance and accounting, libraries and regulatory functions, while no or negative productivity growth was measured for legal and judicial activities, personnel management, medical services and electric power and production.

Services are more tradable than in the past

Services are traditionally considered non-tradable. Certain of their characteristics, such as the difficulty of storage and transport, as well as the need for direct interaction with consumers, make trade difficult. However, they are becoming more tradable and therefore exposed to international competition. Four modes of trade in services can be distinguished:

- Mode 1. Cross-border supply: services supplied from one territory to another.
- Mode 2. Consumption abroad: services supplied in one territory to consumers in another (e.g. tourism).
- Mode 3. Commercial presence: services provided through firms of one party in the territory of another (for example, banking).
- Mode 4. Presence of natural persons: services provided by nationals of one party in the territory of any other (for example, construction projects or consultancy services).

As conventionally measured (modes 1 and 2), the share of services in total exports of goods and services remains relatively low (19% in 1998) but is rising. Between 1990 and 1998, world exports of commercial services grew at an average annual rate of 6.4%, to USD 1.3 trillion, slightly above that of merchandise trade (exports) (WTO, 1999). Growth was highest in services other than transportation and travel, such as financial services, construction and computer and information services. Modes 3 and 4 accounted for another USD 820 billion in trade in 1997, bringing the total to about USD 2.2 trillion or 7-8% of world GDP (Karsenty, 1999).

Increased trade arises partly because more and more firms organise their development, production, sourcing, marketing and financing activities on an international basis. There is also more trade in services in areas such as software, financial services, telemarketing, transport and accounting, where international competition is prevalent. The increased use of ICT and electronic commerce is likely to affect trade in services such as retailing, travel services and telecommunications, and may contribute to making them even more tradable and, consequently, more exposed to international competition. In 1997, international sales of e-commerce firms such as Amazon (books) and CDNow (music) amounted to almost one-third of total sales (OECD, 2000*d*).

Foreign direct investment (FDI) is an important component of international trade in services. In the OECD area, the total volume of FDI in services is significantly higher than that of manufacturing FDI (OECD, 1999*c*). Retailing, banking, business services and telecommunications and, to a more limited extent, hotels and restaurants make important contributions to FDI in services. These are sectors where commercial presence (mode 3) is a requirement of business activity. However, it is only over the past decade that the total volume of these FDI flows has surpassed that of manufacturing FDI (OECD, 1999*c*). Consequently, in most countries, stocks of FDI in services are relatively low compared with those of manufacturing. OECD data indicate that turnover of foreign affiliates is still greater in manufacturing than in services, Austria, Norway and Finland being exceptions (Figure 2). This is due to the large share of services in the economy as a whole.

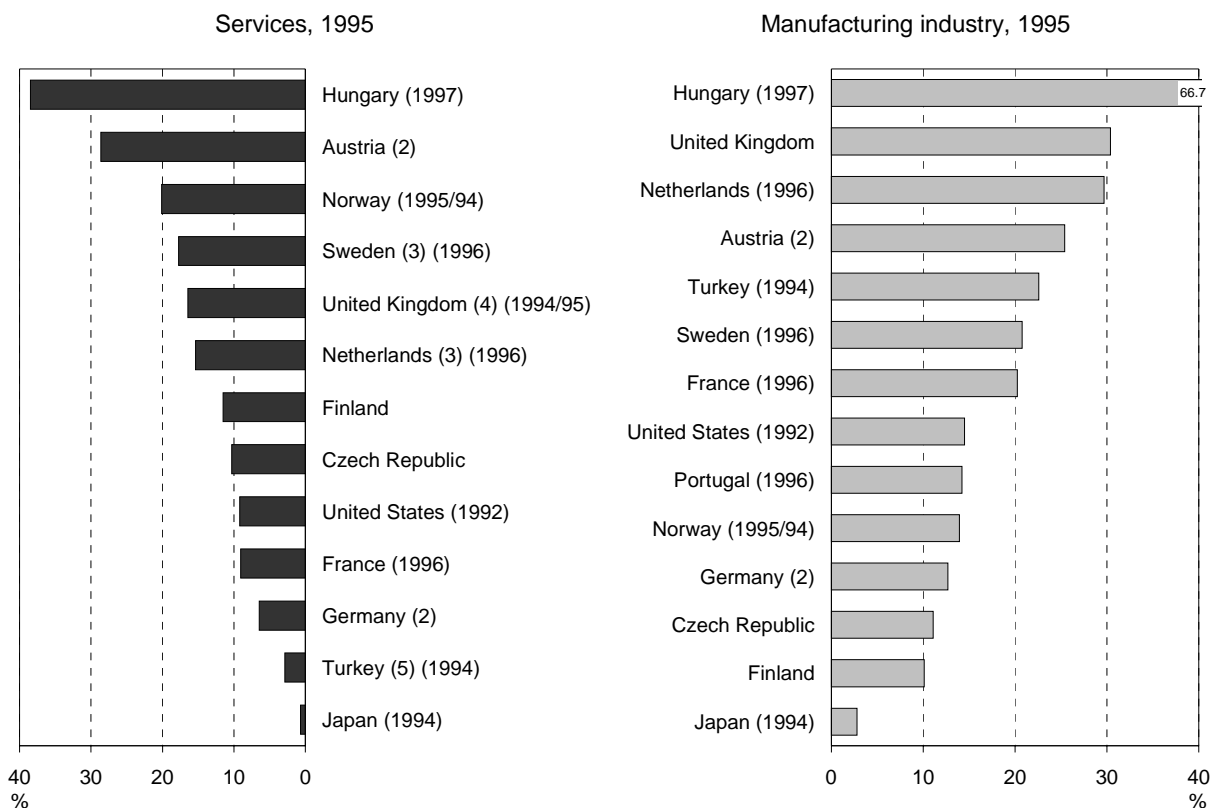
Services perform a larger share of R&D

OECD data show that services account for an increasing share of total business R&D (Figure 3.1). In a number of countries, including Australia, Canada, Denmark and Norway, around one-third of business R&D is carried out in services. In others, including Italy, the Netherlands, the United Kingdom and the United States, services account for around 20% of total business expenditure

on R&D. In still other countries, e.g. Germany and Japan, services play a minor role in measured R&D.

R&D in services is often different in character from R&D in manufacturing (National Institute of Standards and Technology, 1998). It is less oriented towards technological developments and more at co-development, with hardware and software suppliers, of ways to apply technology, in particular ICT, to deliver services. The research may, for example, be aimed at improving the interface with customers and increasingly involves human factors, psychology and design.

Figure 2. Share of foreign affiliates in total turnover¹



1. Share of foreign affiliates in the turnover of all domestic firms.
 2. Production instead of turnover.
 3. Agriculture included in services.
 4. Services exclude financial intermediation, insurance, real estate and other social, community and personal services.
 5. Services exclude transport, storage and communications and other social, community and personal services.
- Source: OECD, FATS and AFA database, October 1999.

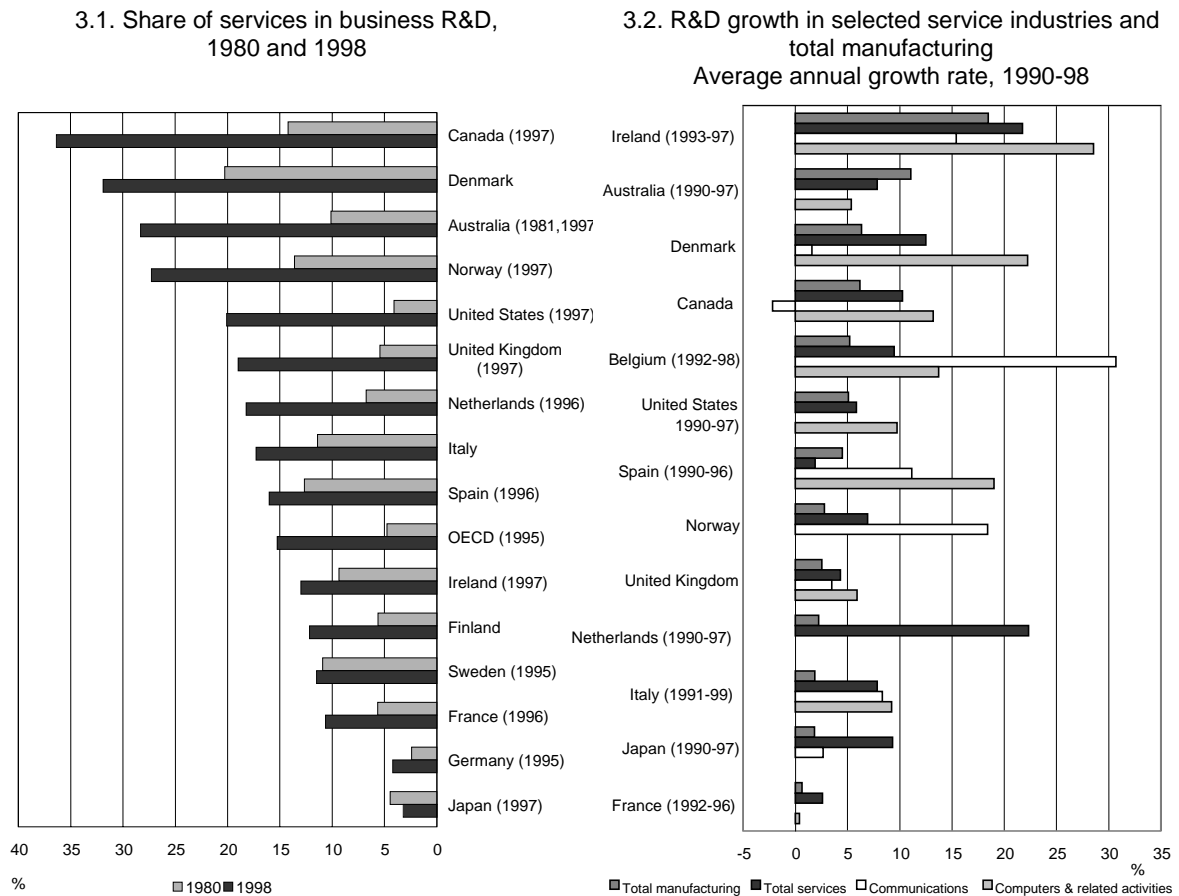
The increasing share of services in R&D reflects four main factors (OECD, 1996a):

- *Measurement.* Statistics on services sector R&D have greatly improved in a number of countries. The growing share of services in R&D is partly the result of changes in statistical practices and better sampling (Young, 1996). Many countries have recently expanded the coverage of their R&D surveys and now cover the sector better than before.⁸ In the past, data on business R&D focused mainly on manufacturing, which was assumed to be the source of most innovation and technological change. There are also problems of classification. Some parts of the information technology sector are classified in manufacturing, while others, such as software development, are included among services. Another problem concerns the

classification of R&D carried out in institutes serving a particular industry. Changes in classification over time, such as the move of IBM from manufacturing to services, can also contribute to the increasing share of services in total R&D.

- *More research.* Services are simply performing more R&D. Some is directed towards developing complex services, and some goes towards application of new hardware in the firm, e.g. R&D on software that allows consumers to engage in on-line banking.
- *Business outsourcing.* Manufacturing firms sometimes buy (or outsource) R&D by spinning off their laboratories into a separate corporate entity or by choosing to purchase R&D services from another private firm.
- *Government outsourcing.* Governments sometimes choose to “buy” rather than “make” R&D. This is likely to become more prevalent as research on software increases, although the general decline in government funding of business R&D is a mitigating factor. Quasi-private research centres funded by government contracts have also experienced some growth.

Figure 3. Business expenditure on R&D in services



Source: OECD, ANBERD database, May 2000; Annex Table 1.

The R&D intensity of services as a whole remains below that of manufacturing, although services such as telecommunications, software development and commercial R&D have very high R&D intensity. Some of these sectors have grown extremely rapidly (Figure 3.2; see also Annex Table 1). The available data suggest that the role of services R&D varies considerably across countries, but

since R&D survey coverage of services also varies, it is unclear to what extent this is due to statistical practices and to what extent the differences are real. For countries with a very low share of services R&D in total business R&D, such as Germany, inadequate statistical coverage is almost certainly the most important factor (Young, 1996; Revermann and Schmidt, 1999).

Many services innovate

As noted above, the character of innovation in services often differs somewhat from that in manufacturing.⁹ Most service innovations are non-technical and mostly involve small and incremental changes in processes and procedures, so that they often do not require much R&D. Many service innovations have often already been implemented in or by other organisations. Sundbo and Gallouj (1998) distinguish four types of service innovations: product innovations, process innovations, organisational innovations and market innovations. Within the category of process innovations, a distinction can be made between changes in the production process and changes in delivery. While it is possible to distinguish these categories analytically, innovation surveys suggest that few firms engage in only one type. In general, product, process and organisational innovation occur together. *Ad hoc* innovation, *i.e.* a specific solution to a particular problem posed by a customer, is a fifth type of service innovation, typically made in interaction with the client.

Traditional measures of technological performance, such as patenting, usually do not capture services sector innovation, as such innovations often do not meet the criteria for patenting. They are mostly covered under other forms of intellectual property protection, such as copyrights and trademarks, which are not commonly captured in innovation statistics.¹⁰ Since most services are also not very R&D-intensive, their low patent activity gives the incorrect impression that they are not very innovative. Innovation surveys suggest that while services are on average somewhat less likely to innovate than manufacturing (Figure 4), several are more likely to innovate than the average manufacturing firm. For instance, the Italian innovation survey suggests that 31% of service firms innovate, compared with 33% in manufacturing. However, over 50% of firms in advertising, engineering and computing and over 60% of firms in banking and insurance innovated over the period reviewed (Sirilli and Evangelista, 1998). The French innovation survey found that knowledge-intensive services were more likely to be innovative than manufacturing firms (55% and 45% of firms, respectively) (SESSI, 1999).

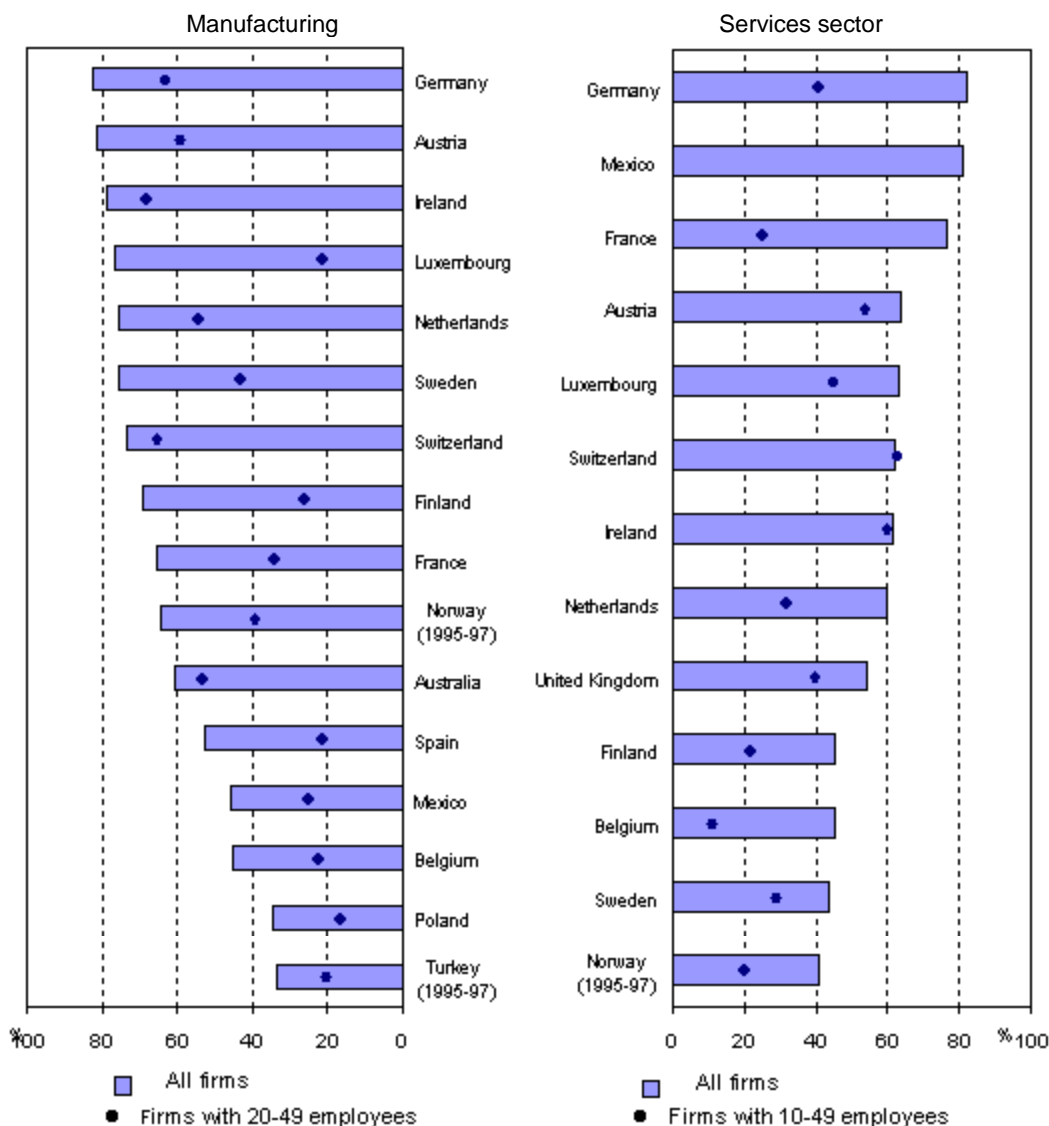
Innovation surveys have also made clear that expenditure on R&D is only one element of firms' expenditure on innovation. For manufacturing, R&D generally amounts to about half of total investment in innovation. Non-R&D expenditure appears even more important for services than for manufacturing. Since most innovation in services is linked to changes in processes, organisational arrangements and markets, R&D expenditure captures only a small part of the total innovative effort of service firms. In Italy, for instance, only 24% of total innovative costs in services went for R&D expenditure, compared to 36% for manufacturing (Sirilli and Evangelista, 1998). In the Netherlands, 23% of innovative costs in services were linked to intramural and extramural R&D, compared to 53% in manufacturing (Central Bureau of Statistics, 1998).

In Germany, intramural and extramural R&D accounted for only 21% of the total innovative effort in services, with expenditure on new machinery and equipment, training and software and patents as the main categories of expenditure (Mannheim Innovation Panel, 1999). The French 1998 innovation survey is an exception, but it mainly covered knowledge-intensive business services, such as telecommunications, computer services and engineering, which are all highly R&D-intensive. R&D accounted for 89% of the total innovative effort, compared with 66% in manufacturing (SESSI, 1999). Data from innovation surveys for a limited number of countries suggest that the non-R&D portion of technological innovation represents up to twice the R&D portion. In most countries, expenditure on

innovation (relative to sales) is higher for manufacturing than for services (Figure 5). Expenditure on innovation in services is highest in the United Kingdom and Sweden. The reasons for the differences in innovative performance and expenditure across countries reported in Figures 4 and 5 remain to be explored (Department of Trade and Industry, 1999b).

Figure 4. Innovative output in manufacturing and services

Share of firms introducing new or technologically improved products or processes on the market, 1994-96



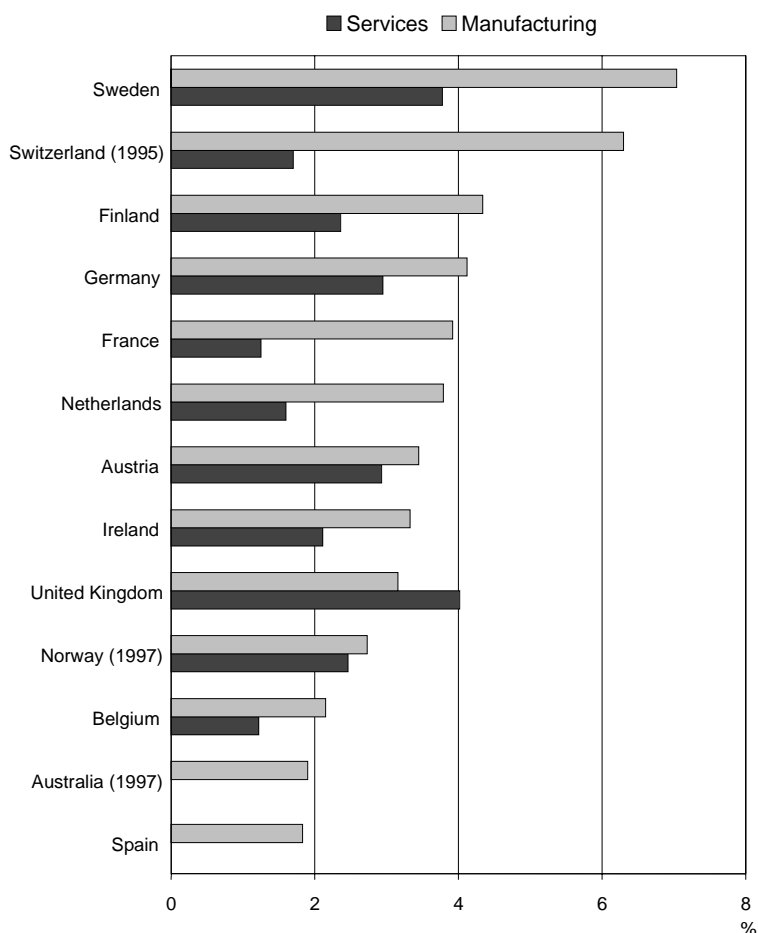
Source: OECD (1999d), mainly based on data from Eurostat.

Innovation in services has often been related to the “reverse product cycle” (Barras, 1986; OECD, 1996a). In the cycle’s first stage, a firm adopts information technology – or another technology – to improve the efficiency of an existing process. In the second stage, this new process generates a significant improvement in the quality and delivery of the service provided. In the third stage, it becomes evident that the new technology provides the basis for an entirely new service, usually in a different field. While the extent to which the empirical evidence supports this theory remains

somewhat unclear, the theory proposes an innovation process quite different from that prevailing in the manufacturing sector.

Innovation surveys also suggest that services innovate for many of the same reasons as manufacturing firms: to increase market share, to improve service quality and to expand product or service range. However, compliance with regulations and standards seems of less importance in services, owing perhaps to their more intangible nature. The same is obviously true for reducing material input, energy or labour costs, because of the difference between the production processes in manufacturing and services. While material inputs and energy costs are of minor importance in most services, labour costs are important but may be difficult to reduce, given the importance of personal contact with the customer (Barkin *et al.*, 1998).

Figure 5. Business expenditure on innovation
Expenditure on innovation as a share of total sales, 1996



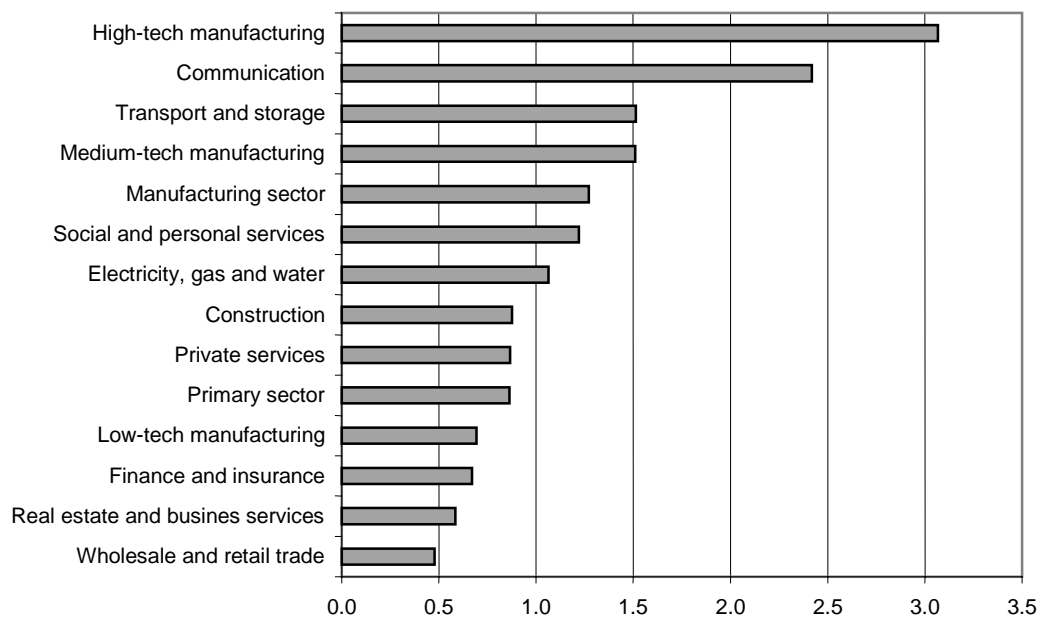
Source: OECD (1999d), mainly based on data from Eurostat.

Acquired technology, particularly ICT, is crucial to performance

Acquisition of technology is an important aspect of innovation. Services rely heavily on technology acquired from the manufacturing sector, in particular information and computing equipment. An OECD study (Papaconstantinou *et al.*, 1996) based on input-output tables for ten OECD countries estimated technology flows for different sectors. The study separated

technologies embodied in equipment and technologies generated by the industry itself. It shows that a limited number of manufacturing industries produce most technology, while services are typically the main users. Since services are the main clients for new technologies, their needs increasingly steer technology development (National Institute of Standards and Technology, 1998). Telecommunications, transport and storage and social and personal services (including health) are generally among the most technology-intensive sectors (Figure 6). Wholesale and retail trade, finance and insurance, and real estate and business services had relatively low levels of technology intensity in the early 1990s.

Figure 6. The relative embodied technology content of production



1. The graph shows the average ratio for nine OECD countries (Australia, Canada, France, Germany, Italy, Japan, the Netherlands, United Kingdom, United States) of the share of technology acquired by each industry in total embodied technology in the economy, to the corresponding share in production. Data relate to 1985 or 1990. *Source:* OECD calculations on the basis of input-output tables. See Papaconstantinou *et al.*, 1996.

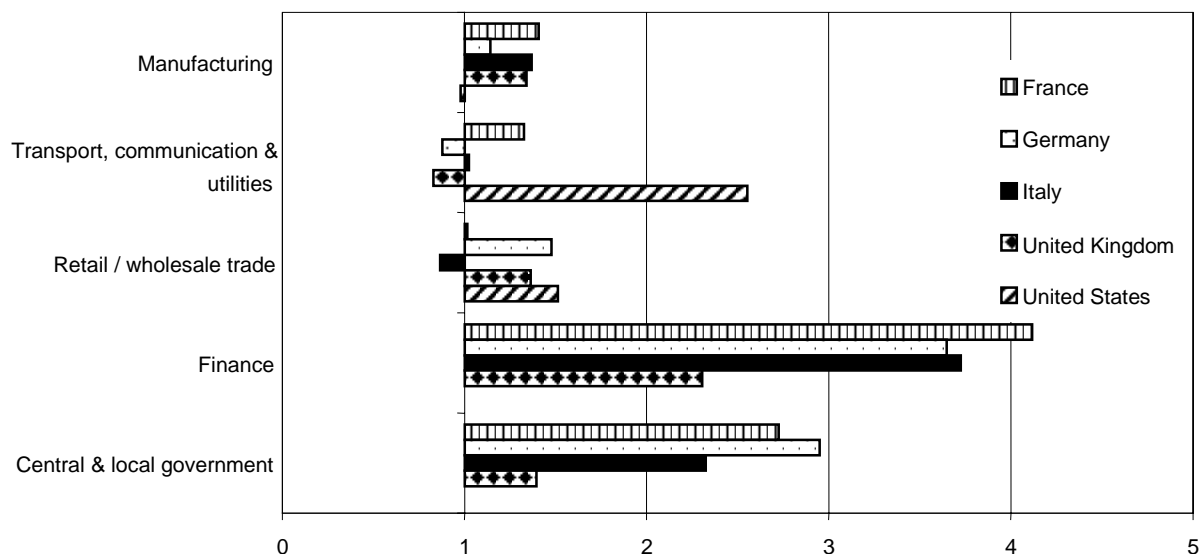
The overall findings mask considerable differences within these broad sectors, however, and further analysis of input-output tables is needed to obtain a more detailed measure of the total technology intensity of various sectors. Evidence from comparable input-output tables also suggests that the technology intensity of countries differs as well (OECD, 1996*b*; Amable and Palombarini, 1998). In the telecommunication sector, however, the available evidence suggests convergence of technology intensity; similarity in the use of ICT and the rapid diffusion of technologies in this increasingly global market may contribute to this trend.

ICT are particularly important for certain services (Figure 7). Their relevance is partly due to the fact that many services process and diffuse information,¹¹ particularly in financial services, communication and public administration. Advances in ICT that allow more information to be codified and the increasing move into knowledge technologies such as expert systems, have expanded the scope for ICT use in many services. In sectors that deal with more physical services, such as transport and distribution, ICT are often integrated in technologies that enhance logistics and automate complex processes. In human and social services, such as medical and health services, ICT is also

increasingly used. In recent years, electronic commerce has furnished an important stimulus to ICT investment in the services sector (OECD, 2000b).

The importance of ICT can also be seen in some of the evidence on services sector R&D (OECD, 1997a). Much R&D carried out in the services sector is IT-related and concerns software development or computer services. The innovation survey for Germany suggests that ICT are the major technologies for service firms. The five most important technologies mentioned by German service firms are personal computers, office software, communication networks, data banks and specialised software (Mannheim Innovation Panel, 1999).

Figure 7. The role of purchased ICT equipment in manufacturing and services, 1995¹



1. The figure shows an industry's share of purchased ICT equipment relative to its share in GDP. An index higher than 1 suggests that the industry is purchasing more than the average for the economy. US data are for 1992. Source: OECD, based on IDC data and National Science Foundation (1998).

Growth in services is accompanied by upskilling

Traditionally, services employment was characterised as low-skill and low-paid. The rise in employment in services was therefore regarded as a move towards “bad” jobs. Empirical research, by the OECD and in many countries, shows that the average job in the services sector is not a low-skill job. Services contain some of the best-paid and most high-skill jobs in the economy, although many jobs are in fact low-skill. This is confirmed in studies for the United States, where most recent employment growth has been in services (US Department of Commerce, 1996; Meisenheimer, 1998). Meisenheimer assessed the quality of service jobs on a range of measures, such as pay, benefits, job security, occupational structure and job safety and showed the wide variety in pay and benefits in the services sector.

An OECD study, covering ten countries, demonstrates that much of the growth in service employment between the early 1980s and the early 1990s involved high-skilled workers (OECD, 1998b). Most of the growth was in real estate, business and financial services and sanitary services. A recent study for Australia also emphasises the importance of skills for the growth of services (Department of Industry, Science and Resources, 1999). It distinguishes between two types of new services. One, reengineered services, is strongly affected by globalisation and the development of

electronic modes of delivery, which pressure firms to cut costs, differentiate their product line, strengthen innovation and expand markets. Much of the value of the second group, knowledge-intensive services, is associated with the delivery of knowledge to other firms. Both groups demand high skills; the second has a strong focus on scientific and ICT skills.

Many new service firms remain small

Firm-level databases can also be used to analyse service performance. These data cover individual firms or establishments and make it possible to trace firms' performance over time (OECD, 1998c). Few studies have looked at services sector performance on this basis, however. A study by Audretsch *et al.* (1998) for retailing, restaurants and hotels in the Netherlands suggests that many relationships between survival, growth, age and size, that have been shown to hold for manufacturing firms also hold for services firms. Consequently, entry and exit of firms are common, new entrants have low market penetration, entry and exit are highly correlated, survival rates of new entrants are low and even successful entrants take a long time to reach a size comparable with an incumbent firm (Geroski, 1995).

The same study also notes a few important differences between services and manufacturing. For the services considered, surviving new entrants grow for a few years but stagnate at small scale. This may be due to the absence of economies of scale in many services, so that firms do not need to grow much to reach minimum efficient scale. In much of the manufacturing sector, instead, firms need to continue to grow. It is not known whether this is also the case for other countries or other services. It may be that greater competition, or changes in service production processes (such as greater tradability owing to electronic commerce), could make economies of scale more important and thus change the dynamics of entry and growth in services (Van der Wiel, 1999). Further studies, covering other services and other countries, will be needed. The absence of economies of scale and the low level of competition also help explain why many services firms are small and medium-sized enterprises.¹²

The forces behind growth and innovation in the services sector

Some of the main characteristics of services – often increasingly similar to those of manufacturing – are (Miles, 1995; Miles and Boden, 1998):

- Traditionally, physical capital for services mainly consisted of buildings and structures. However, services increasingly use machinery and equipment, and services are the main investors in ICT equipment.
- Some services mainly use low-skilled labour and others mainly use high-skilled labour. In general, however, skills are becoming more important, notably technical and client skills, and some craft-like tasks are now standardised.
- Knowledge and innovation are increasingly important. The development of knowledge-intensive services, linked to the delivery of intellectual property, is one sign of this trend, as is the growing R&D-, skills- and ICT-intensity of services.
- Economies of scale remain more limited in most services than in manufacturing but are more important than in the past. Some services, such as banking and airlines, are quite highly concentrated.
- Services are often disembodied and hard to store, but information services can increasingly be stored and therefore traded. Electronic commerce will affect many services and open the way for global delivery.

- Service innovations are hard to patent, although they are sometimes embodied in patentable goods. Other forms of intellectual property protection, such as copyright and trademarks, are prevalent.
- Markets in services are often structured differently from those in manufacturing. Some are monopolies, public provision plays a considerable role in several areas, and most are heavily regulated. The structure of these markets is changing, however, as the rationale for many monopolies has eroded, the private provision of services such as health and education is increasing and regulatory reforms are improving competition in many services, including transport and communication and financial services.

These characteristics of services suggest that while the drivers of service performance are not quite the same as those of manufacturing, similar processes are at work in both parts of the economy. Underlying these processes are broader forces which have changed significantly in recent years. They include the growing role of market forces and private funding in the innovation process, which is linked to regulatory reform and globalisation; the growing role of knowledge, innovation and information technology; and the increased importance of networking and co-operation in the growth process. These forces are changing the workings of economies throughout the OECD area.¹³ Some key drivers of performance in services are discussed in the following sections.

R&D, innovation and networking

Innovation surveys suggest that services firms rely to a very limited extent on universities and research laboratories for the knowledge they require. First, they are often mainly interested in the development, marketing and customer orientation of new ideas. Basic R&D is often less relevant, as most services do not develop their own technologies. Second, many – though not all – are quite small and of limited interest to universities. Third, partly for historical reasons, universities often focus on industrial production processes and technologies that are of limited relevance to services firms. There are important exceptions, however. For example, innovation in health services is closely linked to university research, as is progress in certain fields of software that are relevant to banks or logistical services.

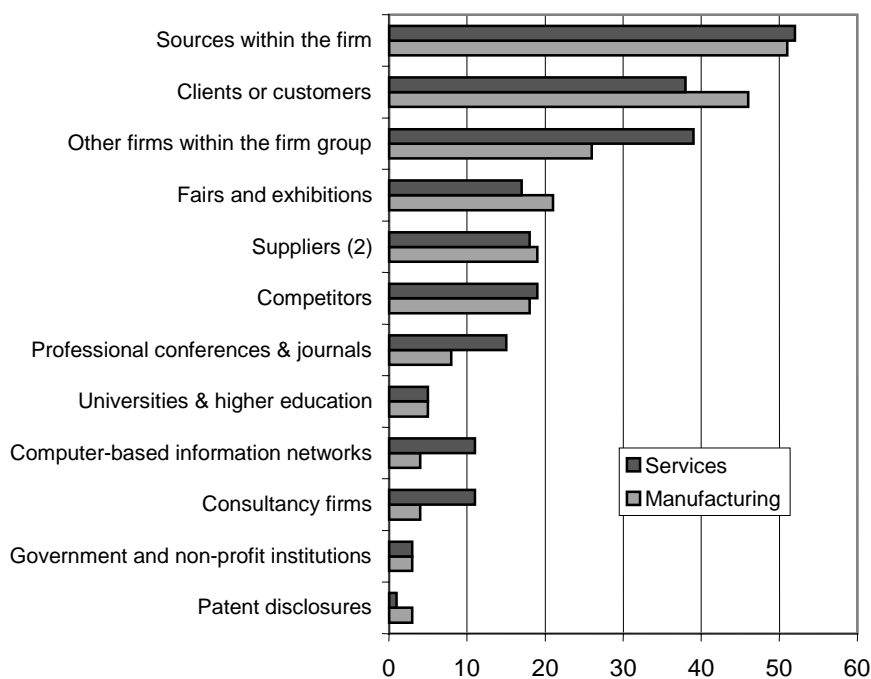
Although services firms have few direct links to science, they may have important indirect effects on the orientation of basic and applied R&D. For instance, in sectors such as air, maritime and rail transport, telecommunications and retailing, they are major customers of specialised equipment manufacturers. United Airlines, for example, played a major role in developing Boeing's 777 series. The needs of such firms orient R&D in the manufacturing sector and influence the focus of the related basic scientific research. Large retailers play an increasingly important role in orienting R&D aimed at new consumer products, since they can guarantee a market and thus reduce manufacturers' risks and uncertainty.

Co-operation and networking play an ever greater role in services (Figure 8). Innovation surveys suggest that services rely extensively on other firms for knowledge. The 1997 German Innovation Survey found that competitors, trade fairs, exhibitions and clients were the main sources of external knowledge. Equipment suppliers were also important. In Italy as well, these four sources were considered the most important, followed by consultancies, conferences and seminars and patents and licenses (Sirilli and Evangelista, 1998). Research institutes and universities were important for fewer than 5% of innovating firms in the services sector. In France, clients and equipment suppliers were by far the most important sources of external knowledge for the services covered in the innovation survey (SESSI, 1999).¹⁴ Competitors were of minor importance compared with Germany and Italy. In the United Kingdom, clients and customers were considered by far the most important source of

knowledge, followed by internal sources, equipment suppliers and other firms (Department of Trade and Industry, 1999b).

Networking and co-operation have become more formalised, owing to the increasing use of external knowledge and cost-sharing. Co-operative agreements now exist in many services, ranging from alliances in air services and telecommunications to purchasing groups, strategic alliances and retail franchises. Services represent a growing share of strategic alliances, particularly in trade, financial services and business services (OECD, 2000b), often with a view to innovation. A study for the United States found that firms that engage in research joint ventures are more competitive and invest more in ICT than firms that do not (NIST, 1998).

Figure 8. Sources of information considered as very important for innovation
12 European countries, percentage of innovating firms¹



1. Austria, Belgium, Denmark, Finland, France, Germany, Ireland, the Netherlands, Norway, Spain, Sweden, United Kingdom.

2. Suppliers of equipment, materials, components and software.

Source: Eurostat (1999).

Many co-operative arrangements in services seek to establish technological standards so as to make different technologies compatible and reduce technological uncertainty. Many are concerned with problems firms encounter in using and implementing ICT (NIST, 1998), and particularly the need for compatibility and interoperability, for instance in banking and airlines. In the United States, the Financial Services Technology Consortium undertook collaborative R&D on exchange of digital images of paper checks. Developing a common standard may be crucial to guarantee a sufficiently large market, often the only way to recover high development costs. For example, the development of the GSM standard has provided a strong impetus to the development of mobile telephony in Europe.

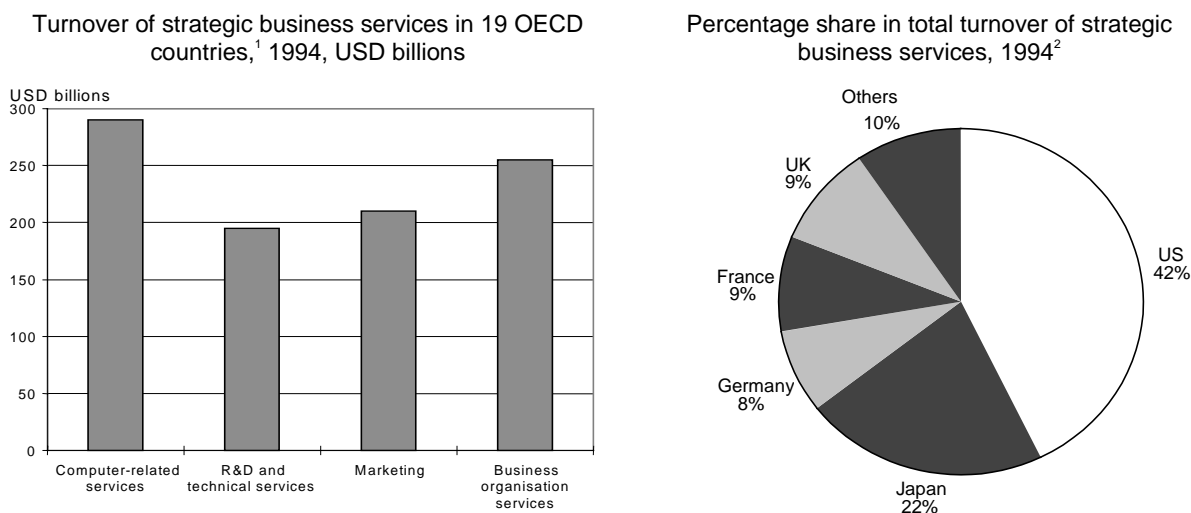
Consultant, training, R&D and computing services play a crucial role in innovation networks, as they help disseminate technology and innovative concepts to other firms. These knowledge-intensive

business services (KIBS) thus facilitate innovation in other firms and are an important source of innovation. They rely on highly specialist skills, are important users of IT and are generally regarded as making an important contribution to the “distribution power” of national innovation systems and helping to improve the economic performance of the system as a whole. Because specialist advice is needed more than before, some observers have suggested that KIBS constitute a second knowledge infrastructure, one that supplements the knowledge infrastructure of universities, research institutes and traditional knowledge transfer institutions (Den Hertog and Bilderbeek, 1998).

A recent study for Canada, covering communications, financial services and technical business services, focused on the characteristics of innovation in this part of the services sector (Statistics Canada, 1998). It found a very high incidence of innovation and suggested that most innovations in these sectors improved the service provided, although the various services differed considerably. For instance, innovation in financial services primarily affected flexibility, speed of delivery and productivity, whereas innovation in communications mainly affected product and service reliability.

In 1994, the OECD market for some of these “strategic” business services amounted to approximately USD 950 billion (Figure 9). Since these services are among the most rapidly growing sectors of the economy, their share in GDP and in total turnover is likely to have risen further over the past years, making them even more important to overall economic performance.

Figure 9. Turnover and percentage share of total turnover of strategic business services, 1994



1. United States, Japan, Germany, France, United Kingdom, Italy, Canada, Australia, Austria, Denmark, Finland, Ireland, Mexico, Netherlands, Norway, Portugal, Spain, Sweden, Turkey.

2. Nearest year available when 1994 not available.

Source: OECD, 1999b.

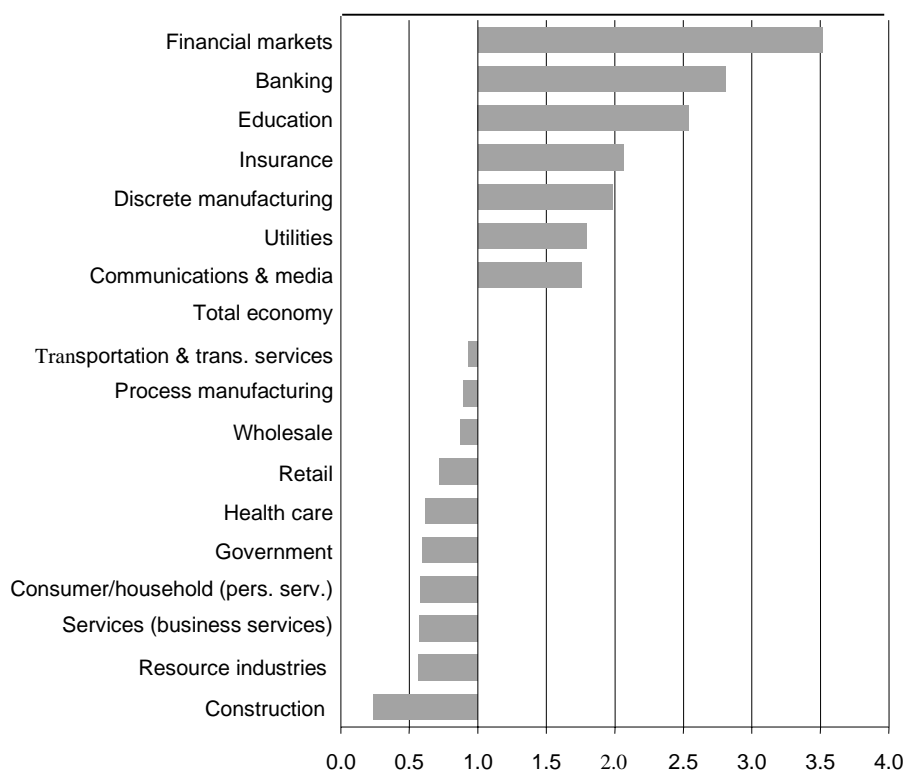
Investment in fixed capital and the role of information technology

The services sector has traditionally furnished the bulk of tangible investment in buildings, structures and equipment (OECD, 1996a). Over the past decades, particularly in Europe and the United States, the investment intensity (measured as the ratio of gross fixed capital formation to gross

value added) of the services sector has been substantially higher than that of manufacturing. Services such as transport and communication are very capital-intensive owing to large investments in infrastructure. Others, such as wholesale and retail trade and financial and business services, are less capital-intensive than manufacturing, but have become more capital-intensive over time.

The innovation potential of several services is limited by the existing stock of fixed capital. Public utilities, transport and telecommunications, for example, have a large stock of capital embodied in infrastructure, which limits the potential for innovation and reduces the scope for alternative technological trajectories (NIST, 1998). For example, many buildings are ill-suited to modern demands for flexibility (OECD, 1998c) and the Minitel, an earlier alternative technology, has probably delayed adoption of the Internet in France. In principle, the legacy problem offers countries that lack heavy investment in infrastructure a potential for “leap-frogging” and adopting the latest technologies.

Figure 10. Relative IT intensity index by industry in the United States, 1997¹



1. The relative IT intensity index represents industry's percentage share of information technology expenditures relative to industry's share of GDP. An index of 1.00 reflects no over- or under-spending in IT relative to the size of the industry.

Source: OECD (2000d), based on data from the US Bureau of Economic Analysis and IDC.

In several sectors, a large part of their investment in machinery and equipment has gone towards ICT, as cheap ICT has substituted for other types of capital (Figure 10). As a result, the largest portion of the fixed capital stock in the US services sector now consists of machinery and equipment. The share of machinery and equipment in the gross capital stock of the services sector is now almost the same as it is in manufacturing.

Firm-level studies show that investment in ICT, when accompanied by organisational change and investment in human capital, has a significant impact on productivity and economic performance. The

evidence extends beyond manufacturing to include significant parts of the services sector (Broersma and McGuckin, 1999). In addition, ICT facilitates networking and co-operation on innovation and underpins electronic commerce. This increases the tradability of services and enables global delivery. The creation of a low-cost network that links existing computing stock through platform-independent, non-proprietary software and allows the use of all existing communication systems (satellite, cable, telephone, electrical grids) has vastly increased the functionality of existing ICT capital in the services sector, reduced information deficiencies and led to new business practices that may be contributing to productivity growth.

Electronic commerce is the prime example of a knowledge-based service activity built on ICT. It provides a fast and potentially more cost-effective way to connect firms, making existing business processes more efficient. Significant productivity gains are possible, especially in business-to-business relations, because electronic commerce is relatively cheap and allows for automation of relatively simple but universally needed processes such as distribution, sales, after sales service and inventory management. In addition, it can be used all along the value chain in an integrated fashion with potentially enormous impacts on productivity performance and innovation. In the United States, early adopters already have shorter design processes, higher levels of product customisation, standardisation of parts, lower inventory cost, faster production and lower supply costs (OECD, 2000b).¹⁵

Human capital

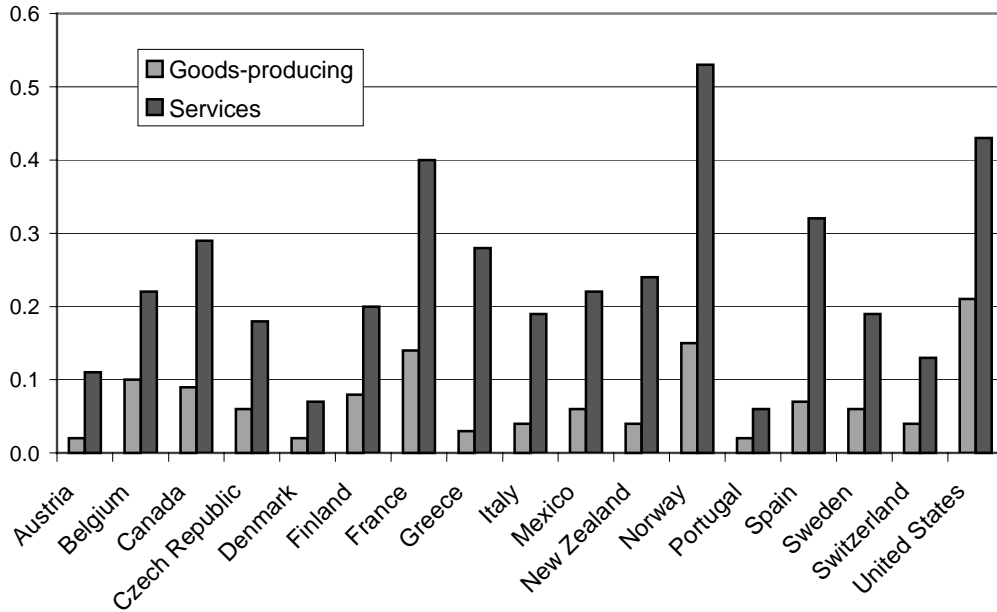
Human capital is among the main drivers of service performance for several reasons:

- Many traditional services are labour-intensive and people are the main resource.
- Certain services are highly knowledge-intensive and provide advice and expertise to other firms. They require highly skilled and experienced workers, often with ICT and scientific skills. Available indicators of skill intensity indicate that services typically have relatively more workers with university degrees than goods-producing industries, and relatively fewer people with very low educational levels (Figure 11; OECD, 2000e).
- Innovation in services is strongly dependent on the skills, expertise and experience of service workers. Their tacit knowledge and experience with customers are crucial to the development of new service products or processes. Many innovation surveys point to a lack of sufficiently skilled personnel as a barrier to innovation.
- Service performance is closely linked to the interaction between the consumer and the service provider. The quality of the service provided depends greatly on service workers' skills, such as creativity, resourcefulness, ability to communicate and strategic thinking (Department of Industry, Science and Resources, 1999).
- The extensive use of ICT in many services requires workers who are sufficiently skilled to use these technologies effectively.

Investment in human capital is thus an important component of services sector performance and includes continuous training and updating of skills, as well as the development of a learning organisation, as the experience of individual firms demonstrates. A recent study by McKinsey, a management consultancy, suggests that service firms often have difficulty improving performance by using methods devised for manufacturing firms (Barkin *et al.*, 1998). Reducing costs and changing management may be less effective than in manufacturing firms, since the most important element for services firms is customer contact. If service workers who deal directly with clients are insufficiently motivated or trained, the company's performance is affected. Improving performance is therefore

often conditional on issues such as a stronger focus on customer service, innovation and changes in the service provided.

Figure 11. Ratio of workers with a university degree to workers without a university degree, 1998
By sector of economic activity



Source: OECD, Employment Outlook 2000, Paris.

Organisational change

A study of innovation and technology policy has shown that the effective use of modern technologies in the workplace is closely linked to changes in working practices and organisation (OECD, 1998a). In manufacturing, for instance, effective use of modern technologies in the auto industry was closely related to the implementation of the just-in-time system. The experience of services is similar. Most innovation surveys indicate that firms need to learn to manage innovation within the firm and develop the proper organisational structures if they are to innovate effectively.¹⁶

Similar evidence is provided by studies focusing on the management of information technology in service firms (Van Biema and Greenwald, 1997). Whereas best-practice firms appear to benefit from the introduction of information technology and improve productivity, many firms have difficulty benefiting from the use of information technology. Management-related factors, a capacity for organisational change and more effective use of human resources are commonly considered to be the main factors that distinguish the best – and often most productive – services firms from those that perform poorly.

Intellectual property rights and incentives to innovate

To protect their innovation and appropriate the returns of their activity, firms depend on various forms of IPR. However, even in manufacturing, many innovations are not protected by IPR, as firms find that other means, such as first-to-market or the complexity of the innovation, provide sufficient

protection against imitation. Firms may also bundle together several products or services, so that customers find it difficult to switch to a competitor.

When IPR regimes are used, the difference between services and manufacturing is substantial.¹⁷ Patents play a limited role in services, as the patent system tends to be based on technological advances that are incorporated in products or manufacturing processes (Andersen and Howells, 1998). Although software and some other information services are covered by patent law, most service innovations are not. Trademark, copyright and trade secrets are more common. A study of Canadian services firms found that less than half of those surveyed used IPR regimes to protect their innovation (Statistics Canada, 1998). Over 40% of innovators in communications found copyright to be an effective way to protect IPR, and over 50% found trademarks effective. Most service firms surveyed found that first-to-market strategies were the most effective IPR strategy. The evidence is similar for Canadian manufacturing.

It is not clear that the IPR regime constrains the innovative performance of the services sector. The innovation survey for Italy suggests that only 2% of firms cite the risk of imitation as a very important obstacle to innovation (Sirilli and Evangelista, 1998). Among the obstacles surveyed, which included financial constraints, skill shortages and high risk, IPR received the lowest rating. The recent French innovation survey on services also gives little emphasis to IPR issues.

Other innovation surveys, however, suggest that imitation is in fact seen as a risk. The Canadian innovation survey (Statistics Canada, 1998) found that about 20% of innovators in communication services and 30% in financial and technical business services regard the risk of ready imitation as an important obstacle to innovation. The services covered by the Canadian survey are among the most innovative in the economy. The high degree of competition and innovation in these services suggests that the risk of imitation may be a more important issue than for less innovative economic sectors. The German innovation survey for 1995 also found that services firms cite the risk of imitation as an important obstacle. However, they cited ease of imitation less often than manufacturing firms (35% and 45%, respectively), which suggests that IPR may only be one element in the risk of imitation.

While evidence on the suitability of IPR regimes for innovation in services is mixed, perhaps owing in part to the level of competition in different industries, there are indications that the specific characteristics of services IPR may affect the diffusion of innovation in services. Patents give IPR protection in exchange for information about the innovation in the patent, which allows knowledge to be diffused. Because the IPR regimes mainly used by service firms are not based on registration of information pertaining to the innovation, the relevant knowledge may diffuse more slowly. When service firms use copyright or secrecy to protect their innovations, their competitors may know little about their new services or processes, and this may strengthen the returns to innovation (Andersen and Howells, 1998). These issues are obviously even more important in an international context. Since services are becoming more tradable and innovative, and exposed to greater competition, it is important to consider whether existing IPR regimes in services are sufficiently geared towards innovation and diffusion and whether they should – in certain cases – be adapted. Recent changes in IPR legislation with regard to Internet-related services suggest that this policy area will continue to require adjustment. The rapid expansion of electronic commerce, in particular, may seriously challenge existing IPR regimes.

Competition and the regulatory framework

International competition in services is increasing but remains limited compared to manufacturing. Trade barriers continue to limit international competition, although considerable progress has been made in the past years. ICT is changing the nature of international competition in a

number of services, however, as financial markets, telecommunications, retailing and travel demonstrate. While international trade is increasing in these areas, global markets are still somewhat underdeveloped and it will take some time before international competition drives performance.

Electronic commerce will increase international trade, particularly in electronically delivered products, many of which are services that have not as yet been exposed to significant international trade but have been “traded” through FDI or have operated at global level only for large corporate clients. The change may come as a shock to sectors that have been sheltered by logistical or regulatory barriers. In addition, it will create pressure to reduce differences in regulatory standards on accreditation, licensing and restrictions on activity for newly tradable products. The direct tradability of services could increase friction among countries in areas that impinge on “culture”, such as language, art and entertainment, sensitivities about pornography and gambling, attitudes regarding health and education and the availability of certain drugs.

Internationalisation has other impacts as well on the innovation process. In services such as retailing and retail banking, international expansion is an important way to expand once firms’ domestic markets are saturated. It also allows companies to gain access to knowledge, innovative concepts, services and ideas and new technologies. FDI, often in the form of joint ventures, mergers and acquisitions, is the main channel for international expansion. Openness to foreign knowledge is increasingly seen as central to the innovation process (Stiglitz, 1999).

Co-operative arrangements and alliances also play an important role at international level. Retailers co-operate in joint purchasing groups, which provide them with additional market power in their dealings with manufacturers. International co-operative arrangements sometimes also include joint marketing, logistics and finance. As these functions are closely linked to the core services provided by retailers, such co-operative arrangements may contribute to their innovative performance.

While internationalisation has become more important in sectors such as telecommunications and transport, domestic competition continues to drive change in many services. Regulatory restrictions tend to be the main barrier to broader competition (Blondal and Pilat, 1997). Traditionally, such regulations were introduced to deal with perceived market failures, such as externalities related to investment in networks or infrastructure or asymmetric information between producers and consumers. Current reform efforts are driven by a reassessment of these market failures and of the ability of governments to correct them via regulations. Changes in technology and experience have cast doubt upon the notion of natural monopolies in many sectors, and there is growing recognition that government failure as well as market failure may create inefficiencies. In services for which the public sector has been the key provider for many years – health services, education and many public services – the scope for private provision has increased and market mechanisms have started to play a greater role in the quest for greater efficiency and lower public costs.

Inappropriate regulations can impose substantial costs and inefficiencies on firms, sectors and the economy as a whole (Gonenc *et al.*, 2000; Chapter 4 in the present volume). If firms have little incentive to economise on resources, they may overinvest in capital, employ excess labour or organise production inefficiently. If competition is lacking, the result may be excess rents to capital or labour, or both, so that profits and/or wages are higher than they would be under competitive conditions. Moreover, regulations on service and product type can prevent firms from taking advantage of economies of scale and of scope by networking. Finally, there is increasing evidence that in the absence of competition, firms have little incentive to innovate and are less willing to adapt the quality and mix of goods and services to meet changing consumer needs. In sum, inappropriate regulation in a particular sector is likely to result in lower productivity, higher costs, higher prices, misallocation of resources, lack of innovation and poor service quality.

The impact of competition and regulation on innovation can be observed in many services, as recent innovation surveys confirm. For instance, a Canadian innovation survey indicated that firms in the communications industry cited legislation as a significant barrier to innovation (Statistics Canada, 1998). In Germany, technical service providers often mentioned long administrative and authorisation procedures as an obstacle to innovation (Mannheim Innovation Panel, 1999). In Italy, legislation, norms, regulations and standards emerged as the fourth most important constraint on innovation (Sirilli and Evangelista, 1998).

Policies to enhance innovation and economic performance

The growing role of services in the economy suggests that macroeconomic and structural policies may need to take more account of the special characteristics of the services sector. Studies by the OECD (1996a) and for a number of OECD Member countries (US Department of Commerce, 1996; Julius and Butler, 1998) suggest possible implications for macroeconomic policy. First, if it is more difficult to measure output and price changes for services than for manufacturing, economy-wide measures of economic growth and inflation risk being more distorted, making it potentially more difficult to design monetary and fiscal policy. Second, an economy largely composed of services may respond differently to changes in interest or exchange rates, so that macroeconomic policies may be less effective. The evidence on these issues is mixed. Rapid technological change in fields such as ICT and biotechnology and the increased bundling of manufacturing and services make measuring output and prices in manufacturing almost as difficult as in services. Third, services appear to be as cyclical as manufacturing (OECD, 1996a).

Structural policies, such as innovation policy, may also be affected by the increasing role of services. While sector-specific policies are needed only in some areas, services may sometimes demand a policy response that is suited to services and to specific problems faced by innovative firms in the sector. Many barriers to innovation in services resemble those in manufacturing, however. Innovation surveys suggest that insufficient access to finance and risk capital, lack of internal capacity to innovate, insufficient expertise in applying ICT and high risk are typically the main barriers to innovation (Sirilli and Evangelista, 1998; Mannheim Innovation Panel, 1999; SESSI, 1999; Statistics Canada, 1998). Other obstacles mentioned in innovation surveys are the limited degree of protection of service innovations, regulatory and legislative barriers, and insufficient demand for innovation. A market with undemanding customers is unlikely to result in much innovation, since innovation in services often requires some consumer input.¹⁸

Insofar as barriers to innovation in services are indeed similar to those in manufacturing, it might suffice to establish generic policies that strengthen the framework for innovation. A framework for such policies was provided in recent OECD work on innovation policy (OECD, 1998a; 1999a; 2000b). Among the principal elements of the framework are policies to build an innovation culture, to enhance technology diffusion throughout the economy, to promote networking and clustering, to leverage R&D better and to strengthen the innovation system's capacity to respond to globalisation. Many of these policies should apply equally to all sectors. For more generic policies for technology and innovation, however, some elements of policy may require adjustment to reduce any implicit bias against services. As technology and innovation policies have generally developed on the basis of innovation practices in manufacturing, they are not always well adapted to service innovation.¹⁹

In terms of regulatory reform, competition and international trade, sector-specific policies may still be needed where the situation for services is different from that for manufacturing. For technology and innovation policy, the growing impact of the services sector shows once more that certain factors that are important to innovation, such as organisational change, human capital and non-R&D expenditure on innovation, have tended to receive less attention than required. In such areas,

government may wish to level the playing field and give fair and equal treatment to the needs of the services sector.

Not all of the barriers identified by innovation surveys require policy intervention. In many cases, firms find their own means of overcoming them (NIST, 1998). For instance, they engage in collaborative arrangements with other firms inside and outside the services sector to gain access to knowledge and skills they have difficulty obtaining within the firm. Such collaborative approaches also involve efforts to set standards; this helps to reduce risk and allows firms to share costs. For governments, it is increasingly important to understand their role in an increasingly complex economy. Policy should focus on what governments can do better than the private sector and on market or systemic failures.²⁰ The following sections note the main elements of a comprehensive policy response to improve services sector performance.

Government policy should create an effective framework for ICT use

Information technology is crucial to improving performance in services. Regulatory reform and investment in information technology are among the main reasons why productivity has improved in many services, although this is not yet fully reflected in productivity statistics. To create an effective framework for IT use by services, governments need to address regulatory reform to bring down ICT costs and to develop standards and an international regulatory framework for electronic commerce; they also need to pay sufficient attention to ICT skills in education and training policy (OECD, 2000b). Governments also play a role in developing the generic technologies and technological infrastructure related to ICT use, since the business sector may not always engage in long-term research that is difficult to appropriate.

Regulatory reform in services must promote competition and innovation

Many services continue to be highly regulated. Experience across the OECD area suggests that appropriate regulatory reform can contribute substantially to improvements in the sector's performance (Gonenc *et al.*, 2000; Chapter 4 in the present volume). This is the case for many sectors, including electric utilities, road and air transport, distribution services, telecommunications, professional and financial services. Further regulatory reform of the telecommunications industry is particularly important to provide better access to ICT services such as high-capacity broadband communications, which can facilitate electronic commerce in many services. Reducing administrative barriers for start-up firms is also an important area for reform, as it can promote greater business dynamism and entry. Appropriate regulatory reform can also help promote new growth areas, as it has for environmental services and the new media (OECD, 1998a). The reform of regulatory structures often has a sector-specific character, as the new competition framework will need to take account of the sector's prevailing market structure.²¹

Trade and investment barriers in services require further adjustment

Barriers to trade and investment in services continue to be an important obstacle to further globalisation of the services sector. Following the reduction of trade barriers for manufacturing, these barriers are increasingly the main constraint on globalisation and international investment. The internationalisation of the services sector would significantly increase the market for domestic firms, would promote the diffusion of ideas and innovative concepts, would encourage specialisation on the basis of each country's comparative advantage in tradable services and would be likely to affect long-term economy-wide growth positively. Not all services are likely to internationalise, however.

Personal services, for example, will probably continue to be closely linked to domestic markets. Certain barriers to investment in services may be difficult to remove, however, as they concern issues closely linked to culture and national values. The globalisation of service markets will also expose a large part of the domestic economy to global forces and trends. This will require further efforts to strengthen the absorptive and adaptive capacity of OECD economies.

Policy must avoid implicit biases against services

Government policies in several areas, including technology and innovation policy, have traditionally emphasised high-technology manufacturing industries and focused primarily on large firms. Since services are increasingly innovative, and it is difficult in any case to define specific criteria for selecting firms, sectors or regions for government support, policies may increasingly need to be generic, *i.e.* open to all sectors and firms. In some cases, this may mean that established policy instruments need to be adjusted and implicit biases removed. For instance, R&D tax credits are more relevant to manufacturing than to services, and, in any case, focus on only one component of total business expenditure on innovation. Manufacturing extension programmes are explicitly designed for technology diffusion in manufacturing, but may be equally valuable for services firms. Similar biases may exist in other areas of government policy, such as taxation.

Skill formation requires government to take an active role

Innovation in services relies more on appropriate skills than innovation in manufacturing. A broad education policy, emphasising multidisciplinary, lifelong learning, will be crucial to developing such skills. It must focus more on working in teams, dealing with customers, maintaining interpersonal relationships, communicating effectively, networking and adapting to change. Many service firms regard a lack of IT personnel as a constraint on innovation. Since ICT plays a central role in services, this is not surprising. The recent shortage of ICT personnel in some countries may be linked to temporary conditions, such as Y2K-related investment and the transition to the euro. To the extent that the problem is structural in nature, it may be necessary to take action to alleviate shortages, *e.g.* by strengthening incentives for training in the business sector. While business must play a considerable role in skill formation, governments continue to be responsible for the development of the common skills pool, especially when these are highly portable. New arrangements between business and government may be required to meet this challenge.

Government must promote an innovation culture in services

The extent to which governments can help business to become more innovative may be limited. Still, they can create favourable framework conditions and encourage business, both large and small, to adopt best practices in innovation and business management. They can help where market or systemic failures hinder their adoption. For instance, they can extend the scope of technology diffusion programmes to include elements that promote firm-level capabilities for identifying, accessing and incorporating new knowledge and techniques. Governments should also address barriers that restrain the emergence and growth of more innovative service firms. This involves, among others, the encouragement of private venture capital markets, the reform of regulations which unduly inhibit entrepreneurship on the part of researchers in the public and private sectors and the removal of other obstacles to risk-taking, such as bankruptcy laws that excessively penalise failure (OECD, 2000*b*).

Intellectual property rights in dynamic services may require adjustment

Innovation surveys suggest that service firms do not regard the risk of imitation as a major barrier to innovation. In countries where they do, the problem is regarded as just as large in manufacturing. To some extent, the low risk attached to imitation may not be the result of insufficiently strong IPR regimes, but rather of a lack of competition and market fragmentation. Once competition increases, innovation becomes more important as a driver of performance, services take greater advantage of economies of scale and some service markets become more global in nature. Insufficient IPR protection may then constrain innovation in services. As a result, the appropriateness of current IPR regimes for service innovation may need to be reconsidered. In addition, the IPR regimes mostly used in services do not promote technology diffusion to the same degree as patenting, and this could limit learning within and among countries about better ways to improve service performance. Finally, protecting IPR is costly, and the small size of service firms may limit the use of IPR regimes in the services sector. However, the available evidence does not indicate that this is the case, and it is therefore premature to strengthen IPR regimes for services. In some cases, such as software, patent legislation has recently been expanded to cover service innovation.

Government must be a demanding customer and innovative provider

The public sector is an important purchaser and provider of services. Since innovation in services is closely linked to sophisticated consumer demand, government can promote service innovation by being a demanding buyer. In sectors where government remains a major provider, such as health, education and social services, it can become a more sophisticated and innovative provider. The demand approach to public procurement is an important component of “cluster” policies in several OECD countries and is particularly relevant to the services sector (OECD, 1999e).

Closer co-operation with business is needed to strengthen policy design

Government policy should focus on areas where the market may not sufficiently provide what is needed to improve the performance of the services sector. In addition, government will increasingly need to work with business to design and implement policies. For instance, the United Kingdom’s Foresight Programme has explicitly sought to include service firms (Miles, 1999). Foresight and the development of roadmaps can help reduce the technological uncertainty faced by many firms and which may limit their investment in modern technologies (NIST, 1998). The active involvement of service firms in such – and other – policy areas is necessary to foster lasting change, as firms will be more likely to feel some ownership of the results (Stiglitz, 1999).

Data collection on services needs improvement

While many countries are making efforts to extend data collection for the services sector, services continue to be poorly covered in most basic statistics. To improve understanding of service processes and performance and to design policies better suited to the services sector, better and more comprehensive data are needed. Data should probably increasingly go beyond the traditional sector boundaries to focus on the interaction among firms and with other actors in the economy, as such interaction is essential to the innovation process.

NOTES

1. This chapter is a somewhat revised version of Chapter 4 of the OECD's *Science, Technology and Industry Outlook 2000*, entitled "Promoting Innovation and Growth in Services" (OECD, 2000a).
2. This chapter also draws on the outcome of the 1999 Business and Industry Policy Forum, "Realising the Potential of the Service Economy" (OECD, 2000c).
3. The distinction between sectors is blurring, however, and changes in the mode of delivery may affect the industrial classification, as in the case of software and other information services.
4. The gap between services and manufacturing productivity performance may – to a limited extent – be due to an increase in outsourcing (Fixler and Siegel, 1999). Outsourcing may temporarily have increased the demand for certain services, thus leading to a slowdown in productivity performance. This suggests that services productivity could increase once the demand shock subsides.
5. The impact of ICT on productivity is particularly important for understanding productivity in services. Triplett (1999) gives an excellent overview of this debate. See also OECD, 2000b.
6. Similar studies exist for the insurance industry (e.g. Bernstein, 1999).
7. Work is currently under way in several countries to address some of these measurement problems. Among the most extensive is a project at the Brookings Institution (Triplett and Bosworth, 2000), which addresses measurement issues in service industries as wide-ranging as business services, retail trade and electronic commerce, insurance, banking and medical care.
8. These surveys are still likely to understate R&D in services, owing to the large number of small firms in many services and the difficulties service firms have for measuring their expenditure on R&D correctly, given its informal character. A recent study for Germany indicated that the terms and examples used in R&D surveys often focus excessively on manufacturing, so that R&D in service firms is underreported (Revermann and Schmidt, 1999).
9. The difference between services and manufacturing innovation is largely one of degree. For instance, services innovation is more often non-technical than innovation in manufacturing, and services firms engage more often in *ad hoc* innovation, since their production is less standardised than that of manufacturing. However, as emphasised above, the distinction between services and manufacturing is becoming increasingly blurred, making sharp distinctions in innovation difficult as well.
10. Copyright does not require registration, so that there is not always a statistical record. Since a copyright is not validated by an official body, its value remains questionable (Andersen and Howells, 1998).
11. The growing economic importance of ICT is accompanied by a mounting demand for ICT-related services. This is one factor driving the increasing weight of services in the economy, and one that is closely tied to the emergence of a knowledge-based economy.
12. The ease of entry in many services, along with the absence of economies of scale, suggests a high degree of competition. However, entry conditions are only one element of competition, and other

factors, such as the degree of regulation in many sectors and the lack of international competition, suggest that competition in services may be more limited than in manufacturing.

13. OECD (2000*a*) and OECD (2000*b*) address these broader changes in the links between innovation and growth. These issues are not addressed here, unless they affect services in specific ways.
14. Telecommunications, computer services and engineering.
15. Studies at the macroeconomic level for several OECD countries, including Australia and the United States, associate some of the pick-up in multi-factor productivity over recent years with the use of ICT in services delivery (*e.g.* Goldman Sachs, 2000; OECD, 2000*b*).
16. Sundbo and Gallouj (1998) suggest that services may be better suited to deal with modern demands for flexible organisations than manufacturing, as their functions and tasks are often less specialised.
17. There are three main IPR regimes, namely patents, trademarks and copyright. Patents give an inventor the sole right to produce an original invention for a limited period in return for public disclosure of information about the innovation. Trademarks are devices or words which are legally registered to distinguish goods or services and are closely linked to “branding” strategies. Copyright provides the author of a text or code with the right to print, publish or sell copies of the original work. Innovation can also be protected by trade secrets, although this may limit the scope for collaboration and knowledge trading.
18. The high rate of service innovation in the United States over the past years may partly be linked to buoyant domestic demand.
19. Much of the above discussion suggests that the distinction between services and manufacturing is increasingly irrelevant. A large part of the sales of major manufacturing firms such as Ford Motors, General Electric and Sony now consists of the services that are bundled with the manufactured product, such as financing and after-sales service. The character of innovation in both sectors has also become closer, and non-R&D sources of innovation are increasingly recognised as crucial for manufacturing innovation. Much of the measurement, analysis and policy debate still focuses on the distinction between services and manufacturing, however, and this suggests that the distinction cannot yet be abandoned in the discussion of innovation policies.
20. Market failure is the traditional argument for government intervention and is often linked to externalities or spillover effects. Systemic failures are linked to the understanding that performance often depends on the degree of co-operation and co-ordination within a system. To stimulate innovation, governments may, for instance, wish to reduce barriers to networking within the economy.
21. Previous OECD studies have looked at the appropriate framework for regulatory reform in sectors such as electricity, gas, air, road and rail transport, telecommunication, distribution and financial services (*e.g.* OECD, 1997*b*).

Annex

**Annex Table 1. R&D expenditures in the services, 1990
USD purchasing power parities**

ISIC Revision 3		Canada		United States ¹		Australia		Japan	
		1990	1998	1990	1997	1990	1997	1990	1997
Total manufacturing	15/37	2 717	4 883	88 934	125 902	923	1 857	45 645	61 231
Total services	50/99	956	2 321	20 793	30 964	468	811	1 315	2 896
Wholesale and retail trade, motor veh. repair, etc.	50/52	145	549	..	8 150	..	..	..	..
Hotels and restaurants	55	..	..	..	155	..	..	..	..
Transport and storage	60/63	15	9	..	681	..	9	80	89
Communications	64	109	101	..	2 017	..	..	1 235	1 756
Post	641	..	..	..	58	..	..	..	..
Telecommunications	642	..	..	..	1 959	..	120	..	..
Financial intermediation (incl. insurance)	65/67	117	213	..	1 499	..	..	..	..
Real estate, renting and business activities	70/74	570	1 449	..	..	..	..	..	1 051
Computer and related activities	72	176	528	4 629	8 868	388	577	..	1 051
Software consultancy	722	..	..	..	..	..	..	..	..
Other computer services n.e.c.	72-722	..	..	..	..	..	..	..	..
Research and development	73	321	730	1 335	7 029	..	..	..	..
Other business activities	70+71+74	73	192	..	..	..	..	..	..
Community, social and personal service activities, etc.	75/99	..	..	..	..	..	..	..	..
Total business enterprise	01/99	3 976	7 649	109 727	157 539	1 511	3 063	47 523	64 576

1. For 1990, Total Services (ISIC 50...99) includes Agriculture (ISIC 1+2+5), Mining (ISIC 10...14), Electricity, Gas & Water (ISIC 40+41) and Construction (ISIC 45).

Annex Table 1 (cont'd.)

ISIC Revision 3		Belgium ²		Denmark		Finland		France	
		1992	1998	1990	1998	1990	1998	1990	1997
Total manufacturing	15/37	1 859	2 524	568	1 018	783	1 906	13 266	14 454
Total services	50/99	351	605	212	594	63	214	557	1 156
Wholesale and retail trade, motor veh. repair, etc.	50/52	78	108	38	138	..	1	..	..
Hotels and restaurants	55	..	..	..	..	..	..	..	..
Transport and storage	60/63	2	6	..	..	..	5	32	461
Communications	64	3	13	22	27	..	118	..	..
Post	641	..	..	..	..	..	..	..	..
Telecommunications	642	3	13	..	..	..	..	..	..
Financial intermediation (incl. insurance)	65/67	64	107	..	..	..	..	..	..
Real estate, renting and business activities	70/74	202	362	151	429	..	..	525	695
Computer and related activities	72	88	191	30	162	..	65	..	395
Software consultancy	722	80	157	..	..	..	..	..	..
Other computer services n.e.c.	72-722	8	34	..	..	..	..	..	..
Research and development	73	10	11	..	60	..	..	..	..
Other business activities	70+71+74	103	159	122	207	..	17	..	300
Community, social and personal service activities, etc.	75/99	2	9	..	..	..	8	..	..
Total business enterprise	01/99	2 225	3 198	788	1 621	921	2 186	14 365	16 554

2. Services data prior to 1992 are subject to future revisions.

Annex Table 1 (cont'd.)

ISIC Revision 3		Germany ³		Ireland		Italy		Netherlands	
		1990	1997	1990	1997	1991	1998	1990	1997
Total manufacturing	15/37	22 061	26 323	183	688	6 051	5 778	2 443	3 048
Total services	50/99	..	1 526	17	101	544	830	171	746
Wholesale and retail trade, motor veh. repair, etc.	50/52	..	37	..	..	..	30	..	172
Hotels and restaurants	55	..	..	..	..	..	..	..	..
Transport and storage	60/63	..	66	..	1	..	8	..	86
Communications	64	..	..	3	34	27	49	..	..
Post	641	..	..	..	..	..	15	..	..
Telecommunications	642	..	..	..	34	27	34	..	..
Financial intermediation (incl. insurance)	65/67	..	7	..	6	..	54	..	94
Real estate, renting and business activities	70/74	..	1 274	..	60	505	675	..	386
Computer and related activities	72	..	484	..	42	80	147	..	120
Software consultancy	722	..	449	..	37	76	116	..	86
Other computer services n.e.c.	72-722	..	35	..	5	5	31	..	35
Research and development	73	..	408	1	11	392	390	..	33
Other business activities	70+71+74	..	382	..	7	33	138	..	233
Community, social and personal service activities, etc.	75/99	..	15	..	..	12	14	120	4
Total business enterprise	01/99	22 967	28 163	206	792	6 735	6 747	2 703	4 025

3. Data from 1991 onwards refer to unified Germany.

Annex Table 1 (cont'd.)

ISIC Revision 3		Norway ⁴		Spain		Sweden		United Kingdom	
		1990	1997	1990	1997	1990	1997	1990	1998
Total manufacturing	15/37	445	564	1 789	2 112	2 467	4 402	11 188	12 476
Total services	50/99	270	451	325	321	240	593	1 983	2 541
Wholesale and retail trade, motor veh. repair, etc.	50/52	..	3	1	3	..	..	7	12
Hotels and restaurants	55	..	..	..	..	..	..	..	..
Transport and storage	60/63	3	7	3	2	..	15	12	32
Communications	64	19	64	57	104	..	120	566	680
Post	641	4	..	..	..	..	..	..	..
Telecommunications	642	15	64	57	104	..	..	..	..
Financial intermediation (incl. insurance)	65/67	..	10	..	..	..	..	..	..
Real estate, renting and business activities	70/74	243	367	255	192	..	453	1 367	1 805
Computer and related activities	72	..	131	23	69	..	164	723	1 042
Software consultancy	722	..	78	20	60	..	102	..	..
Other computer services n.e.c.	72-722	..	53	3	9	..	61	..	..
Research and development	73	189	194	99	6	..	265	405	524
Other business activities	70+71+74	35	42	133	118	..	25	239	238
Community, social and personal service activities, etc.	75/99	..	..	8	19	..	5	32	12
Total business enterprise	01/99	684	989	2 239	2 585	2 791	5 124	13 817	15 501

4. The sum of manufacturing and services is greater than total business enterprise because of different classifications.

Source: OECD, ANBERD database, May 2000.

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Chapter 3

THE NATURE OF INNOVATION IN SERVICES

by

Jeremy Howells
PREST/CRIC, University of Manchester

Executive summary

This chapter questions many of the assumptions behind services and the innovation process and seeks to redress the balance in terms of the relation between the two. Services are becoming more important in both technological and non-technological innovation terms. This chapter reviews key changes taking place in services innovation, although services continue to suffer from, and be bound by, historical and institutional legacies which still shape and constrain their development.

Services industries are not only becoming more research-intensive, they are also taking a more central role in many innovation activities. This chapter focuses on how services, which are associated with non-technological innovation, are used to encapsulate products to respond to consumer demands and to add value to the firms providing those products. Various forms of the encapsulation model are explored and the model is offered as a useful framework for viewing current developments in services innovations.

First, three issues in particular are identified: disintermediation and intermediation (associated with e-commerce and the Internet); services and “virtualisation”; and “embodied” services.

Key barriers to innovation in services are then examined: intellectual property rights and the problem of imitation, regulatory lags, the problem of information, employment growth and skill levels and the short cultural and institutional history of innovation in services.

The chapter concludes that services-centred perspectives will become more central to the competitive advantage of firms and nations.

Introduction

Services are coming of age in the current economic and technological landscape (Alic, 1994). No longer can they be simply regarded as passive consumers of technology from other sectors (see Hipp, 1999, p. 163) that merely serve the important sectors of the economy, notably manufacturing, and individuals and households. A number of key services, such as knowledge-intensive business services (KIBS), play an increasingly dynamic and pivotal role in the new or reinterpreted knowledge-based economy (Miles, 1993; OECD, 1996; Lamberton, 1997; Alic, 1997; Rooney and Mandeville, 1998). Academics, industrialists and policy makers, bound by old ways of thinking, have been slow to realise

and accept how services have changed over the last few decades.¹ Even those academics and policy makers who have realised that services play a larger part in the economy still tend to view them as providing a supporting, infrastructural role in the service of the rest of the economy (as facilitators, mediators and repositories in the knowledge-based economy; see below). However, the Internet and Web-based services and the growth in high-technology environmental services indicate that certain types of KIBS industries are taking a more active economic role. The most high-profile business services firms have been strongly associated with information and communication technologies (ICTs) and new forms of transactions based on e-commerce and the Internet. Such firms are increasingly becoming the drivers of industry. The services sector has changed, owing to the presence of new types of entrants, firms that carry out original, innovative and sometimes unique activities that in many cases would have been impossible a decade or two ago.

This chapter questions many of the assumptions about services and the innovation process and seeks in some measure to redress the balance with respect to the relation between services and innovation (both technological and non-technological). The analysis highlights the fact that services are becoming more important in the innovation process and looks at some of the fundamental changes taking place. This is not to deny that services continue to suffer from, and be bound by, historical and institutional legacies that still shape and, more particularly, constrain their development (Petit, 1986). One is intellectual property regimes, in which protection of service-based innovations is much less well-defined (Andersen and Howells, 2000). Some preconceptions about the innovation process, and the role of services in that process, are challenged, and it is argued that, with respect to consumption and technological innovation, more service-centred perspectives on will become central to the competitive advantage of firms and nations.

Innovation: what role for services?

Definitions and perspectives

Our conceptualisation of innovation and the innovative process remains dominated by manufacturing-based paradigms (Gallouj and Weinstein, 1997). This can be seen, for example, in the metrics frequently used to measure innovation, which centre on indicators associated with technological innovation, based on embodied technologies and physical artefacts, and formal research and development (R&D) or patent activity. By contrast, measures to capture processes of non-technological innovation involving the less tangible, disembodied changes associated with new ways of doing things or the novel forms of organisation, which are more typical of services, remain poorly developed.

At best, services companies, and the services sector as a whole, are seen as facilitators for “proper” innovators – manufacturing firms – or occasionally as good imitators that take ideas from the manufacturing sector and apply them in the services sector. At worst, services are seen as passive reactors to innovation taking place in the manufacturing sector, or indeed as “no hoppers” in innovation terms, as inactive or non-receptive in terms of innovation. Services are therefore too frequently seen as being laggards (Miles, 1993, p. 661) and as consumers, albeit often significant consumers, of innovations produced by manufacturing firms.

Even the technical KIBS (t-KIBS) firms, with a more research-based and technically intensive profile, are still viewed as playing a supporting role in the innovation system. As such, they are seen as elements of the innovation infrastructure (Smith, 1997) or the technological infrastructure (Tassey, 1991; Carlsson and Stankiewicz, 1991; Teubal *et al.*, 1996). This is not meant to suggest that previous researchers have underplayed their role. Lundvall (1992, pp. 14-15), for example, looks through the lens of the learning economy to highlight the central role of education and training systems in the

national innovation systems. Similarly, Shohert and Prevezer (1996, p. 295) have pointed to the crucial and pivotal role of service-based intermediaries in the growth and development of the UK biotechnology sector. However, services firms have been viewed primarily as reactive agents, or at best supporters, that facilitate the central, active players – manufacturing firms.

In distinguishing between different types of innovation processes, it is also important to distinguish between services industries and service activities. Services industries are those sectors classified as services under ISIC (International Standard Industrial Classification) and national classifications. Service activities and functions, instead, can be undertaken by both services and manufacturing firms and include such activities as marketing, R&D, accounting and transport (Crum and Gudgin, 1977). The word “services” can cover both, but the distinction remains important here.

Services in context

As a result, services have not received due recognition in terms of their role in the innovation process in either academic or policy circles. Although this is gradually changing, innovation models still centre predominantly on manufacturing, and the implicit, if not explicit, conceptual framework of analysis has been very much the dominant manufacturing innovation paradigm (MIP; see below). If care is not taken, analysis of the innovation process will continue to be shaped, even unconsciously, by traits that apply to manufacturing, and many of the differences between manufacturing and services traits will be ignored.

Table 1. Innovation: manufacturing and services system traits

System trait	Manufacturing	Services	Status/significance
1. IPR	Strong; patents	Weak; copyright	Current, strong
2. Technology orientation	Technology push; science- and technology-led	Technology pull; consumer-/client-led (co-terminality)	Historical, declining
3. Research/innovation generation and supply	In-house	Mainly sourced externally	Declining significance; manufacturing and services converging
4. Labour productivity	High impact	Low impact (until 1980s?)	Current, potentially declining significance
5. Innovation cycles	Short	Long (except for computer services)	Declining, weak
6. Product characteristics	Tangible, easy to store	Intangible, difficult to store	Declining significance; medium
7. International servicing	Exports, then FDI*	FDI*, then exports	Current, medium
8. Spatial scale of system or reach	National ⇒ global	Regional ⇒ national global	Declining significance; services catching up in internationalisation

* FDI = Foreign direct investment

Source: Adapted from Howells, 2000b.

Table 1 presents some of the relevant traits of these two sectors. In some instances, they may be broad generalisations rather than well-defined traits, and they may reflect the historical background of two major sectors of the modern economy, the secondary and tertiary sectors (leaving aside the primary sector and the quaternary sector, a subsector of the tertiary sector). Many of the traits of

services with regard to innovation have been viewed as peculiarities (Miles, 1993; Miles and Rush, 1997; Sirilli and Evangelista, 1998) because of the manufacturing innovation paradigm and despite the fact that the services sector is by far the largest sector of the economy. For example, the intellectual property rights (IPR) regime for services is very different from that for manufacturing. Intellectual property in services is protected (if it is protected at all) by copyrights and trademarks, rather than primarily by patents as in manufacturing, as well as by other mechanisms which include short cycle times and secrecy (Andersen and Howells, 2000).

Other aspects of the differences in manufacturing and services systems lie in technology and industry characteristics (which have an important bearing on technology). These include technology orientation, generation and acquisition of research, impact of technology on labour productivity and innovation cycles.

In terms of broader industry or system traits with a bearing on the innovation profile of each sector, one may note product characteristics relating to the tangibility and storability of manufacturing and services products, the servicing of the international market and the geographical scale and reach of manufacturing and services systems. Some of these traits may be questioned and some, such as labour productivity, while of continuing importance, now appear to be of declining significance (see, for example, Baumol, 1967; Bernard and Jones, 1996; Rubalcaba-Bermejo, 1998). Nonetheless, many of the differences outlined in Table 1 remain important for conceptualising services.

However, these distinctions are not used here as the basis for analysing services in an innovation system framework. Rather, they highlight the trap of assuming or applying manufacturing traits to services sectors when analysing innovation (Howells, 2000*b*). One of the most important points here is the range and diversity of services (Miles, 1994, p. 247).

Services sectors have very diverse traits. Some t-KIBS sectors are very similar to high-technology manufacturing sectors in terms of R&D effort and technological intensity (Tether and Hipp, 2000). Other services sectors exhibit the supplier-dominated traits (Pavitt, 1984) associated with reliance on adoption and implementation of technology developed elsewhere in the economy (Brouwer and Kleinecht, 1995, p. 145). Pavitt (1984, p. 356) applied this supplier-dominated classification (characterised by firms that undertake little or no R&D and receive innovations from outside the sector) mainly to the services sector but included some traditional manufacturing sectors. This view, which fit the pattern of main knowledge inputs used by innovating firms up until the end of the 1970s and was centred on manufacturing industry (Pavitt, 1984, p. 347), has continued to colour our view of the services sector as a laggard.

Soete and Miozzo (1989) adapted Pavitt's taxonomy more specifically to services. They retain the supplier-dominated category to cover large sections of the public, personal and distributive services but include new categories. The first category centres on a production- or scale-intensive services group, which includes service activities that depend on large-scale processing (back-office) administrative tasks (such as banking and insurance) and/or physical and information networks, such as transport and telecommunications services. The second category covers specialised technology suppliers and science-based activities that generate and develop their own innovations and new technologies.

Services and innovation: growth in technological and non-technological innovation

Introduction

A significant proportion of services sectors and firms still display very low levels of innovative activity, as measured by a variety of indicators, such as R&D intensity and a wide range of tangible and non-tangible investment expenditure related to innovation (see, for example, Young, 1996; OECD, 1999a; and Chapter 2 in the present volume). More detailed analysis has been hampered by poor collection and availability of data on innovative activity in services (see Hamdani, 2000). The problem is that much innovative expenditure and activity is in non-R&D areas (Evangelista and Sirilli, 1995; Sirilli and Evangelista, 1998) where data availability is extremely poor.

Services and technological innovation

Innovation expenditure in a number of services sectors has risen sharply over recent years (Young, 1996) although it is still heavily under-recorded² (OECD, 1999a, p. 26). However, even using traditional, manufacturing-centred indicators associated with measuring technological innovation, services are becoming more innovative, as various key measures show.

Services have seen rapid growth in R&D activity, with a share of total business expenditure on R&D (BERD) between 1980 and 1997 rising sharply in most countries (except Germany and Japan), from less than 5% in 1980 to 15% in 1997 for the OECD area as a whole. In some countries, including Canada, Norway, Denmark and Australia, services account for approximately a third of all BERD (Table 2).

Table 2. Services R&D activity in business expenditure in research and development (BERD), 1997

Country	Services R&D as a % of total BERD
Canada	37
Norway	32
Denmark	32
Australia	28
United States	19
United Kingdom	19
Netherlands	19
Italy	18
Spain	16
Ireland	13
Finland	13
Sweden	12
France	11
Germany	4
Japan	4
OECD average	15

Source: Compiled from OECD Main Science and Technology Indicators (MSTI), 1999-1 database.

Services industries are also large users of R&D-intensive goods, in particular information technology (IT) goods. They are also strongly associated with technological innovation via the uptake of new technology incorporated in new equipment and capital goods. Thus, some services sectors, most notably communication services, incorporate as much R&D intensity, if not more, via new equipment and intermediate goods as many manufacturing industries (Amable and Palombarini, 1998, pp. 658-59).

Services and non-technological innovation

As noted above, there is evidence to suggest that innovative activity in services is organisational and disembodied in nature (de Laat *et al.*, 1997, p. 5), and thus very difficult to capture with innovation metrics. However, there have been attempts to broaden the measurement of innovation in services to include wider expenditure patterns and outputs, *i.e.* to record more than technological activity. On such a basis, a study of innovation expenditure in Germany by services firms increased by 15% between 1997 and 1998 (ZEW, 1999). Similarly, a study by Tether and Hipp (2000) using data from the second Community Innovation Survey (CIS II) revealed a high proportion (76.5%) of German firms claiming to have introduced an innovation (of any type) between 1993 and 1995, with high knowledge-intensive firms being slightly more likely to claim to have innovated than less knowledge-intensive ones. Above all, services firms themselves see innovation as important, with some 76.1% of services firms in Denmark acknowledging the importance of innovation for maintaining their competitive position (DTI, 1997).

The relative importance of non-technological innovations in services, however, is more explicitly highlighted by Danish surveys on financial services during the 1980s. A study by Sundbo (1997) indicated that of the significant innovations introduced by the industry over the period, 54% were non-technological, and a further 30% were primarily non-technological in nature but depended on technology in some form. Only 16% of the innovations recorded by the industry were seen by respondents as being technological in nature.

Services and innovation: changing dynamics

Introduction

Services have undoubtedly become more innovative in both technological and non-technological ways. However, manufacturing is becoming more like services, and this is affecting the innovation process. On a simple level, manufacturing firms are gaining an ever higher share of their turnover from selling services. IBM and Siemens, for example, now derive more than 50% of their turnover from service activities, while other services companies, notably in the computer industry, such as International Computers Limited (ICL) in the United Kingdom (owned by Fujitsu), have completely abandoned manufacturing. This process may be summed up crudely as the “servicisation” of manufacturing industry. As a result of this trend, value is primarily added by service activities in a number of manufacturing sectors (Quinn *et al.*, 1990b, p. 79).

The increasing importance of software in the computer industry and beyond is clearly helping to drive this phenomenon (see below). It is also linked to how both manufacturing and services firms view consumption and how they seek to provide for this. This process, which is helping to blur the line between manufacturing and services, is explored below, first in the context of manufacturing and then in relation to services. The analysis then shifts to an examination of this phenomenon in relation to innovation.

Service “encapsulation”: a non-technological services innovation?

Part of the process of “servicisation” is the trend in manufacturing firms (and indeed in agricultural and resource-based companies, see below) towards providing service products that are related to the manufactured products they produce. Vehicle manufacturers, for example, have created finance and leasing subsidiaries to facilitate the purchase of their cars and trucks. They also have substantial maintenance and repair operations associated with after-sales care. Through their sales franchises and outlets, they may buy back cars and trucks for second-hand sales. More recently, owing to increased environmental awareness and legislation, vehicle producers arrange for the disposal and recycling of their cars. Ford has long been involved in finance (Ford Credit) and in maintenance and car components (Visteon) activities, but it has more recently moved into car insurance and general after-sales care (by buying Kwikfit plc based in the United Kingdom) and Web retailing (Fordjourney.com) (Table 3). It has further extended its customer offerings through a joint venture (Wingcast), with Qualcomm (a wireless electronics company) and Cartell (a telematics equipment supplier) to provide its customers with in-vehicle navigational assistance and Internet and entertainment services. Similarly, Fiat has recently taken over full control of Toro Assicurazioni to provide its customers insurance and other financial services. All these activities are closely associated with selling the manufactured product, the car, but they also respond to consumers’ wishes in terms of support.

Table 3. Service encapsulation of manufactured or resource-based products

Company	Manufactured product	Service encapsulator	Final offer and consumption
AstraZeneca	Cancer drugs	Cancer healthcare (Salick Health Care)	Cancer treatment
Fiat	Cars	Financial and insurance services for car customers (Toro Assicurazioni)	Car travel
Ford	Cars	Car travel services: financing and leasing (Ford Finance); maintenance (Kwikfit); in-vehicle services (Wingcast); Web retailing (Fordjourney.com)	Car travel
General Electric	Aerospace engines	Leasing or selling hours of flight	Air travel
General Electric	Medical diagnostic equipment	Medical analysis and diagnosis	Diagnostics
Liebherr	Cranes	Special software programming to control and run the machines; remote running and testing	Lifting
Pacific Power International/ Rio Tinto Energy Resources	Coal	Power plant design and operating expertise and environmental advice	Power/Energy
Rolls Royce	Aerospace engines	Leasing or selling hours of flight (minus time on ground due to faults)	Air travel
Xerox	Reprographic equipment	Maintenance and leasing	Photocopying

This trend is also evident in the aerospace industry, with aircraft builders offering finance and leasing arrangements. Aerospace engine manufacturers not only provide finance but also operate major repair and overhaul facilities. In this industry, General Electric, for example, has a major finance and leasing company (GE Finance), while Rolls Royce has moved strongly into acquiring aero

engine repair and maintenance companies across the world, such as National Airmotive, a US engine repair company. Increasingly, aerospace engine manufacturers are providing engines not as a product (an engine) but as a service (hours of flight). This aspect of the “servicisation” phenomenon may be termed the “service encapsulation” of manufacturing products.

Manufactured products are not offered as such to consumers but rather in terms of adding more final demand. This can occur in two ways:

- The first is to offer the manufactured product along with closely aligned service products in a single package. In the case of the motor car, this means finance, insurance, maintenance warranties, repurchase clauses and tax all rolled together.
- The second is more sophisticated in that it seeks to offer the consumer not the manufactured product itself but rather the goal that the purchase of the manufactured product would ultimately fulfil.

A case in point is the replacement of aerospace engines (product) by hours of flight (service) by both General Electric and Rolls Royce. Another example, taken from the computer industry, is to offer computer services to carry out certain tasks rather than supply the computers that are used to provide the service. Zeneca (now AstraZeneca) bought Salick Health Care (SHC), a company that operates a fully integrated cancer and chronic care services in the United States. By so doing, AstraZeneca can both better monitor the performance of its own cancer drugs and that of its competitors and also test the notion of offering more complete healthcare services to customers (patients). As part of this total patient care service, AstraZeneca also operates in the United States a managed care service, SalickNet, to provide customised disease management programmes.

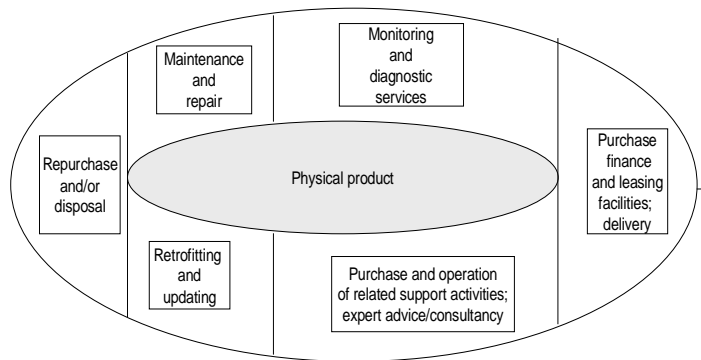
These examples suggest that ultimate demand is being satisfied at a different but more effective level by going directly to the central issue of concern for the both the intermediate actor (the healthcare service or insurance company) and the ultimate customer (patient). In addition, these companies offer something beyond what their competitors offer. Interestingly, General Electric offers a similar package for their medical diagnostic equipment, *i.e.* diagnostic services (Table 3). A Swiss company, Liebherr, which manufactures cranes, has been able to grow successfully in this niche business by satisfying customer demand for lifting heavy objects. Its cranes are often sold as part of a package associated with the need for effective lift. The company may develop specialised software and remotely test the lifting capability of the crane *in situ* if difficult or unusual circumstances indicate the need for such measures. For resource-based products, Pacific Power International (PPI), an Australian coal exporter, has joined with Rio Tinto Energy Resources to move from simply supplying coal to providing a broad range of products and services targeted at offering clean, efficient power. The companies provide their expertise in coal-fired power plant design and operation so that overseas operators, in China for example, can improve the thermal and environmental efficiency of their plant.³

Service encapsulation is not necessarily a new phenomenon. The example of Xerox and the sale of its reprographic equipment is more than 30 years old. Encapsulation in this context was less an intentional act, arising from careful strategy, but rather arose out of necessity. Xerox quickly realised that its reprographic machines were too expensive and indeed too unreliable (requiring high maintenance levels), for target customers to buy them outright. Instead, Xerox signed up customers with leasing contracts which gave customers varying use, maintenance and service levels.⁴

Such encapsulation mechanisms are being combined to allow firms to provide consumers with ever more seamless solutions and to create more value added for the firm that supplies them. This goes beyond issues of industry outsourcing and vertical integration and also moves beyond the economic and competitive benefits of integrating the supply chain to focus on satisfying customers’ actual demands. For firms that sell such products and services, these activities suggest a new concept of what

consumption and innovation are about. In the case of the car, consumption has moved from the simple, one-off purchase to the wider process of buying, using and maintaining a car over the long term. This shift in focus has major implications for firms that sell such products and services in terms of how they address consumers' needs and satisfy their ultimate demand.

Figure 1. Service encapsulation: new patterns of consumption and innovation through the life cycle of a manufactured or resource-based product



Consumption is therefore not a one-off contact via the sale of a product but a continuing process involving long-term customer contact through service delivery. This is to be expected if consumption shifts from a single, one-off act to long-term user support; *i.e.* from selling a car at a single point in time to supplying fast/reliable/cheap/flexible/safe transport over a period of time. Figure 1 provides a diagram of various services that may be sold with a manufactured product over its lifetime. It includes services that are important prior to purchase (setting up and facilitating purchase and delivery in a convenient and timely fashion), those required in using the product (for example, its efficient operation) and the repair and maintenance of the product. The final support service that can be provided is to dispose of a product. This has become increasingly important for many goods, such as tyres, because of growing environmental concerns associated with waste disposal. Indeed after-sales and delivery services have been increasingly recognised as crucial to the long-term success of manufacturing firms (see below).

Encapsulation and service innovation

It is important to recognise that such a shift can also radically change a company's perception of innovation. When companies move from simply selling a product to long-term involvement in satisfying customers' needs, they will start to be more concerned, for example, about reliability and ease of servicing, the costs of which they may increasingly have to bear. For aerospace engine firms, reliability and safety have always been high on the agenda. However, contracts with consumers, such as Rolls Royce's contract with American Airlines, where heavy penalties are incurred for unintended periods of inactivity due to engine problems, have meant that in-flight monitoring and diagnostics of various critical parts of an engine become more important. Thus, problems associated with particular components or performance can be relayed in flight and the maintenance teams and components can be ready when the plane arrives and problems can be solved before they create a major difficulty for the company and its customer.

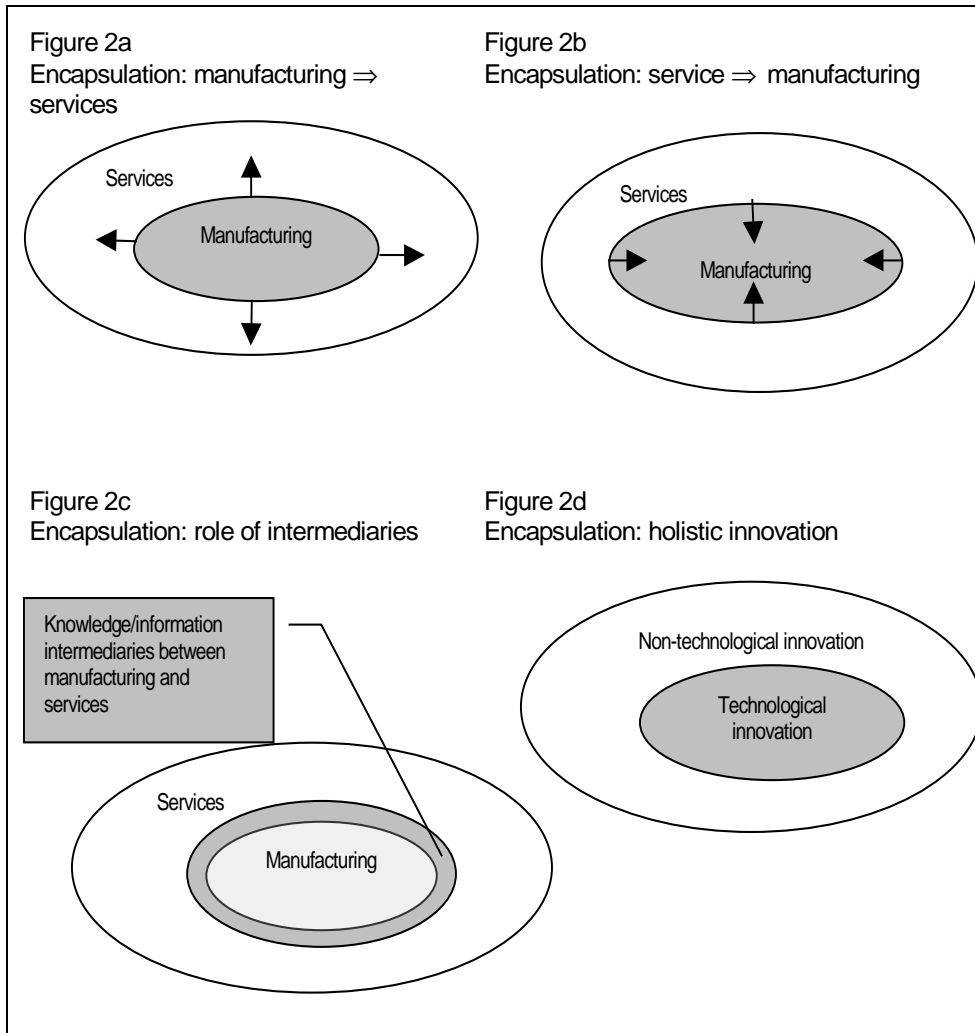
For companies like Rolls Royce, therefore, instrumentation and electronics for monitoring and diagnostics become more central to the company's innovation profile and strategy. Its competitive and technological profile will place more emphasis on: in-flight monitoring and fault-finding, improved reliability, better organisation of parts and components logistics and improved and faster maintenance. Intrinsic to this shift in the company's innovation strategy has been a *de facto* transition from a manufacturing to a service type of contract with the customer.

The discussion has so far concentrated on how manufacturing firms have moved into service activities and adopted non-technological innovations as they have become more attuned to their customers' wishes (Figure 2a).⁵ However, the process has also moved the other way. Services companies delivering services to their customers have become more attuned to what manufactured products may be delivered as part of their service package or may become involved in supporting such a delivery (Figure 2b). Their involvement varies. A driving instructor company may simply switch to a different make of car because the model it uses keeps breaking down. Large hamburger restaurant chains, for their part, may have very strict product requirements, for example, for the type and quantity of meat for the hamburger, the type of bun, the bun's shelf life and so on. Or again, a services company may seek to control the manufactured product(s) by acquiring, or setting up, manufacturing facilities to make the product (or products) to support the service involved (see below).⁶

This process is not completely new. In terms of the (intermediate) manufactured products used in supporting the delivery of the service, the first effective commercial computer manufactured in the United Kingdom was built by Lyons Tea Houses, which required speedy updating of its accounts at the end of each working day and found existing calculating machines too slow. In response, J. Lyons Limited created the Leo computer which ultimately led to the foundation of International Computers Limited (ICL) (Hendry, 1987). More recently in the computer industry, some computer chip design companies have sought to enter semiconductor manufacture to control quality, to secure production supplies (especially in periods of buoyant demand) and to achieve more effective control of the intellectual property in the chip design.

The interface between the manufactured product and the encapsulating service is also important in terms of innovation and new ways of doing things. The firms described above are large manufacturing firms that have mainly moved into service activities on their own. The rise of the Internet and e-commerce has allowed the process of disintermediation to take place in several functional areas (see below), cutting out middlemen in the supply chain and gaining access to customers. In aerospace, Rolls Royce now sells over 60% of its parts on line, and Boeing and Airbus operate similar systems (Boeing Online and Airbus Online Services). For large firms, the process of disintermediation in certain parts of the business-to-business (B2B) transaction environment may not be a problem, but for smaller firms and/or in areas requiring more innovative and specialist inputs a whole new set of largely Internet and Web-based intermediaries has arisen. Non-technological service-oriented innovations, while based on technological innovations and related to various aspects of ICT hardware and communication infrastructure; have been extremely important in developing this new layer of actors.⁷ These have focused on new forms of access routines, on the creation of secure (encrypted) communication, on the design and running of Web sites and portals. Disintermediation may have done away with part of the earlier layer of brokers and intermediaries (related to the "old" economy), but a new, although more permeable, layer has been established because of the novelty and the expertise required to set up these new, more intangible forms of interlinkage between manufacturing and service activities (Figure 2c).

Figure 2. Encapsulation and service innovation

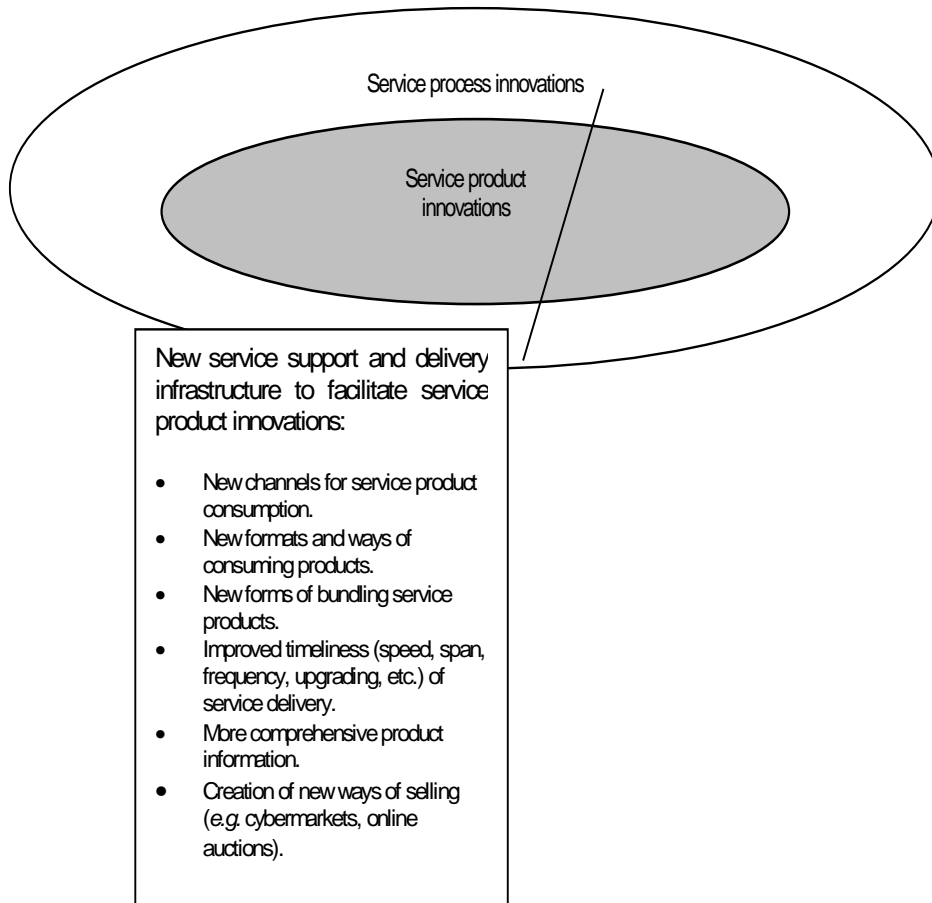


The encapsulation model can be extended to describe the innovation process itself, with a technological core and a non-technological outer layer (Figure 2d). This is not to be understood as a parallel to the manufacturing/services split, because, as previously mentioned, services companies have increasingly moved into arenas of technological innovation. Rather, the point is to show the holistic nature of innovation that will make firms truly competitive. Successful manufacturing firms have come to recognise the importance of non-technological innovations if they are to remain competitive, while successful services firms have come to recognise the importance of more direct technological innovations for serving their customers adequately. Nonetheless, the strengths of manufacturing firms still largely reside in technological innovation, while those in the services sector have much greater competence in non-technological innovation.

This discussion leads to the final element of the encapsulation model as a framework for describing the product-process split in services innovation (Figure 3). Just as manufactured products can be considered as being encapsulated by services, so service products can be considered to be encapsulated even more specifically by service processes. In relation to innovation, many recent service process innovations have been heavily (but not solely) influenced by developments in ICTs.

New Internet delivery channels have made possible the delivery of services via the Web. This has been linked to new consumption patterns, as in the case of some types of publications which have moved from the paper-based to the on-line medium. Increasingly, service providers are seeking to bundle services together to add value (*e.g.* travel with travel insurance), and this can be viewed as part of the wider encapsulation process. Similarly, service products are being made available more rapidly (Kenney and Curry, 1999, p. 137), over longer periods of time (such as 24-hour banking) and are updated more regularly (for example, anti-virus software). Consumers are also being provided with much more information about products through on-line catalogues and manuals. Lastly, service products are being sold in new ways, for example through cybermarkets and on-line auctions (and indeed experimentation with different auction formats, such as Dutch auctions).

Figure 3. Service encapsulation: service-to-service embedding



It should however be stressed that not all these new developments are necessarily Internet-based (or novel), and they may not happen overnight or be successful. Moreover, the boundary between the process and the encapsulated product remains blurred. How far do changes in the way a service is delivered actually change the nature of the product offered? Does offering the product in a different form (for example, in electronic rather than paper form) change the intrinsic nature or novelty of the product?

Services and innovation: new perspectives

On a simple level, services firms are becoming more innovative, and this is reflected in many of the traditional metrics used to measure innovation in manufacturing, such as R&D spending or patenting activity (as discussed above). However, a more complex change is also taking place. An increasing number of services firms are becoming active innovators, often leading innovation in other groups of firms. A growing number of studies indicate that services firms are taking a more central (and sometimes leading) role in the innovation process. Research on the contribution of consultants (Bessant and Rush, 1995; Baark, 1999); specialist design and engineering services firms (Elfring and Baven, 1994); environmental services companies (Miles, 2000); software systems designers and integrators (Quintas, 1994; Khazam and Mowery, 1996); and research contract companies and other technical services organisations (Howells, 1999) have all highlighted the central role that services companies can play in the innovation process. Software designers, through their pivotal role in the development of computer systems and their vertically integrated links with hardware manufacturers, can create *de facto* standards which have powerful bandwagon effects across the computer industry. Applications software libraries may come to have a more important impact on the enduring “dominant design” of computer architecture than hardware-embodied technologies (Khazam and Mowery, 1994). Thus, the “software ‘tail’ wags the ‘dog’ that is technology commercialisation in hardware” (Khazam and Mowery, 1996, p. 97; see also Quinn *et al.*, 1996; Howells, 2000*b*).

Moreover, both Quinn (1988; Quinn *et al.*, 1990a) and Mathé and Shapiro (1993) see service-related attributes as providing companies their key competitive advantages. Mathé and Shapiro (1993, p. 5) have highlighted the crucial role of after-sales and delivery services in sustaining the long-term success of manufacturing firms. The competitive focus has shifted towards developing and exploiting service qualities and moving into non-technological innovations.

The intent here is not to suggest that services lead manufacturing in the innovation process, or that services have gained the upper hand over manufacturing (the importance of manufacturing to services more generally has been forcefully argued by Kitson and Michie, 1997, for example). Rather, the point is that perceptions about services should not necessarily be locked into the dominant manufacturing innovation paradigm, with services seen as consumers of innovation and passive elements in the innovation system. At best they are perceived as part of a supporting innovation infrastructure looking on to the real innovation performers, manufacturing firms, or occasionally giving them a helping hand. The MIP has focused on physical and tangible aspects of technological innovation, on the manufacturing process, on the consumption of physical goods and artefacts, on patents and R&D as indicators for innovation and on the lone manufacturing firm pioneering innovation in various industrial (read manufacturing) sectors.

The rise of studies investigating the role of networks in the innovation process (Freeman, 1991) and describing the distributed nature of the innovation process (Coombes and Metcalfe, 1998) have served to highlight that innovation is rarely undertaken in isolation by a single (manufacturing) firm. Innovation more frequently involves bilateral or multilateral networks of (manufacturing and service) firms working together and often collaborating with higher education institutions (HEIs) or public research establishments. The focus of attention moves from a single entity, the (manufacturing) firm, to a distributed innovation process (DIP) of firms and organisations working in partnership to produce an innovation. In this view, services firms, organisations and agencies can be seen as more equal partners, mainly following but sometimes leading manufacturing firms in the innovation process.

The reach of the services sector is also expanding. Traditionally, services were seen as parochial and local in nature. They did not travel well. They were difficult to export, as the production of many services had to take place where they were consumed. To overcome this problem, services firms had to set up operations abroad in order to serve foreign markets, which meant that services firms wishing

to supply overseas markets faced high barriers to entry. In addition, cultural, linguistic and regulatory barriers are often much higher for services; to compete effectively overseas requires adaptation to local market contexts. Services companies have therefore lagged behind in moving abroad. When they did so, it was often in the familiar role of supporting dynamic manufacturing firms. However, trade in services has increased and service-led FDI has expanded rapidly (Roberts, 1999; O'Connor and Daniels, 2000). Many services are no longer so strongly tied to the expansion of manufacturing activities.

The global expansion of services and services firms has a second important underlying feature. As service activity has expanded internationally, the diffusion of service innovations has become more rapid and more widespread. Service providers have become more international and the orientation of service markets themselves has become more international. Service markets are no longer tied to their local or national roots, and consumers of services have become more open to international and standardised service products. Early international service products, such as airline travel, have long been similar worldwide, almost from the start, because of the nature of the business. Services such as banking are changing rapidly. Even in a sophisticated market such as Britain, banking was dominated by regional banks such as the Midland Bank, the Linen Bank (Northern Ireland) or the Royal Bank of Scotland up to the late 19th century. Today, Internet banking is offered virtually instantaneously in many markets at once.

Nonetheless, the reach and diffusion of many services, particularly sophisticated services, remains partial. Until recently, few developing countries have undergone many of the changes described above. They remain largely information- and knowledge-poor (United Nations Development Programme, 1999), although certain less-developed countries, notably India, have undergone rapid growth in certain KIBS-based activities, such as computer and software services (Howells, 2000a). The information- and knowledge-rich remain concentrated in a number of pockets scattered across the world's advanced industrialised economies. The global spread of knowledge-based services remains highly uneven.

Innovation and services: conceptual failings?

Conceptual gaps

This chapter has sought to describe some of the changes that are occurring in the services and the knowledge economy, but also to show that the economic and technological impact of services remains a neglected phenomenon. This neglect is evident in many ways, but is particularly acute in terms of the lack of available data, particularly the type of data that are collected and supplied by government agencies. Problems with measuring service productivity levels is a case in point (Englander, 1991) and hampers research on services and the knowledge economy. Without such data, can the increasingly knowledge- and service-based economies of the 21st century develop effective government policies and commercial strategies? For their part, academics are not wholly blameless, as they have accepted this situation and have not stressed why government policy makers should be more concerned about capturing trends in newer parts of the economy and society.

What are the implications of and the opportunities for research created by emerging trends and the changes in innovation and the service economy? Perhaps most obvious is the continued spread and intensification of services and knowledge-based activity in the overall economy. Within this general pattern will be found the greater sophistication, in terms of technology and knowledge, of a key subset of services, KIBS. Some of the background to such services has been described (Andersen *et al.*, 2000), but their nature and characteristics remain unclear. This is due, in part, to their highly dynamic growth and change and is also associated with their increasing technological intensity, as shown by

their R&D expenditure and patenting activity. It relates as well to the potentially more active behaviour of services companies in the innovation process and the lead role they now take in certain areas of technological endeavour.

Above all, research on services innovation still has difficulty in capturing what such innovation involves. The problem centres on the difference between services innovation and the more artefact-based manufacturing innovation. Attempts to identify new forms of innovative activity and the processes that underpin them have proved difficult. In part, this is due to problems of data and existing innovation indicators for services, but also to the lack of new indicators that would more adequately capture innovation in services. This in turn is a reflection of a still inadequate conceptualisation of the innovation process in a more services-oriented regime.

A strand of work that needs to be undertaken involves the role of services, not as potential leaders in the innovation process, but as intelligent and knowledgeable facilitators and supporters in the technological and industrial process. With the spread of outsourcing, services companies are taking over parts of the industrial process that manufacturing companies previously undertook themselves. This is not a new phenomenon, but its spread and reach has widened and the nature of activities outsourced has expanded. Outsourcing no longer simply involves routine activities such as catering and cleaning, it now includes ICT activities and, more recently, what were earlier considered strategic and core areas, such R&D and human resource management. The outsourcing process has tended to be described as an all or nothing process. What might be described as complete outsourcing does occur (although staff must still manage contracts and be intelligent customers). However, services companies are increasingly moving into partnerships with manufacturing companies (and indeed other services firms), in which key functions remain with the client company but the services company acts as a partner, often sharing the savings and profits. In this way, services companies help other firms achieve their strategic objectives based on their core competencies. The result of the increased focus on services companies as facilitators and partners is a move away from the notion of services companies as servants. Much of the shift in relationship between services companies and their clients has not been fully recorded or conceptualised.

Services and non-technological innovation: trends and issues

ICTs have had a major impact on all aspects of the service economy and its innovation profile. Future trends in ICTs will undoubtedly affect how the services sector evolves, although the outcomes are difficult to determine. Three main factors appear to warrant examination:

- Disintermediation and intermediation, associated with e-commerce and the Internet.
- Services and virtualisation.
- “Embodied” services.

Disintermediation and intermediation. As noted above, while services companies may be becoming more prominent as facilitators, their role as intermediaries in some activities may be declining. With the rise of the e-commerce and the Internet, manufacturing and services firms can deal more directly with customers, cutting out the middlemen; this is disintermediation (see, for example, Evans and Wurster, 1997). The middlemen include retailers, but also sales agents, wholesalers, market research and marketing operators. As a result, manufacturing may actually be taking back certain areas of activity. By interacting electronically with their customers, firms can gain more knowledge about their customers’ wants and concerns and can also handle their post-purchase requirements. However, as noted above, where an old layer of intermediaries may disappear, a new one (see Figure 2c) may be formed. For smaller firms and/or for areas requiring more innovative and specialist inputs, a whole

new set of Internet and Web-based intermediaries has been established. For example, application service providers (ASPs), together with Web-hosting companies, provide outsourcing services to large and small firms alike because of the expertise required, the speed of change in the industry and the difficulty of recruiting and retaining staff in this specialist field.

Virtualisation. Here, the key issue for services companies centres on how much physical presence is required. For example, how will on-line shopping affect retailing in terms of the need for shops? However, virtualisation also affects areas such as banking, insurance and other financial activities. This in turn raises the question of location and co-location. To what extent do services need to be co-located with consumption? Certain service activities, such as air travel, go together, while others, such as buying insurance, do not. If issues to do with consumption and selling are tied up with aspects of what might be termed front-office or shop aspects, there are also considerable changes in back-offices and operations. Services companies that operate behind the scenes are now much more footloose in terms of location of activities such as data entry, telesales, technical support, Internet activities or more general administrative activities. This has considerable implications not only for location but also for employment growth and the international expansion of service activities to sites with attractive low-cost resources (increasingly based on knowledge) abroad. Nevertheless, physical presence and face-to-face contact will remain important for many aspects of sharing, generating and using knowledge (Howells, 1996). The establishment of trust and indeed friendship (Roberts, 2000) through face-to-face meetings can provide a good basis for subsequent work through virtual forms of working (Howells, 1995).

“Embodied” services: Although disintermediation and virtualisation are occurring, this does not mean that physical activities associated with services will disappear. Many will expand. Wholesalers may come under increasing pressure, but transport and logistic operators, encouraged by the rise of e-commerce, will expand to handle Internet purchases. Logistic firms will also benefit from the trend towards outsourcing by companies. All types of transport and logistic support activities will grow strongly. Although the path to consumption of services may become more virtual, the actual consumption of many services will remain physical in form.

This introduces the further issue of new forms of service organisation and delivery as new forms of disembodied innovation. Although disembodied innovation has long been seen as important, research has not progressed very far in this area. Again, the rise of the Internet and intranets will have a big impact. The time is ripe to start a baseline for mapping and measuring these potential paradigm shifts in the service economy.

Services: barriers to innovation

Like the nature of the innovation process in services, the peculiar barriers to innovation that services may face have also been neglected. What are these barriers and how do they differ from those in manufacturing or industry more widely? Several main barriers to successful innovation in services are briefly outlined below:

Intellectual property rights and imitation. There is a longstanding debate over the lack of adequate IPR protection in services and the problem of the ease of imitation of service innovations (see Miles *et al.*, 2000; Andersen and Howells, 2000), although there appear to be significant national differences in how services firms view this issue (Licht, 1999; Sirilli and Evangelista, 1998). Despite poor IPR protection, imitation of innovation appears to be less a problem for services companies than for manufacturing firms. However, for certain innovation-intensive services sectors, such as computer software, it is seen as a problem (40% of software firms in Germany saw ease of imitation as a barrier to innovation; Licht, 2000). Over time, this issue appears to become more significant as services

overall become more innovative. Imitation is easy not only because of the lack of IPR protection but also because information is often be relatively cheap to copy and share.

Regulatory lag. Although regulation may provide opportunities for services firms, as intermediaries, to provide advice and technical support, for example in environmental services (Miles, 2000) or legal services, regulations can also hamper innovation in services. This may be due to the relatively short history of many services sectors, which may have a poorly defined regulatory structure, but also to the highly dynamic technological nature of certain sectors. Even in highly regulated industries, such as banking and finance, regulatory authorities (such as the Financial Services Authority in the United Kingdom) have not fully acknowledged or defined e-commerce outsourcing arrangements that may hinder more novel forms of working within the industry.

The problem of information. Many services industries are based on information and knowledge. Services firms in these sectors wishing to obtain new contracts must disclose some information to inform the buyer about their capabilities. Too much initial disclosure could lead to giving away parts of the key service product to potential clients or competitors. The often high initial cost of generating information, but the low cost of duplicating it makes the task of producing and distributing new information and knowledge a difficult one.⁸

Employment growth and skill levels. The success of some services industries is also causing problems. As services jobs have shifted away from being low-skilled, the problem for services is no longer the traditional concern that services only provide low-skilled, low-wage jobs but that high-skill services sectors have grown so fast that recruiting and retaining personnel is a major problem. For example, employment in computer services in Australia grew from 30 056 to 55 046 in just four years (1993-96), a rise of 83% (50% of those employed were computer and technical staff; OECD, 1999b, p. 42). In a sense, this is a problem that many countries would welcome, but it does raise the issue of how and where Australia is going to find the skilled workforce to sustain such high rates of growth. Being able to co-ordinate and harness the education system to support such levels of expansion will be a major issue in the future.

The short cultural and institutional history of innovation in services. Lastly, while outsiders may believe that the services sector does not innovate, insiders often have the same perception. Innovation surveys of the services sector have often discovered that respondents who initially replied that their firms did not innovate or use technology were found in follow-up questions to have technology-intensive operations. The low level of perceived innovation is accompanied by a lack of cultural and institutional recognition of technological innovation in many services firms. The lack of an acknowledged history of research or technical activity within the company helps maintain this viewpoint.

Conclusions

What can be concluded from this discussion of innovation and services? Adopting and applying manufacturing orthodoxy when analysing of the services sector will not be particularly successful and, more especially, is likely to help maintain the view that services lack innovative capacity. New perspectives and tools need to be developed to overcome this. Certainly, while services sectors overall have become more innovation-intensive and there are some, such as computer and telecommunication services, which are technology-intensive, there are still many services sectors where innovation intensity is low. Services firms may not be identified as the source of innovations purchased by their manufacturing customers, or, with the ever closer supplier-buyer relations in research and technology, it may be too difficult to unbundle the individual contributions of services and manufacturing firms involved in DIP activity.

The preceding discussion is not aimed at developing what might be termed a separate service innovation paradigm (SIP) that would displace or downplay the role of manufacturing in the wider innovation process. Rather, it seeks to highlight SIP as a key element in a new, broader paradigm in which the hitherto neglected contribution of services to innovation is recognised. Thus, while separating manufacturing and services may provide a useful starting point (see Table 1), it will ultimately be more useful to acknowledge a spectrum of innovative activity across the economy. This viewpoint has been put forward at a more general level by Coombs and Miles (1999, pp. 96-97) in their discussion of the Rainbow Economy.

The SIP proposed here should be seen as an element of or an adjunct to the dominant MIP, which remains valid, in order to gain a more coherent and realistic view of the innovation process and to lead eventually to a new innovation paradigm (IP). The basic tenets of the SIP, to be included in a more balanced IP, are listed in Table 4.

Table 4. Shifting the agenda: the role of services in the innovation process

Acknowledgement that services are becoming more research- and technology-intensive over time, as reflected in the R&D expenditure recorded by the OECD and in patenting activity.
Some specialist services firms, associated with the t-KIBS sector, can be as R&D-intensive and technologically innovative as high-technology manufacturing firms.
Services firms are taking a more central role in innovation in national and international innovation systems.
Services firms and organisations play a more active role in the innovation process than formerly realised.
With the rise of innovation networking and DIPs, services firms and organisations are increasingly being drawn into partnerships with manufacturing firms, which in the past undertook innovation on their own.
Services firms themselves are becoming important customers of R&D and technical services firms.
Exceptionally, certain services take the lead role in the innovation process, subsequently subcontracting production to manufacturing firms.
There has been a shift in the innovation balance from tangible to non-tangible innovation. The generation, delivery and consumption of innovations are involving fewer direct physical products, processes and equipment. This has always been true of disembodied, organisational innovation, but it is increasing in more direct and specific areas of computer services, multimedia and products and services associated with the Internet.

Finally, what are the key implications of this review and analysis? First, that services are now more innovative, both in technological and non-technological terms, and they play an increasing role in the innovation process. Second, that changing perceptions and patterns of consumption are favouring more service-like competencies and shifting innovation more towards services. Moreover, the shift towards a more distributed system of innovation will also favour services firms and qualities; services firms will be increasingly recognised as full members of innovation networks. This is not to deny that services companies will remain important facilitators, but an increasing number will become more active in the innovation process in their own right. As a consequence, service-type, non-technological innovations will increasingly be the source of the binding glue and the competitive advantage in innovation (Khazam and Mowery, 1996).

However, the review has also highlighted the fact that both manufacturing and service activities are taking on traits that previously belonged to the other. This blurring raises the long-term issue of how long services-specific studies will be needed. Certainly, it will become harder to identify a distinct service (or indeed manufacturing) activity as the economy becomes more knowledge- and service-intensive. As all activities take on a more service-like function, the role of services as a descriptor for economic and social analysis may actually decline. At present, however, a deeper understanding of sectoral patterns of innovation remains an important objective (Pavitt, 1984, p. 370), above all in services. Otherwise, the possibility of developing a more complete and holistic view of the innovation process will remain out of reach.

NOTES

1. Although not all; a report by the Bureau of Industry Economics (1980,p. 1) in Australia noted as far back as 1980 that “services form a vital part of the economy contributing in a variety of ways both to output and employment”.
2. For example, the Japanese R&D survey covers the services sector in a very limited fashion.
3. I am indebted to the Department of Industry, Science and Resources, Australia for this example.
4. Encapsulation also took place earlier in the computer industry when computer hardware manufacturers, such as IBM and Honeywell, sold hardware bundled with free software. This changed, however, in 1969, when a court ruling required IBM, under anti-trust pressure from the US Department of Justice, to unbundle its hardware and software services. As a result, IBM could no longer sell computer hardware with free software “bundled” and a single price for the package.
5. In taking up more service activities, manufacturing firms, such as IBM, have metamorphosed into essentially services-dominated companies.
6. This has parallels with the “soft” start-up model of new firm formation where new enterprises start-up as service (“soft”) providers but then move into (“hard”) manufacturing firms.
7. The layer described in the main text has parallels with what Edvinsson and Richardson (1989, p. 36) call “thoughtware”.
8. For a more complete review of the problems with information see, for example, Arrow (1962); Stiglitz (1985); Carter (1989); Lamberton (1996); Lamberton (1998).

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Chapter 4

REGULATION IN SERVICES: OECD PATTERNS AND ECONOMIC IMPLICATIONS

by

**Giuseppe Nicoletti
Economics Department, OECD¹**

Abstract

This chapter looks at patterns of regulation in service industries and explores their implications for service performance. Focusing on restrictions to market mechanisms, a map of the state of services regulation in OECD countries is provided, based on data recently collected and summarised by the OECD. It also surveys the available cross-country empirical evidence on the effects of regulatory reform on service productivity, prices and innovation. Finally, it discusses ways in which regulation can encourage competition, efficiency and investment in those segments of the service industries where non-competitive elements persist. The main conclusions are: *i*) in the past two decades, OECD governments extensively reformed regulatory environments in both competitive and network service industries, generally bringing them closer to market mechanisms; *ii*) however, due to differences in initial conditions and in the pace of reform, the dispersion of regulatory approaches is still wide within each service industry and there remains significant scope for further reforms; *iii*) cross-country empirical evidence suggests that these reforms could contribute substantially to improved economic performance and living standards in the OECD area; *iv*) but to take full advantage of the reform process, policies in network service industries should take into account the implications of regulatory settings for incentives for regulated firms to invest and innovate.

Introduction

Several stylised facts characterise services industries in industrial countries.² Their contribution to gross domestic product (GDP) and employment growth is increasingly important and, hence, they represent a growing share of OECD economies. Services also represent a growing share of world trade and foreign direct investment (FDI), but in absolute terms their share in trade remains relatively small and, as a result, international competition still exerts little discipline on domestic industries. Historically, services have been highly regulated, partly owing to pervasive market failures in some industries, but also as a result of the domestic influence of special interest groups sheltered from foreign competitive pressures. In the past two decades, many services markets have been extensively liberalised and, where regulation remained necessary, it has often been overhauled. However, initial conditions differed widely across countries, as did the pace and extent of regulatory reform. As a result, the market friendliness of regulatory environments remains uneven for many service industries.

There are good reasons to believe that this reduces consumer welfare and constitutes a major hindrance to growth and innovation in this crucial sector of OECD economies.

This chapter looks at patterns of regulation for service industries and explores their implications for performance. It surveys the available empirical evidence on the effects of regulatory reform on service productivity, prices and innovation and discusses ways in which regulation can encourage competition, efficiency and investment in those segments of the service industries where non-competitive elements persist. To this end, regulatory environments in industries that are structurally competitive, such as road freight and retail distribution, and in network industries, where competitive and non-competitive markets coexist, are analysed separately. For illustrative purposes, mobile telephony and air passenger travel are included among the structurally competitive industries, though they share some characteristics of network industries. Moreover, for the sake of completeness, the electricity supply industry is analysed together with other network industries, although electricity supply cannot strictly be classified as a service. The analysis does not cover important areas such as financial, business, personal and community services.

The following section provides a map of the state of service regulation in OECD countries, drawing on data recently collected and summarised by the OECD. Regulatory environments are assessed on the basis of their restrictive impact on market mechanisms, but no attempt is made to evaluate their quality or their ability to reach stated public policy objectives. The next section reviews the empirical evidence on the impact of different regulatory regimes on service sector performance, focusing especially on cross-country studies. Then, issues of regulatory design in network industries are briefly discussed, focusing on ways in which entry of efficient operators can be encouraged in liberalised service markets, while also stimulating the necessary investment in networks. The concluding remarks summarise the main findings and point out some areas of concern for policy.

Regulatory patterns: some cross-country evidence from the OECD database

Comparing regulation across countries can help policy makers to situate their country against the range of possible regulatory policies and economists to infer the economic consequences of different regulatory choices. The task is arduous, however, because information about single regulatory provisions can hardly be analysed in isolation, and detailed information about regulatory environments is usually scarce and qualitative in nature. Furthermore, this information needs to be supplemented in many cases with data about market structure to provide an adequate picture of the state of competition in an industry.

To address some of these problems, the OECD has constructed a database and indicators containing detailed information about regulatory and market environments in the OECD area (see Box 1 and Figure 1). The data focus on economic and administrative regulations in the product market.³ Social (*e.g.* health and safety) and environmental regulations are not covered. The information collected is multidimensional and encompasses several aspects of a given regulatory area. The data collection methodology was the same for all countries and relied as much as possible on a multiple-choice questionnaire. The resulting data cover both industry-specific and economy-wide regulations, *i.e.* regulations that apply to all industries equally. Economy-wide data include administrative procedures needed for business start-ups. Industry-specific data focus on services and electricity supply.

The data on regulation and market structure can be used for international benchmarking, which is particularly instructive for policy making.⁴ However, to perform effective cross-country comparisons, data on regulations often need to be summarised to facilitate comparison of cross-country approaches in different regulatory areas. In doing so, regulatory approaches need to be appraised using uniform

criteria. To this end, the OECD has constructed summary indicators of economy-wide and industry-specific regulations measuring (along a least-to-most restrictive scale) how conducive regulatory environments are to competition (see Box 2).⁵ Regulatory indicators were used to benchmark each country's environment against best practice in the OECD area and to investigate empirically the impact of cross-country differences in regulatory environments on economic performance.

Box 1. The OECD International Regulation Database (IRD)

The OECD International Regulation Database contains a comprehensive and internationally comparable information about the state of regulation and market structures in OECD countries. For each Member country, it contains over 1 100 quantitative and qualitative observations. It covers economy-wide regulations concerning product markets:

- State control of business enterprises.
- Legal and administrative barriers to entrepreneurship.
- Barriers to international trade and investment.
- Competition policies.

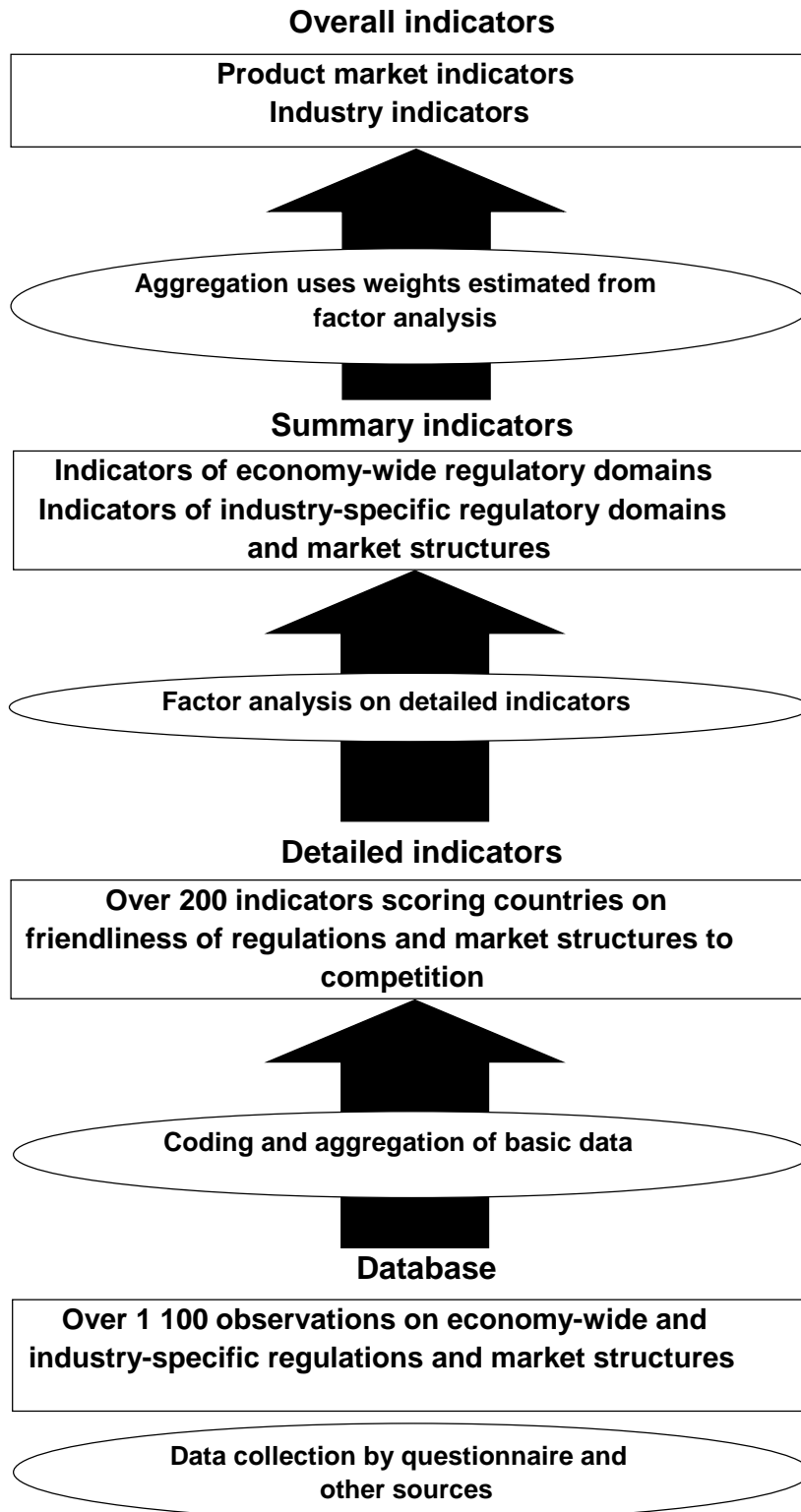
It also covers sector-specific regulations, regulatory settings and industry or market structures in:

- Telecommunications (local, trunk and international fixed telephony; analogue and digital mobile telephony).
- Transportation (road freight, air passenger travel, rail).
- Electricity supply.
- Retail distribution.

The database provides a "snapshot" of regulatory and market environments in (or around) 1998, as well as (for telecommunications and electricity supply) a time series of regulations and market structures covering the past 15 years. Regulations and market structures for over 100 main international air routes are also covered. The main sources of information are the responses of OECD countries to an *ad hoc* questionnaire, OECD expertise and data published by the OECD and other international organisations. The data collected are extensively checked by the OECD and government experts. The database is available on the OECD Web site: <http://www.oecd.org/subject/regdatabase/>

In the following, the OECD data and indicators are used to map the cross-country dispersion of product market regulations that potentially affect competition in service industries. In general, both economy-wide and industry-specific regulations may be relevant, to the extent that they restrict entry or business operation or create fixed costs that increase the minimum efficient scale of companies. Here, the focus is on three dimensions of industry-specific regulations: legal and/or administrative barriers to entry, involvement in business operation and the degree of vertical integration (in rail transport and electricity supply). In addition, the economy-wide administrative requirements for businesses are also considered, since they may be particularly relevant for dynamic small and medium-sized service firms. For illustrative purposes, services are classified into competitive and network industries. The first group includes road freight, retail distribution, air passenger travel and mobile telephony. The second group includes fixed (trunk and international) telecommunications, railway transportation and electricity supply. As mentioned above, the latter is not usually classified among services but, from the standpoint of regulation, electricity supply has much in common with the other network industries, and hence was included in the analysis.

Figure 1. The OECD benchmarking exercise



Box 2. The OECD summary indicators of regulation

The regulatory indicators are cardinal measures that summarise economy-wide and industry-specific regulations by regulatory domain. They are all designed to express the stringency of regulations, from least to most restrictive (generally along a scale of 0 to 6), as regards their impact on market competition. The indicators have a pyramidal structure. At the top of the pyramid they summarise the overall regulatory environment in the product market, in a regulatory area or in a specific industry. At lower levels, they summarise information about increasingly specific classes of regulatory interventions. The construction of the summary indicators involved several steps. First, the raw information contained in the database was coded into country scores. Second, a large set of detailed indicators was created by aggregating the country scores on individual regulatory provisions. The coding and the aggregation of different regulatory provisions typically involved some discretion in the construction of the detailed indicators. Third, the detailed indicators were summarised into more synthetic measures using a statistical approach based on factor analysis, in which each detailed indicator is weighted according to its contribution to the overall variance in the data. A similar approach to the analysis of economic data was used by Berlage and Terweduwe (1988).

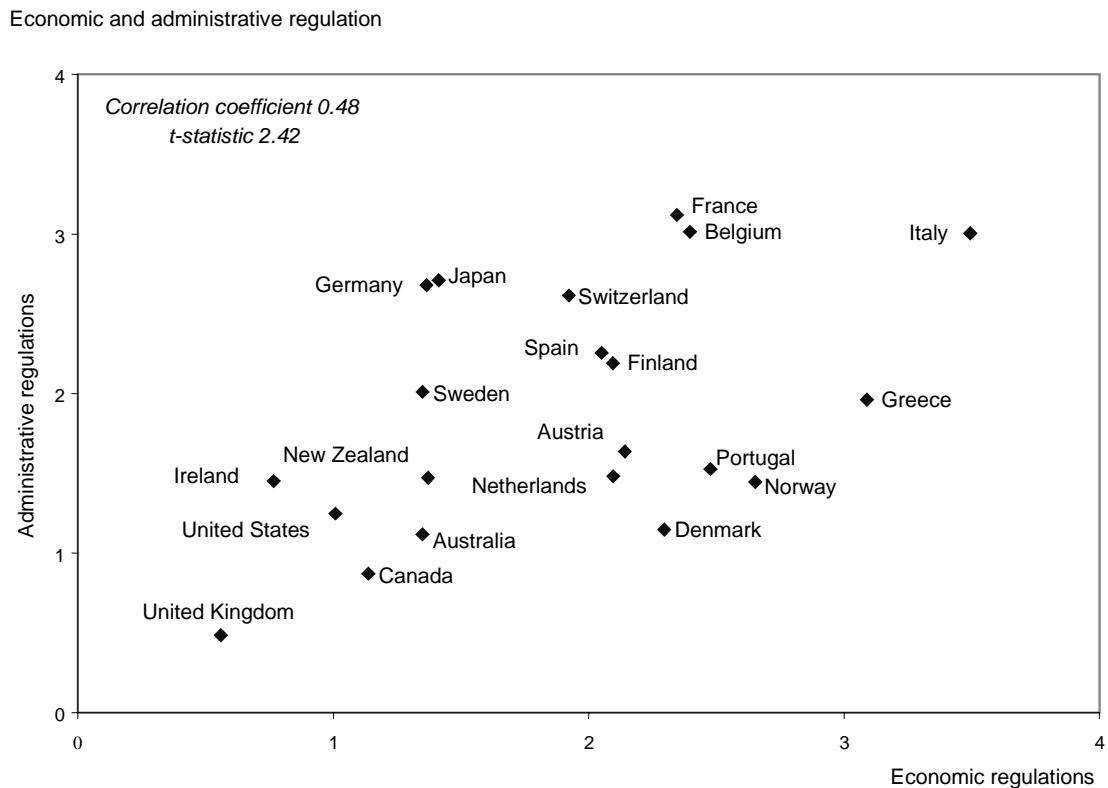
Factor analysis is appealing because the aggregation of the detailed indicators is data-based and ensures that the resulting summary indicators account for a large part of the cross-country variance in the detailed indicators. In addition, factor analysis assigns the largest weights to the indicators that have the largest variation across countries, quite independently of prior views on their relative economic importance. Therefore, the focus is only on those dimensions of regulation that are potentially useful for explaining the cross-country variation in regulatory environments, and the summary indicators are constructed without pre-empting the conclusions of the analysis, since the weights do not depend on the analyst's beliefs as to the likely impact of regulations on performance. These properties are particularly desirable for cross-country comparisons of regulatory structures and analyses of the effects of differences in regulation on performance.

Economy-wide regulations

Economy-wide administrative requirements for businesses represent fixed costs that can play an important role, especially in competitive service industries such as road freight, retail distribution and communications services. These industries typically consist of a large number of small and medium-sized firms with high turnover rates. Costly administrative procedures, such as multiple and complicated licensing systems, may constitute barriers to entry, influencing the number of start-ups and the survival rate of new firms and protecting the market power of incumbents. Ultimately, the barriers to entry generated by regulation-induced fixed costs may create rents that affect consumer welfare.⁶

Administrative approaches in OECD countries vary widely. As of 1998, the OECD indicators summarise three main administrative dimensions: requirements for sole proprietor and corporate business start-ups (number of required licenses, number of competent government departments, average delays, direct and indirect costs); features of the licensing system (*e.g.* existence of “silence is consent” rules); and opacity of rules and regulations. Administrative burdens in the most regulated countries are estimated to be as much as six times greater than in the most liberal ones. Interestingly, restrictive administrative regulations often go hand in hand with restrictive economic regulations, defined to include state control over business enterprises and legal barriers to competition (Figure 2). This correlation suggests that overall regulatory environments that are hostile to competition combine serious administrative burdens with regulatory restrictions that affect market mechanisms. This combination of policies is bound to be harmful in competitive service industries and to curb new entry and innovation.

Figure 2. Regulatory approaches across countries: economic and administrative regulations

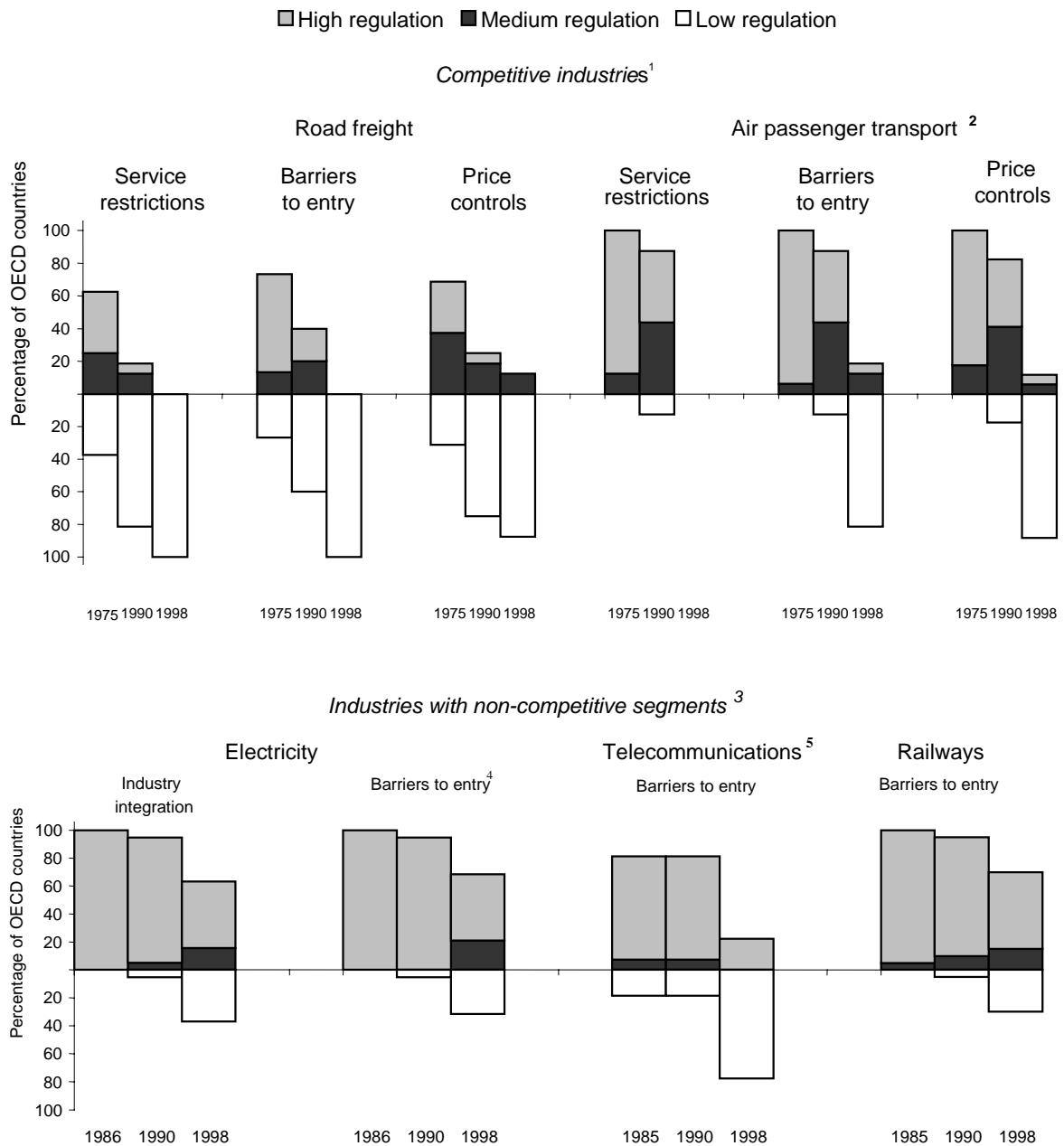


1. The scale of indicators is 0-6 from least to most restrictive.
Source: Nicoletti *et al.* (1999).

Industry-specific regulation

Most restrictions on market mechanisms in services are industry-specific. They may affect entry, pricing and service provision. Some of these restrictions may be justified by the existence of market failures and by the wish to satisfy non-economic objectives, though the latter need not stand in the way of greater competition and cost-based pricing. However, many restrictions have no economic justification other than the protection of incumbents. Moreover, regulation is sometimes used as an improper tool for reaching policy objectives that could be obtained in a more transparent and less distorting way.⁷ Realising this, most OECD countries have reformed, sometimes radically, the regulatory environments in which services and electricity are provided. Using a simple characterisation of regulatory environments (high/medium/low), Figure 3 summarises entry, price and service liberalisation in the competitive and network industries for which historical data on regulations are available.

Figure 3. Product market liberalisation in OECD countries



1. *High regulation*: Entry is restricted and prices or services are set or approved by a regulatory authority.
Medium regulation: Some limited entry is allowed and businesses have some freedom to set prices or services.
Low regulation: Businesses are free to enter and have full control over prices and services they supply.
 2. Domestic and regional routes.
 3. *High regulation* indicates that access to competitive markets is restricted and, for electricity, vertical integration.
Medium regulation indicates that some limited market access is allowed and, for electricity, limited vertical separation.
Low regulation indicates that market access is free and, for electricity, full vertical separation.
 4. In electricity generation.
 5. Fixed telephony: trunk and international.
- Source: OECD (1992); and OECD international Regulation Database.

Reforms have been widespread in road freight and air passenger transport (although they have generally been restricted to domestic and regional markets) as well as in telecommunications, but they have been much more limited in rail transport and electricity supply. Despite the reforms, markets in network industries often remain dominated by incumbents and competitive pressures are weak.⁸

Although many OECD countries have taken a more market-oriented approach to services regulation in the past two decades, a map of regulatory environments by country and industries in 1998 shows that industry-specific policy approaches still vary widely across countries and, in the same country, across industries. Table 1 summarises these environments for seven industries using the OECD summary indicators (see Box 3).⁹ In each industry, policy approaches were labelled “very liberal”, “liberal”, “restrictive” or “very restrictive” depending on whether the value of the regulation indicator falls short or exceeds the average value found in the OECD countries included in the sample by more or less than one standard error. Indicators for retail distribution, road freight, mobile telephony and air passenger travel include barriers to entry and government involvement in business operation. Indicators for the network industries include only barriers to entry and industry structure: government involvement in business operation was assumed to be justified by the existence of the non-competitive segments. In mobile telephony and electricity supply, barriers to entry refer to the digital and generation segments, respectively.

It should be stressed that the four types of policy approaches have to be interpreted in relative terms and in the light of the structural characteristics of the industries themselves. For instance, widespread reforms have considerably reduced the regulatory constraints throughout OECD countries, but the indicators in Table 1 measure the strictness of remaining regulations relative to the OECD average. Similarly, a “very restrictive” approach has a different meaning in railways, where non-competitive segments dominate, and in retail distribution, an industry that is structurally competitive. As a reminder of this, industries have been ordered from most to least competitive.

Ordering countries by the percentage of industries in which they are deemed to have a liberal approach, several clusters emerge.¹⁰ There is a very liberal cluster (Australia, the United States, Sweden, the United Kingdom); a mostly liberal cluster (Germany, the Netherlands, New Zealand, Finland, Norway, Korea, Canada, Ireland, Mexico); a cluster characterised by a balanced mix of liberal and restrictive approaches (Iceland, Denmark, Belgium, Japan); and a mostly restrictive cluster (all the remaining countries). Among the latter, Poland, Spain, Italy, Turkey and Greece have particularly restrictive environments.

Cross-country differences in approaches concern both competitive and network industries, but they are larger in the latter.¹¹ Interestingly, while countries having a liberal approach in network industries could be expected to have, *a fortiori*, a liberal approach in competitive industries, this is not always the case: for instance, the United Kingdom and Germany have relatively restrictive policy stances in retail distribution and road freight, respectively; this is in sharp contrast with their liberal approach in other industries. Japan has a restrictive approach in several competitive industries and a mostly liberal approach in network industries.

These simple indicators cannot show whether liberal approaches are matched by policies that promote competition in liberalised markets. Taking a step in this direction by combining the regulatory data with information about market structures increases the polarisation between liberal and restrictive clusters by shifting Canada, Korea and Mexico towards the more liberal clusters, and other countries (especially Norway and Ireland) towards the less liberal clusters.

Table 1. A map of regulatory environments in service industries and electricity supply¹
 OECD countries, 1998

	Competitive industries				Network industries		
	Retail distribution	Road freight	Mobile telephon	Air passenger transport	Fixed telephony ²	Electricity	Railways
Australia	○	○	○	○	○	○	○
United States ³	○	○	○	○	○	●	○
Sweden	○	○	○	○	○	○	○
United Kingdom	●	○	○	○	○	○	○
Germany	○	●	○	○	○	○	○
Netherlands	○	●	○	○	○	●	○
New Zealand	-	○	●	○	○	○	●
Finland	●	○	○	○	○	○	●
Norway	●	○	○	○	○	○	●
Korea	○	○	○	●	○	-	●
Canada	○	○	-	●	○	●	○
Ireland	○	-	○	○	○	●	●
Mexico	○	○	○	●	○	-	●
Iceland	●	-	○	●	○	-	-
Denmark	●	-	○	○	○	●	●
Belgium	●	●	○	○	○	●	●
Japan ⁴	●	●	○	●	○	●	○
Austria	●	●	○	○	○	-	●
France	●	○	○	●	○	●	●
Switzerland	○	●	○	●	○	-	●
Czech Republic	○	●	●	●	●	-	○
Hungary	○	●	●	-	●	-	○
Portugal	●	○	○	●	●	●	-
Poland	●	●	○	●	●	-	○
Spain	●	●	●	○	○	●	●
Italy	●	●	●	○	○	●	●
Turkey	●	●	○	●	●	-	●
Greece	●	●	○	●	●	●	-

○	Very liberal
○	Liberal
●	Restrictive
●	Very restrictive

1. See Box 3 for details.

2. Long distance (international and trunk) only.

3. The indicators for the retail distribution and mobile telephony industries were partially estimated.

4. The indicator for the retail distribution industry was partially estimated.

Source: OECD International Regulation Database.

Box 3. Summary description of the regulation indicators

In road freight and retail distribution, indicators of barriers to entry include industry-specific administrative burdens, capacity limitations and participation of professional bodies in decisions concerning entry. In road freight, they also include discriminatory provisions against foreign road freight companies and price restrictions; in retail distribution, they also include special provisions concerning large outlets. Government involvement in business operations includes the use of command and control regulations (e.g. restrictions on driving periods, haulage, shop opening hours) and, in retail distribution, price controls. In mobile telephony, barriers to entry are defined as legal provisions limiting the number of competitors in the digital business. In air travel, the indicator of barriers to entry summarises information about liberalisation of domestic and regional routes, the existence of open-sky agreements on international routes and flag carrier entrenchment. In fixed telecommunications, barriers to entry include legal provisions limiting the number of competitors in long distance (trunk and international) services. In electricity, the indicator includes third party access provisions, the existence of an organised electricity market and the extent of consumer choice of supplier. In railways, the indicator includes legal limitations on the number of competitors in passenger and freight services. Only regulatory provisions applying at the national (or federal) level have been taken into account.

Through this kind of benchmarking, “economic” rationales for restrictive regulations can be better assessed. In areas or industries where “zero-based” regulation is an option, it is useful to look at the experience of countries that have eliminated unnecessary restrictions ON market access, pricing or service provision in an industry in order to decide whether or not to push ahead with domestic reform. Examples are the “destructive competition” argument for restricting access or regulating prices of road freight, the “safety” argument for restricting access in air passenger travel, or the “spectrum scarcity” argument for limiting competition in mobile telephony. Examples of liberalisation in these industries have probably contributed as much as economic analyses to stimulate reform in OECD countries.

Summary indicators are less useful for evaluating the merit of different regulatory approaches in the non-competitive segments of network industries. However, international benchmarking at a finer level of data disaggregation can provide some information on the scope for specific regulatory approaches. For instance, the available evidence on the use of price caps to regulate retail prices in different industries suggests that RPI-X rules have been massively adopted in fixed telecommunications and, to a lesser extent, in railways but are seldom used in the electricity supply industry. One of the reasons why price-cap regulation is more prevalent in telecommunications than in the electricity industry may be that cost information is easier to obtain in the latter.¹² Other areas in which benchmarking of regulation in network industries could be helpful are the scope for and the pricing of network access, the scope for and the funding of public service obligations and the design of regulatory institutions.¹³ In many of these industries, reforming countries are still “experimenting” with new regulatory approaches. Therefore, international benchmarking may help policy makers to understand the range of possible options and their relative success.

Economic implications

Regulatory reform in services is likely to have effects at both industry and macroeconomic levels. The benchmark against which to judge different regulatory approaches is their effect on productive efficiency, innovation and consumer welfare. Most of the empirical research has concerned their effects on the performance of specific industries in individual countries. Here, the focus will be on the available cross-country evidence concerning the economic effects of regulation and regulatory reform in the seven industries covered in the preceding section, as well as, more suggestively, at the economy-wide level. Although this restricts the scope of the analysis to a thinner empirical literature, the interest of moving to a cross-country dimension is to see whether general conclusions can be drawn as to the relative economic advantages of different regulatory choices.

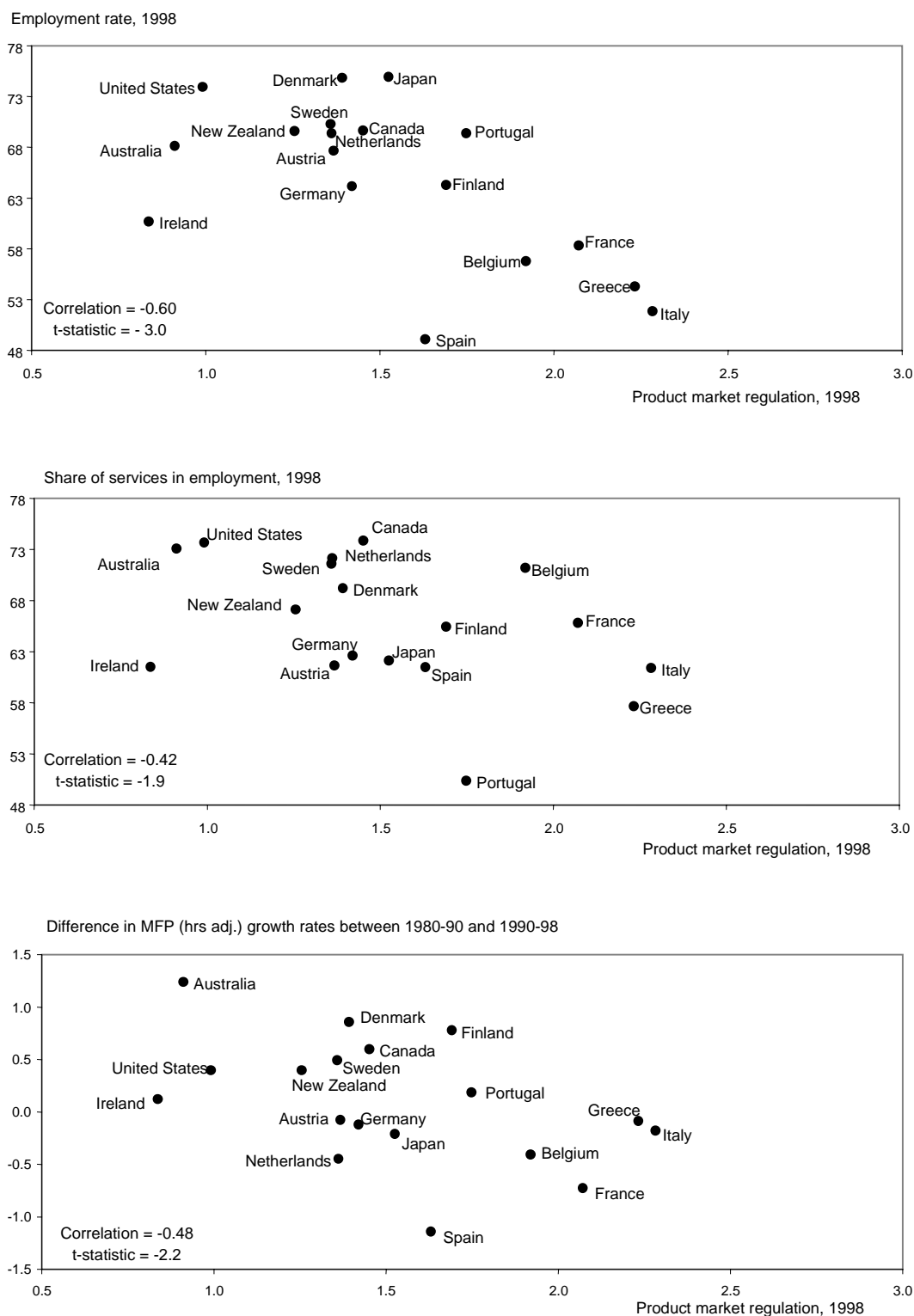
Economy-wide effects of service regulation

While there have been attempts to estimate the overall welfare effects of certain reforms, very few studies have analysed how industry-specific effects work through the economy to affect macroeconomic outcomes, such as employment rates and GDP growth. Among the latter, only two take a comparative cross-country approach: Van Bergeijk and Haffner (1996) summarised the evidence contained in several country-specific reports and in a report aimed at assessing the effects of the implementation of the EU Single Market;¹⁴ the OECD (1997) looked at the effects of a plausible medium-term programme of regulatory reform in eight countries using estimates of efficiency gains in several service industries.¹⁵ All these studies reported sizeable and positive effects of product market liberalisation, mainly concerning service industries, on GDP levels and growth rates. For instance, the OECD study reported long-run potential output gains ranging from 3% to 6% in some European countries and Japan to 1% in the United States, reflecting the initial state of regulation in different countries.

While such simulation studies may be suggestive of the welfare gains to be obtained from regulatory reform in the services sector, more direct empirical evidence is needed of the linkages between reforms and macroeconomic outcomes. To date, few attempts have been made to estimate these linkages on the basis of two decades of experience with regulatory reform in OECD countries. This is partly due to the inherent difficulty of summarising regulatory environments by means of the quantitative indicators that are used in empirical analysis and to the lack of comparative and historical data on such environments across countries. Some recent studies, using the new OECD regulation indicators, provide some initial insight into the possible links between services sector reforms and macroeconomic performance. Controlling for differences in GDP per capita, Messina-Granowski (2000) finds that anti-competitive product market regulations are associated with low employment shares for services in a cross-section of 27 OECD countries. Controlling for several dimensions of labour market regulations and institutions, Nicoletti *et al.* (2000) find that such regulations also have a negative impact on business employment rates for a panel of 19 OECD countries over the 1982-95 period. Finally, Bassanini *et al.* (2000) find a significant inverse relationship between anti-competitive regulations and catch-up in total factor productivity (TFP) growth during the 1990s for a cross-section of 18 OECD countries. Figure 4 attempts to illustrate these relationships by means of bivariate correlations using the same sample of OECD countries and a single regulation indicator. The relationships are weaker than in the studies cited above, but some suggestive evidence remains.

The robustness of these (highly tentative) findings has to be checked and the relevant economics requires further development. However, a conjectural explanation may rely on the effect of regulations on services sector performance. Restrictive regulations, which often combine heavy administrative burdens with barriers to competition and extensive state control (see Figure 3 above), may damage entrepreneurial initiative in services, curbing services sector growth.¹⁶ Given the employment intensity of this sector, its share in overall employment and employment rates may be negatively affected. Moreover, to the extent that dynamic services sector firms are intensive users of new information technologies, the ability of the economy to trigger “new economy” externalities may be impaired, with negative consequences for productivity growth.

Figure 4. Regulation, the employment rate, the share of service employment and total factor productivity



1. The scale of indicators is 0-6, from least to most restrictive.
 Source: OECD and Bassanini *et al.*, 2000.

Industry-specific effects

Measuring output, costs and prices in services is particularly difficult. The pitfalls of measuring services output are well known.¹⁷ An important source of cost mismeasurement (and of regulatory failures) in network industries concerns the allocation of common costs across the different services provided by the network. Collecting meaningful price data is often problematic either because they are not observable, as in retail distribution, or because market and posted prices differ widely (*e.g.* owing to discounts). These empirical problems are somewhat easier to handle on a single-country, single-industry basis, and indeed much of the existing evidence on the economic effects of services regulation and regulatory reform concerns individual industries and countries, especially the United States. The following briefly summarises the main conclusions of empirical studies of competitive and network industries in different countries and reports more extensively on the results of cross-country studies, focusing on the recent OECD work in this area.

Competitive service industries

Retail distribution

The main kinds of regulations affecting the retail distribution industry are legal or administrative entry barriers (restrictions on large outlets, requirements for setting up businesses, limitations on product ranges, etc.) and provisions that constrain business operation (opening hours, pricing restrictions, etc.) (Boylaud and Nicoletti, 2001*a*). Due to the difficulty of obtaining reliable data on both performance and regulatory regimes, most empirical studies of the effects of deregulation in the retail distribution industry are based on simulation techniques (see Pilat 1997; OECD 1997; van Bergeijk and Haffner, 1997; and the references therein).¹⁸ Only a few take an econometric approach using cross-country/time-series data on performance and/or regulation (Hoj *et al.*, 1995; Pilat, 1997). Both simulation and econometric studies point unequivocally to potentially large welfare gains from the liberalisation of entry and prices in retail trade:

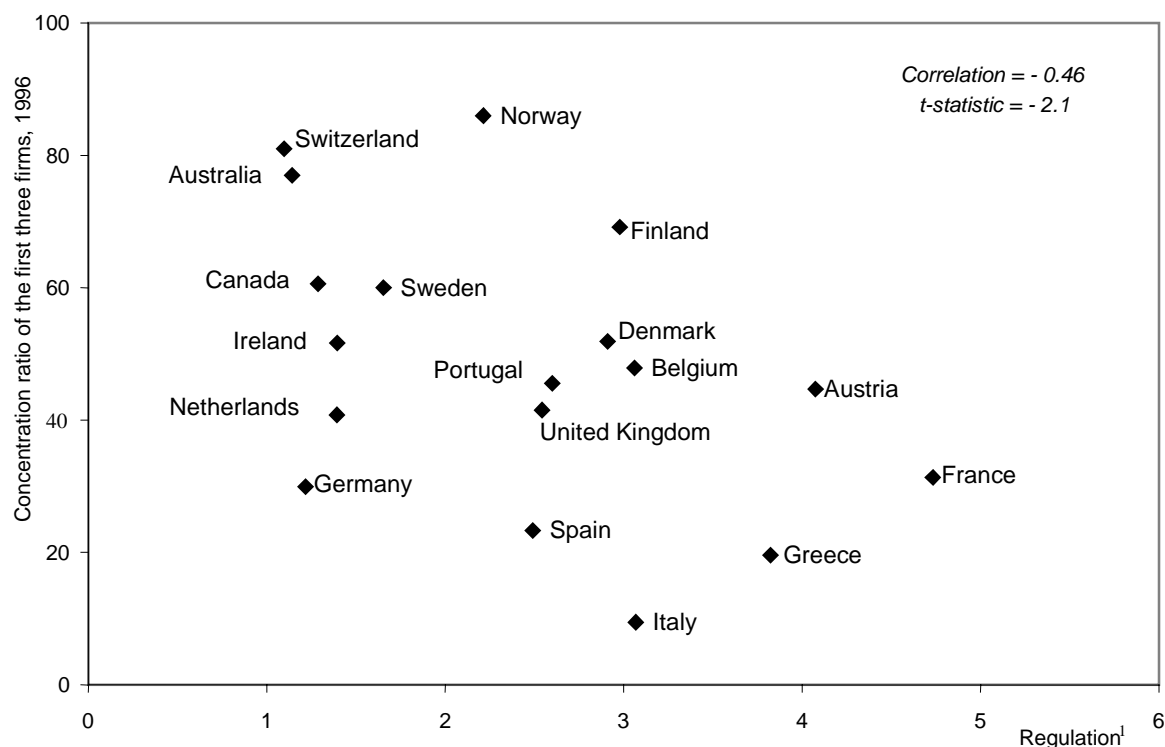
- Distribution systems become more efficient (notably as large outlet restrictions are removed).
- Employment and volume of sales increase.
- Margins decline, putting downward pressure on consumer prices.¹⁹

Gains from liberalisation in these industries point to the lack of solid economic rationales for restricting access, service provision and prices (apart from provisions protecting consumers against abuse, such as transparency requirements on promotions and sales). The widespread benefits to be obtained from regulatory reform suggest that restrictive regulatory arrangements are mainly motivated by private interest factors (such as pressures to protect incumbents).²⁰ There remains, however, ample scope for further empirical research on the motivations and the effects of regulation in retail distribution.

For instance, some additional insight into the relationship between the regulatory environment and industry structure can be drawn from plotting across countries the OECD regulation indicators for retail distribution against an index of industry concentration (Figure 5). The inverse relationship suggested by the figure can be interpreted as evidence that excessive regulation prevents the modernisation of the industry. However, this interpretation should be qualified, to the extent that excessive concentration may be harmful to competition and, ultimately, consumer welfare. Efficiency gains in modern distribution systems are passed on to consumers only if competitive pressures remain

strong and competition authorities ensure that the increased purchasing and market power of large distribution companies do not reduce competition between retailers (OECD, 1999d).

Figure 5. Concentration and regulation in retail distribution



1. The scale of indicators is 0-6, from least to most restrictive.
 Source: Boylaud and Nicoletti (2001a).

Road freight

The main regulatory restrictions currently affecting road freight in the OECD area are discriminations against foreign hauliers, limitations on own-account transport and, in some countries, price controls; regulations limiting access or freedom to set prices are often designed and enforced in collaboration with professional bodies (Boylaund and Nicoletti, 2001b). There is a vast body of evidence on the effects of entry and price liberalisation on road freight.²¹ Empirical approaches in this industry include simulations, *ex post* descriptive assessments of reform outcomes and econometric studies. Although no studies have been made so far to evaluate the effects of reform on a cross-country basis, the results of research on individual countries are unambiguous:

- Industry employment and output rise.
- Productive efficiency and the quality of services are enhanced, partly because of network rationalisation and an increased rate of innovation.
- Fares fall by a significant amount.

Estimates of price reductions following deregulation range from 15% in France to 75% (for full-load road haulage) in the United States, where reforms were more radical (McKinnon 1996; OECD, 1999*e*). In the United States, performance improvements and price reductions have concerned both the full-load and less-than-full-load segments of the industry (Winston, 1998). Welfare gains from regulatory reform are estimated to be correspondingly significant.²²

The relatively long experience of countries that have liberalised road freight suggests that most motivations underlying regulatory interventions were unfounded. For instance, the idea that price and service regulation were needed to make sure that shippers in small communities were not deprived of transport services (the “public service” argument) proved baseless. Similarly, the concern that entry and price liberalisation would lead to instability and widespread bankruptcies due to cut-throat competition among hauliers was not substantiated by post-reform outcomes (OECD, 2000*a*). The lack of empirical support for “economic” and “social” arguments for regulation and the strong evidence of welfare gains from reform suggest that previous regulatory restrictions were mainly the result of pressures by special interest groups, such as railway companies, incumbent firms and unionised workers.²³

Mobile telephony

There is ample cross-country evidence of the benefits of competition in the mobile telephony industry. For instance, the OECD has documented the differentials in output growth and prices between liberalised and regulated countries over the 1990s (OECD, 2000*b*). In the former, the density of mobile phones has grown much faster and prices have fallen more rapidly.²⁴ For Europe, Gruber and Verboven (1999) provided econometric evidence on the impact of competition on mobile penetration. More extensive econometric evidence for the OECD area has been recently provided by Boylaud and Nicoletti (2000), who used the OECD regulation indicators and market structure to look at the effects of privatisation, liberalisation and competition on productive efficiency and prices for a panel of 23 OECD countries over the 1993-97 period. Table 2 summarises the empirical findings by pointing out the sign of the statistically significant effects of the policy or competition variables. Regression estimates controlled for country-specific effects and other influences assumed to be unrelated to ownership, regulation or market structure over the sample period (such as technology and economic structure).²⁵ For simplicity these variables are omitted from the table.

Table 2. Effects of ownership, regulation and market structure on productivity and prices in the mobile telephony industry
Summary of results of panel regressions (1993-97)

Dependent variable	Productivity	Price
	Cellular subscribers per employee	Mobile revenue per cellular subscriber
Number of periods	5	5
Number of countries	22	23
Number of observations	110	115
Market share of new entrants	n.s.	--
Time to liberalisation	+	n.s.
Degree of state control	n.s.	n.s.
Time to privatisation	--	n.s.

Source: Boylaud and Nicoletti (2000).

The main messages conveyed by these results are:

- Productivity (defined as cellular subscribers per industry employee) increases as liberalisation approaches.
- Average prices (defined as mobile revenue per cellular subscriber) decline only as competition in the market unfolds.
- Neither ownership nor prospective privatisation *per se* have positive effects on the performance variables.

Prospective and actual competition have important effects on productivity and prices, but ownership does not *per se* appear to have had a clear bearing on performance in the mobile telephony industry.²⁶ The mere prospect of competition generates changes that lead to gains in efficiency, as incumbent operators prepare to meet future competitive pressures. However, incumbents have no incentive to cut prices until new entrants are operational. Thereafter, the number of operators is crucial in determining the degree of price competition. This has important implications for mobile telephony prices in the OECD area. For instance, it is estimated that countries such as the United Kingdom, the United States, Canada and Germany, competitive pressures contributed as much as all other factors taken together (technology, economic structure, ownership, etc.) to keep prices below the OECD average. In countries such as Australia, Greece and, to a lesser extent, Germany, the downward effect of competitive pressures more than offset the upward effect of other factors.

Air passenger transport

Reforms have been more limited in air passenger travel than in other competitive services industries, as they have involved only domestic routes and routes included in regional free trade agreements. Most international routes, which constitute the bulk of world traffic outside the United States, are still governed by restrictive bilateral agreements or, at best, “open sky” agreements that do not grant all traffic freedoms to participating airlines and generally exclude third-party competition. Furthermore, the air transportation industry has some elements of network industries that make the competitive features of air travel markets unusual. Carriers compete at both route and network levels. Common costs over the network may make cross-subsidisation efficient in some cases, with consequences for competition at route level. More importantly, regulatory and competitive conditions for accessing fixed ground infrastructures significantly affect competitive pressures on city-pair markets. For all these reasons, empirical research on the effects of entry and price liberalisation on industry performance and consumer welfare has been complex and general conclusions have often remained out of reach.²⁷

The available evidence on the outcomes of reform, mostly for the United States, generally points to large efficiency gains from network rationalisation and significant reductions in airfares on long-haul routes, with prices sometimes tending to increase on short-haul ones.²⁸ Infrastructure congestion, airport domination and market concentration were found to temper the benefits of reform.²⁹ US research has also demonstrated that certain feared outcomes of liberalisation – such as declines in safety levels or loss of air service to small communities – failed to materialise. On the contrary, reforms have been matched by an increase in number of destinations served and overall improvement in safety.³⁰ The relatively rare analyses documenting the implications of airline competition for efficiency and airfares outside the United States, such as in trans-Pacific routes or the European internal market, found less clear-cut results, perhaps owing to more limited liberalisation and the wider presence of exogenous factors that dampen competition.³¹

Cross-country examinations of the relationship between regulatory frameworks, market structures and performance in air passenger transport have been few. A recent study by Gonenc and Nicoletti (2000) uses the OECD regulation indicators to investigate the effects of different regulatory and market environments at both national and route levels for a cross-section of 27 OECD countries and 102 international city-pair routes connecting the 14 largest OECD-area airports. The results of this econometric analysis, which controls for the effect of technology (*e.g.* fleet composition and age) and economic structure (*e.g.* propensity to travel by air) at route ends, are summarised in Table 3.

Table 3. Effects of ownership, regulation and market structure on productivity and prices in the air passenger transportation industry

Summary of results of cross-country and cross-route regressions¹

Level of analysis	Route level				National level	
Dependent variable	Prices			Productivity	Productivity	
	Business fare	Standard economy fare	Discount fare	Highest load factor	Efficiency (DEA measure)	Average load factor on international routes served by domestic carriers
No. of observations	154	154	406	168	27	27
Strictness of regulatory and market environment	+	+	+	--	--	--
<i>Strictness of regulatory environment</i>	+	+	n.s.	+	--	n.s.
<i>Strictness of fare regulations</i>	+	+	n.s.	n.s.		
<i>Strictness of access rights for charters</i>	n.s.	n.s.	+	+		
<i>Strictness of market environment</i>	n.s.	n.s.	n.s.	--	--	--
<i>Capacity concentration</i>	n.s.	n.s.	n.s.	--		
<i>Lack of challenger carriers</i>	n.s.	n.s.	+	--		
<i>Role of airline alliances on route</i>	n.s.	+	n.s.			
Strictness of national market environment at route ends	n.s.	n.s.	+			
Strictness of infrastructure access conditions at route ends	+	+	n.s.	n.s.		
Degree of government control over route carriers	+	n.s.	n.s.	+		

1. The reference periods for the cross sections are 1996-97 for regulation, market structure and efficiency indicators, and 1998-99 for air fares.

n.s. = not significant.

+ = significantly positive effect.

-- = significantly negative effect.

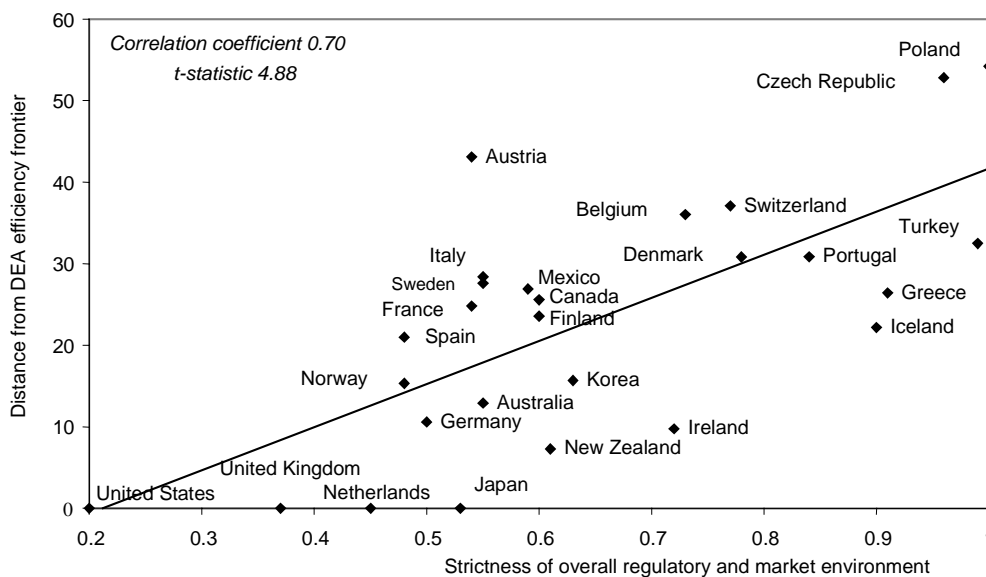
Source: Gonenc and Nicoletti (2000).

The main conclusions are as follows:

- At national level, restrictive regulatory and, especially, market environments are unambiguously associated with the lower overall efficiency of the domestic industry.
- At route level, regulation and market structure influence performance indicators in different ways.
- Efficiency (as measured by the highest load factor) improves significantly in competitive environments, but entry deregulation *per se* may have adverse consequences, as incumbents implement pre-emptive strategies against potential new entrants (*e.g.* increased frequency of flights on liberalised destinations).
- Business and economy fares tend to decline significantly when the route-specific regulatory environment is relaxed, but are little affected by further competitive developments in the city-pair market (such as increases in the number of competitors and reductions in market concentration).
- Business and economy fares tend to rise with tighter infrastructure access conditions at route ends, the capacity share of airline alliances and the role of government-controlled carriers on the route.
- Discount fares tend to decline significantly when the overall market environment at route ends is friendlier to competition and when charter rights are extensive and challenger airlines (*i.e.* limited size incumbents) exist on the route.

Thus, to a different extent and in different ways depending on the performance indicator, both regulation and the market environment affect efficiency (at national and route levels) and air fares. The latter are also affected by airport dominance/congestion and government control over route carriers.

Figure 6. Efficiency in air passenger transportation and the regulatory and market environment



Source: Gonenc and Nicoletti (2000).

Figures 6 and 7 illustrate some of these effects at national level and for a selection of routes, respectively. Figure 6 shows the positive cross-country correlation between the indicator of the strictness of the national regulatory and market environment and an indicator of the industry-level efficiency gap relative to best OECD practice.³² Figure 7 describes, for a selection of routes, the effects of regulation (including government control over route carriers), market structure and other route characteristics on the deviation of business and discount fares from their average values, taking into account differences in route stage length. Contributions are positive or negative depending on whether regulations and market structures are more or less adverse to competition than in the average OECD country. The combined effect of regulation and market structure is often as large as that of all other route characteristics taken together. The relative contributions of regulation and market structure are reversed for different categories of fares. Business fares are mainly affected by regulation, access to infrastructure and alliances; market structure has only a minor influence. Discount fares are mainly influenced by market structure; the influence of regulation is smaller and the other factors have no impact.

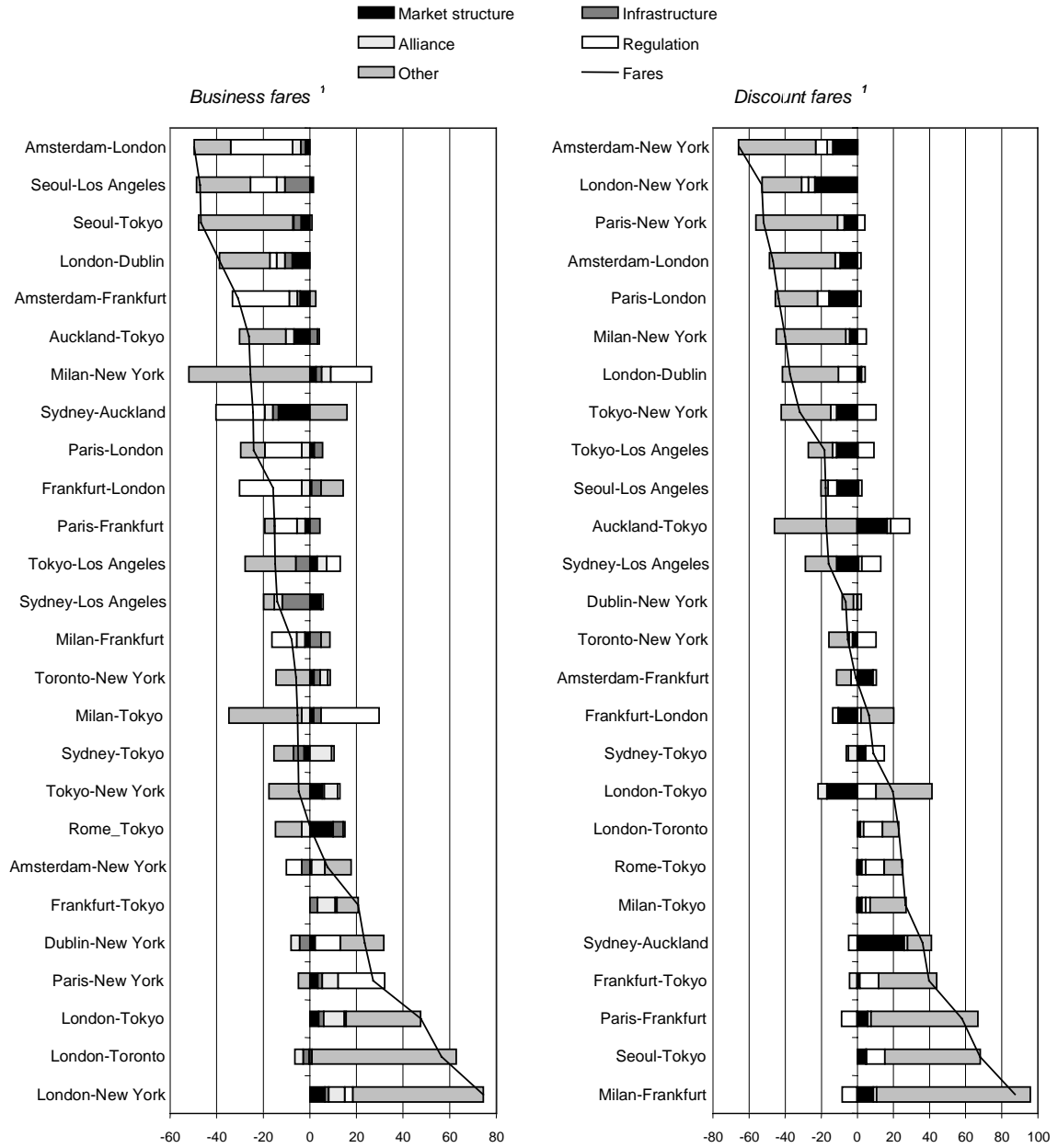
Effects in network industries

Network industries have non-competitive segments that need to be regulated. Moreover, owing to past regulatory arrangements, their price structure is often distorted and needs to be redressed gradually to make it consistent with competition in the liberalised segments. For this reason, it is more difficult to assess the economic impact of regulation; it is necessary to evaluate at the same time the effects of competition where entry and prices have been liberalised and the effects of access, pricing and service regulations remaining in the non-competitive parts of the industries. Moreover, dominant firms in these industries are often privatised shortly before, or shortly after, sectoral regulatory reforms are implemented. Empirical studies are rarely able to take account of all these dimensions. They generally concentrate on specific aspects, while attempting, at best, to control for some others. Furthermore, except in a few countries, regulatory reform in network industries has a relatively short history and it is often premature to attempt to evaluate its effects on performance. The lack of cross-country empirical studies on the effects of regulation and/or liberalisation in network industries is unfortunate, because it is precisely in these industries that policy guidance is needed. Evidence is particularly thin for railways and (to a lesser extent) electricity supply, where regulatory issues are most complex and liberalisation is most challenging. As its crucial role in fostering growth became evident, the area of fixed telecommunications has been increasingly explored.

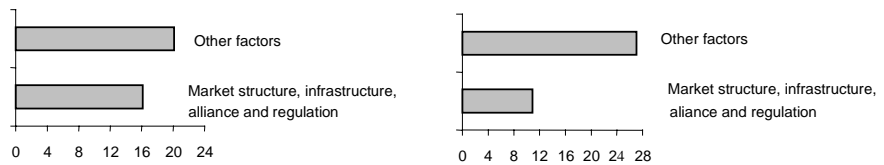
Rail transport

Rail transport is perhaps the most highly regulated industry in the OECD area, partly because the economies of scale that lead to natural monopoly are widespread (Kessides and Willig, 1998). It is also the industry with the fewest systematic evaluations of the effects of different regulation and market structure arrangements on performance. There have only been three efforts at global reform in this industry: the US reform of 1982; the UK reform of a decade later; and Mexico's reform at the end of the 1990s. Interestingly, the first two took two opposite approaches. The US reform maintained vertical integration between railtrack and services, but required open access to the network by competing service providers; within this framework, entries and fares were fully liberalised. The UK reform unbundled railtrack, rolling stock and services; railtrack became a regulated natural monopoly, three rolling stock companies were created and services were franchised to private bidders for a fixed term and were subject to fare regulation. The Mexican reform concerned only rail freight and was closer in spirit to the US reform, with the national company being split into several regional, vertically integrated companies. In other OECD countries, reforms have mainly concerned reorganisation of the industry, with widespread but timid attempts at separating the various functions and the opening up of rail freight business, with access rights for competing service providers being (very) gradually extended.

Figure 7. The contribution of regulation, government control and market structure to air fares



Average contributions to the fare gap (absolute values)



1. Percentage deviations of fares from sample average (102 routes), taking into account route stage length.
 Source: Gonenc and Nicoletti (2000).

The country-specific evidence available on post-reform outcomes suggests the following conclusions:

- The US reform has led to a radical reduction in rail passenger transport and relatively strong growth in freight services, with fares declining by 30-50% in certain markets and enhanced efficiency and quality of service (OECD, 1999*e*; Wilson, 1994).
- The UK reform is still too recent to be appropriately assessed, but passenger traffic franchisees often made larger-than-expected profits, leading to renegotiation of price caps with the regulator; attempts to introduce competition in rail freight have not yet succeeded (OECD, 2000*c*).
- The Mexican reform has led to a moderate decline in freight fares and an improvement in the quality of service, but the effects on efficiency are unclear (OECD, 1999*f*).
- Given the existence of radically different policy options and the dearth of empirical evidence on the effects of regulation in railways, this is an area where further empirical research is needed.

Electricity supply

Over the past decade, the regulatory environment for the electricity supply industry has begun to change. A few OECD countries have already implemented new regulations to stimulate competition by attempting to liberalise the industry, focusing reform efforts on functions that do not possess a natural monopoly component. Other countries are taking initial steps to open the generation segment of the industry to competition.³³ However, issues of regulatory design for the electricity supply industry are formidable: create a market for a non-storable good where there was none, provide the right price incentives for the location of generation plants, ensure access by suppliers to a vertically integrated industry or reorganise it to promote competition, establish benchmark competition in markets that are inherently local monopolies, etc. Moreover, because of their sheer size, the vital role they play in the economy and their connections with government, incumbents have often effectively lobbied to delay measures to promote competition in electricity supply. Thus, even among early reformers, implementation of reform has been a slow process, so that at most a handful of countries can point to actual progress towards competition.³⁴

Liberalisation of the electricity supply industry holds the promise of enhancing welfare by improving efficiency and reducing prices. However, there is no consensus on the specific regulatory reforms most likely to achieve the benefits of competition. Empirical work in this area has been largely country-specific and/or anecdotal and often based on simulations.³⁵ Concluding an extensive survey of existing studies, Pollitt (1997) lamented “the small amount of academic literature ... on such a world-wide policy programme”. Results are at best mixed and difficult to generalise, because they generally depend on a host of country-specific factors.

A recent study by Steiner (2000) used the OECD regulatory indicators to assess the impact on electricity prices and industry efficiency of specific policy provisions aimed at introducing competition in electricity generation, based on a sample of 19 OECD countries over the 1986-96 period. Provisions included privatisation, liberalisation, vertical separation, third-party access to the grid, creation of an electricity pool and the degree of consumer choice of supplier. The results of the analysis, which controlled for differences in economic structure (*e.g.* urban density and consumer preferences) and generation technologies, are summarised in Table 4.

Table 4. Effects of ownership, regulation and industry structure on efficiency and prices in the electricity supply industry

Summary of results of panel regressions (1986-96)

Dependent variable	Price		Efficiency	
	Industrial price	Ratio of industrial to residential price	Rate of capacity utilisation	Deviation of reserve margin from optimum
Number of periods	11	11	11	11
Number of countries	19	19	19	19
Number of observations	209	209	209	209
Degree of unbundling of generation from transmission	n.s.	--	+	--
Degree of private ownership	+	+	+	n.s.
Extent of third-party access	n.s.	--	n.s.	n.s.
Existence of wholesale pool	--	--		
Time to liberalisation	+			

n.s. = not significant.

+ = significantly positive effect.

-- = significantly negative effect.

Source: Steiner (2000).

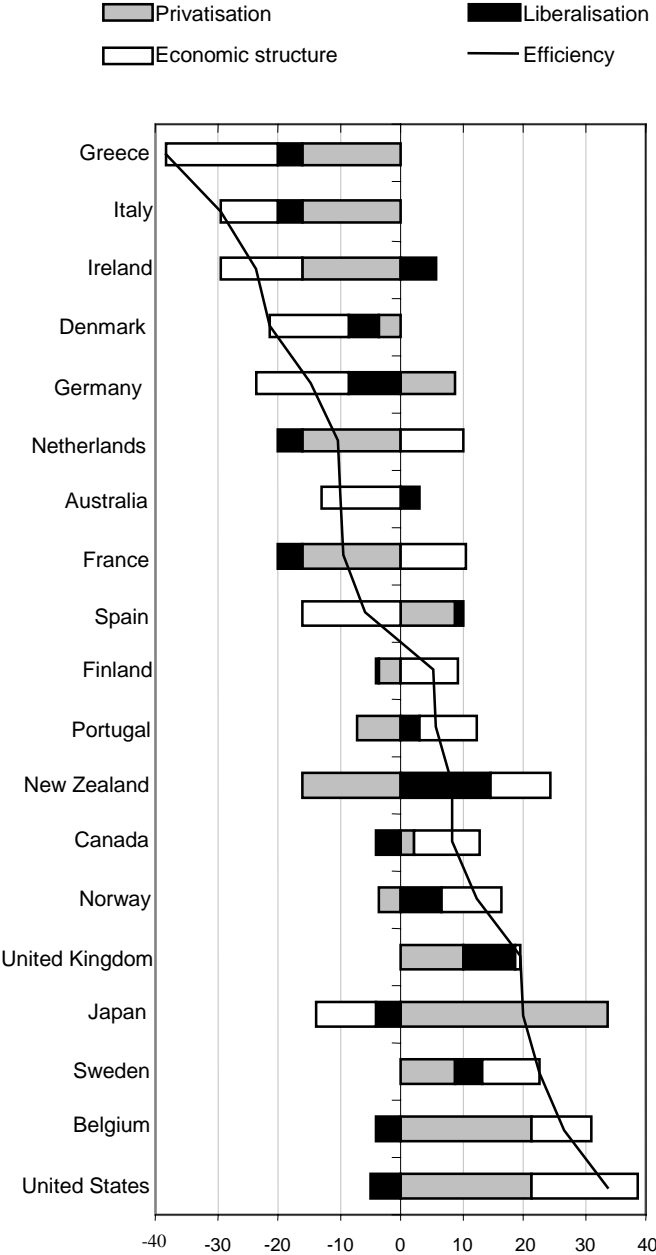
Steiner's cross-country analysis makes it possible to reach the following general conclusions as to the impact of regulatory reforms:

- Electricity prices (measured as the ratio of industrial to residential end-user tariffs) tend to fall when generation and transmission are unbundled, third party access to the grid is expanded and an electricity market is created.
- Productive efficiency of generation plants (measured by both the rate of capacity utilisation and reserve margins) tends to increase when ownership is private and generation and transmission are unbundled.
- Private ownership or imminent privatisation tend to increase industrial end-user prices.

Promoting competition in electricity supply through both structural and regulatory measures is crucial for harnessing the benefits of electricity reform. The cross-country evidence is consistent with the proposition that privatisation *per se* reduces x-inefficiencies but can hardly enhance welfare if it is not matched by effective market liberalisation.

Figure 8 shows some of the implications of these results for the comparative efficiency of electricity supply industries across the OECD area. Efficiency is measured by the rate of capacity utilisation. Contributions to efficiency are positive (negative) when liberalisation, privatisation or other effects (related to economic structure, technology and other country-specific unexplained factors) are broader (narrower) than the OECD average. The combined effects of privatisation and liberalisation are generally larger than other effects in explaining the relative efficiency of countries. Given the limited degree of liberalisation in OECD countries, privatisation often has the largest effect. However, in countries that have reformed their regulatory framework more extensively (*e.g.* the United Kingdom, New Zealand, Norway), the positive impact of liberalisation is apparent.

Figure 8. The contribution of ownership, regulation and industry structure to efficiency performance in the electricity supply industry¹



1. Efficiency is defined as the rate of capacity utilisation. Percentage deviations from OECD average. Source: Steiner (2000).

Fixed telephony

Liberalisation of entry into long-distance (trunk and international) telecommunications has already taken place in much of the OECD area. Most countries are now moving to make access to the local loop possible. Reconciling the competitive provision of fixed voice services with the persistence of strong market power over networks continues to be a difficult issue for regulators, but there has been more experience with telecommunications reform than with electricity supply and a broader consensus exists on the policies likely to lead to a competitive situation. Most countries regulate prices charged by the incumbent operator(s) for accessing the network or interconnecting it with other networks (taking into account both the incumbent's common costs and the need to encourage the entry of efficient service providers only); they also regulate tariffs charged to users in markets where market power persists (usually through variants of the price cap mechanism). However, the debate is still open on the best kind of interconnection pricing rule and the degree of network unbundling to be ensured by the incumbent.

While empirical research on detailed regulation issues (such as interconnection price regulation and unbundling options) and on the effects of opening up the local loop is still thin, evidence on the economic benefits of entry liberalisation and competitive developments in long-distance fixed telephony is more extensive. However, most is country-specific, generally for the United States.³⁶ The liberalisation of trunk and international services was generally found to create competitive pressures (in both trunk and local markets) that generated productivity gains and improved the allocative efficiency of previously regulated firms.³⁷

Few studies have looked at these effects from a cross-country perspective. Van Cuilenberg and Slaa (1995) found that the increase in competitive pressures implied by entry liberalisation had positive effects on an index of innovation in the OECD area. A recent study by Boylaud and Nicoletti (2000) used the OECD regulatory and market environment indicators to assess the effects of regulatory reform and changes in market structure on the efficiency, the quality and the prices of trunk and international telecommunications services in 23 OECD countries over the 1991-97 period. The analysis controlled for country-specific effects due to economic structure and technology, which were assumed to be unrelated to the regulatory and market environment over the sample period. The empirical results are summarised in Table 5.

The main conclusions from this cross-country analysis are the following:

- Anticipated entry liberalisation (measured as the time remaining to announced liberalisation) has a significant impact on the performance of trunk and international services, with increases in productivity, improvements in quality and lower prices.
- Competitive pressures following liberalisation (measured by the share of new entrants) further increase productivity and lower prices of both trunk and international services.
- The effects of ownership and privatisation *per se* are unclear.

Table 5. Effects of ownership, regulation and market structure on productivity and prices in the telecommunications industry

Dependent variable	Prices			Productivity			Quality		
	Int'l.	Trunk	Int'l., trunk and mobile	Int'l.	Trunk	Int'l., trunk and mobile	Int'l.	Trunk	Int'l. and trunk
Industry	Int'l. revenue/outgoing minutes	OECD tariff basket		Outgoing minutes/employee	Mainline per employee		Answer seizure ratio	Service reliability	
No. of periods	7	7	5.6	7	7	6.2	7	7	7
No. of countries	22	22	65	24	24	70	24	24	48
No. of observations	154	154	406	168	168	446	168	167	335
Market share of new entrants	--	n.s.	--	+	+	+	+	n.s.	n.s.
Time to liberalisation	--	--	--	+	+	q+	+	n.s.	n.s.
Degree of state ownership	+	--	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Time to privatisation	n.s.	n.s.	n.s.	n.s.	--	--	n.s.	n.s.	n.s.
Internationalisation of domestic market	+			--			n.s.	n.s.	n.s.

1. 1993-97 for pooled estimates.

n.s. = not significant.

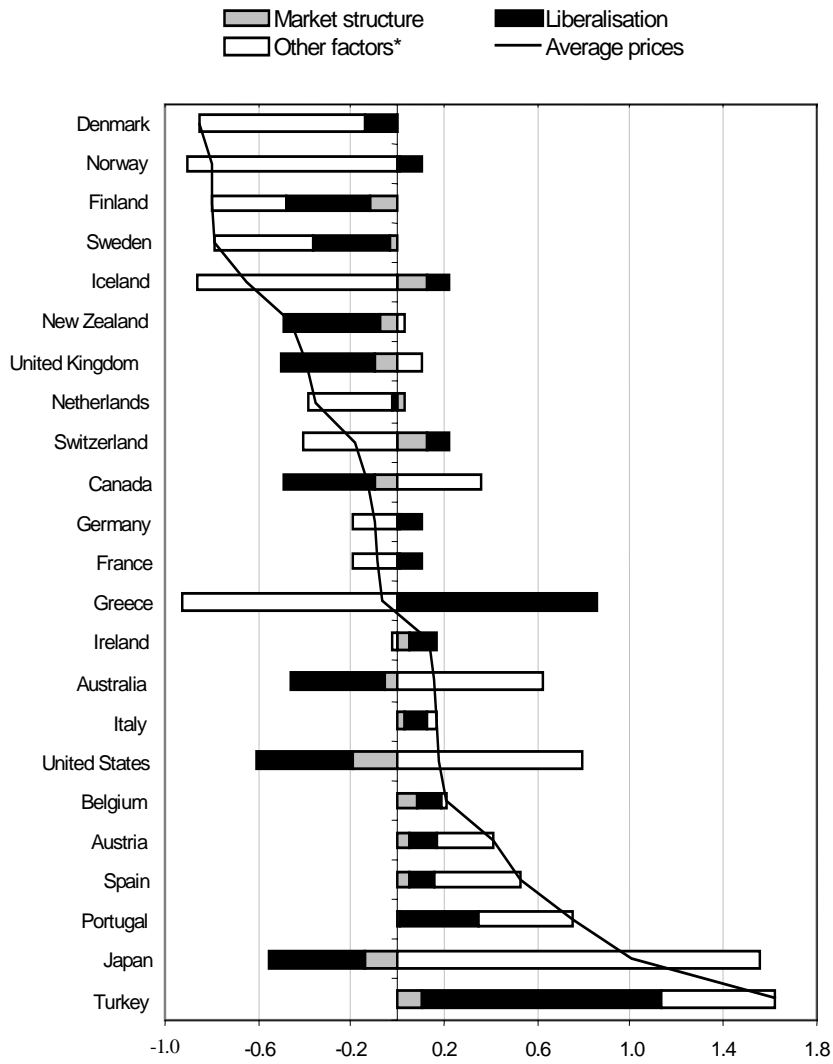
+ = significantly positive effect.

-- = significantly negative effect.

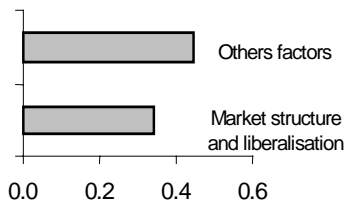
Source: Boylaud and Nicoletti (2000).

Thus, the mere perspective of liberalisation sets in motion adjustments that reduce inefficiencies and curb prices as incumbents prepare to meet future competition. While in mobile telephony these adjustments can be delayed until competitors actually enter the market, in fixed telephony they have to be anticipated because x-inefficiencies of incumbent operators are often large and unwinding the complex web of cross-subsidies established under the previous regulatory regime takes time. Actual competition reinforces these adjustments, so that productivity gains are translated into lower prices for consumers. Once changes in regulation and competition are accounted for, there is not much evidence that changes in ownership affect performance.³⁸ The effects of cross-country differences in regulatory and market environments on average telecommunications prices (including fixed and mobile communications) are illustrated in Figure 9. Deviations of prices from the OECD average are broken down into effects of policies that open up markets and effects linked to other country characteristics (including ownership, economic structure, technology, price rebalancing and other unexplained factors). In many countries (*e.g.* New Zealand, the United Kingdom, Canada, Finland, Sweden), liberalisation policies have contributed significantly to keeping prices relatively low and have sometimes offset countervailing effects (as in Canada, Australia and the United States). In other countries (*e.g.* Italy, Ireland, Belgium, Portugal, Turkey), restrictive environments explain most of the excess in prices higher than the OECD average.

Figure 9. The contribution of regulation and market structure to average telecommunications prices¹



Average contributions to price gap (absolute values)



1.Deviation from OECD average. Average of prices of fixed and mobile communications.

2. Includes the effect of ownership, economic structure, technology, price rebalancing and other unexplained country-specific effects.

Source: Boylaud and Nicoletti (2000).

Regulation, competition and investment in liberalised network industries

Among the areas least analysed empirically is the effect of regulatory reform on dynamic efficiency. In many industries, reforms have been made inevitable by technical progress: digital technology made it easier to fit several operators in a given frequency spectrum; technologies that bypass fixed networks made it possible to create competitive pressures in fixed telecommunications even ahead of liberalisation; new electricity generation technologies have substantially reduced economies of scale, making competitive entry possible in electricity supply; the Internet and e-commerce have the potential to undo entry barriers in distribution systems. What have been the feedback effects of reforms on investment in human and physical capital and technical progress? Everyday experience suggests that entry and price liberalisation in competitive service industries and in competitive segments of network industries often stimulates innovation and product diversification. This casual observation is corroborated by economic analyses describing the evolution of specific industries in individual countries, but systematic empirical studies of the linkages between regulatory reform, capital accumulation and innovation are lacking (see, however, Van Cuilenburg and Slaa, 1995).

This empirical lacuna is particularly serious in the analysis of network industries where regulation remains necessary, hence the risk that regulatory failure may affect the dynamic efficiency of the regulated industry. In these industries, empirical research has mainly addressed the differential effects on investment by the network operator of rate-of-return and price-cap regulation of retail prices in markets where the incumbent has market power. In telecommunications, price-cap mechanisms were generally found to lead to a better set of incentives and more efficient investment patterns.³⁹

Apart from alternative forms of retail price regulation, a number of other regulatory interventions can affect investment and innovation in network industries. A non-exhaustive list includes:

- *Open access to a vertically integrated network.* In some cases, competitive service provision in network industries is introduced by enforcing third-party access to the network (e.g. railways in the United States, telecommunications in the European Union, electricity supply in France). This regulatory approach may have consequences for investment and innovation, because it may not be in the interest of the owner of the vertically integrated firm to expand capacity or introduce the innovations needed to accommodate new entry, and the regulator may not be able to force the regulated firm to do so (OECD, 2000c).⁴⁰
- *Vertical separation of infrastructure and services.* By controlling the terms and conditions under which competitors in (upstream or downstream) liberalised markets gain access to the network, a vertically integrated firm has the incentive and the ability to restrict competition. Therefore, pro-competitive regulatory reform may require the unbundling of the competitive and non-competitive segments of a network industry. To the extent that innovations in service and infrastructure require co-ordinated planning (as may be the case in certain transport industries), vertical separation may reduce innovation incentives. In addition, several kinds and degrees of unbundling can be envisaged, and some may have consequences for investment and innovation.⁴¹ For instance, so-called “operational unbundling”, in which the vertically integrated firm retains ownership but hands over control of the network to an independent operator (e.g. a non-profit body),⁴² may weaken incentives for network maintenance, upgrading investment and innovation in response to customer demands. Dynamically efficient unbundling may require the independent operator to receive a share of the profits generated by the operation of the network or implementation of a more radical ownership separation (OECD, 2000c).
- *Network access/interconnection pricing.* The existence of common or fixed costs in network operation requires pricing rules that include a mark-up over marginal costs to allow the

network operator to recover total costs. Pricing rules can be cost-based, demand-based or efficient-entry rules. Cost-based approaches (e.g. long-run average incremental costs) generally apportion common or fixed costs in an arbitrary way, with no guarantee that the network operator has the incentives necessary to make efficient investments.⁴³ Demand-based approaches (e.g. Ramsey prices) aim to minimise static efficiency losses from setting prices above marginal costs, but may imply excessively high margins for certain products (which effectively cross-subsidise other products). This may lead to dynamic inefficiencies as competitors may be willing to bypass existing network by duplicating parts of it. Efficient-entry rules (such as Baumol's efficient component pricing rule) provide the network operator the appropriate investment incentives, in principle, but may imply static inefficiency as they cannot control for the incumbent's market power for the final product.

- *Institutional design.* Regulatory settings in network industries have several patterns: *i*) several sector-specific regulators, as in the United States (at federal level) and in most European countries; *ii*) an all-purpose regulator for all regulated industries, as in Australia and many US states; or *iii*) exclusive reliance on the application of the general competition law (so-called "light-handed" regulation), as in New Zealand. A possible drawback of multiple sectoral regulators is that regulatory inconsistency across industries can induce distortions in investment by regulated firms, especially when the activities concerned by inconsistent regulatory enforcement are substitutes (e.g. road, rail and air transport; electricity and gas; post, telecommunications and broadcasting) (Helm, 1994).
- *Regulatory risk.* When regulators have too much discretion, regulated firms may face increased "regulatory risk", with potentially adverse effects on investment by those firms and, hence, regulatory outcomes.⁴⁴ For instance, resetting price caps between review periods or disallowing capital investments from the rate base can be justified *ex post* on economic or distributive grounds. However, the perceived risk that such regulatory changes may take place can have undesired consequences for investment by regulated firms. Other sources of regulatory risk that may affect investment by regulated firms are uncertainties about future policies towards liberalisation;⁴⁵ changes in environmental policy or the possibility that the regulated firm will be subject to some kind of restructuring. To minimise regulatory risk and its undesired consequences on investment, the regulatory framework should be reasonably stable and predictable, and regulators should be credible. Reconciling the stability and credibility of regulation with the necessary flexibility and responsiveness to unexpected events is a policy challenge. Steps in this direction may be: *i*) to provide regulated firms with legal safeguards against excessive regulatory discretion (such as rules or appeal mechanisms protecting them against regulatory expropriation or guaranteeing fair rates of return on their investments);⁴⁶ and *ii*) to create rules that interiorise the policy reaction to a range of possible regulatory outcomes.⁴⁷

Regulatory choices would be made easier by better knowledge of the scope for these inefficiencies and the comparative advantages of different countervailing policies. However, empirical studies that analyse the evidence on the possible sources of regulation-induced distortions and the effectiveness of different regulatory options in preventing them are lacking. This is, therefore, a very useful area of research for policy making.

Conclusions

Services have traditionally been highly regulated in OECD economies. To varying extent depending on the service provided, regulation has typically addressed entry, output and/or price choices of firms, thereby restricting actual and potential competition. The range of service activities is

broad and heterogeneous; they include industries that are fully competitive and industries in which competitive and non-competitive markets coexist. Therefore, regulation has had a variety of motivations, some based on economic grounds, others of a more political nature. Owing to a variety of factors, including technological advances that have made the social costs of inappropriate regulation more evident, OECD governments have extensively reformed regulatory environments in both competitive and network service industries over the past two decades, generally bringing them closer to market mechanisms. However, initial regulatory conditions and the pace and extent of reform have differed. As a result, within each service industry the breadth of regulatory approaches is still wide and there is significant scope for further reform. Policy areas covered in this chapter for which advances would be possible in many countries as well as on a multilateral basis include:

- The simplification of administrative requirements for businesses, which are particularly burdensome for dynamic small and medium-sized service firms.
- The elimination of restrictive provisions concerning entry and/or investment in competitive service industries such as retail distribution and road freight, for instance the removal of provisions discriminating against certain categories of service providers or investors (large outlets, foreign firms).
- The opening up of international air travel routes to competition and the elimination of FDI restrictions for airline companies.
- The creation of conditions for competitive service provision of rail freight services.
- The promotion of competition in liberalised telecommunications services (*e.g.* through appropriate network interconnection and access policies) and, especially, the creation of conditions for opening up the local loop to competitive service providers (*e.g.* through appropriate unbundling requirements).
- The acceleration of reforms in the electricity supply industry, involving vertical separation of generation and transmission, extensive third-party access to the grid and unrestricted choice of suppliers for retail consumers.

The empirical evidence surveyed in this chapter, including OECD cross-country analyses, suggests that these reforms could contribute substantially to improved economic performance and living standards in the OECD area. In countries where competition-enhancing regulatory reform in service industries and electricity supply is more advanced:

- The share of services, employment rates and the catch-up in productivity growth have been higher.
- Distribution systems have been modernised.
- Rail and road freight transport have become less costly.
- Air transport networks have been modernised and made more efficient, and airfares for all categories of travellers have declined substantially.
- Telecommunications and electricity supply have become more efficient and cheaper, especially for industrial consumers.

In many industries, regulatory reform has been matched by technical progress, innovation and product diversification. Competitive pressures in liberalised markets have encouraged productivity-enhancing investment. However, to take full advantage of the reform process, policies in network

service industries should take account of the implications of regulatory settings for the incentives of regulated firms to invest and innovate:

- Structural interventions in these industries, such as vertical separation of infrastructure and services, should strike a balance between the need to encourage competition in their competitive segments and the need to encourage investment and innovation by the owner of the non-competitive component.
- The design of network access provisions should seek to prevent inefficient bypass while maintaining (or creating) sufficient and correct investment incentives for network operators.
- Institutional design and regulatory policies should avoid cross-sector inconsistencies in order to prevent potential distortions in the allocation of capital across industries that provide substitute products.
- The danger that investment in networks could be deterred as a result of regulatory risk should be minimised by establishing stable and credible regulatory settings and rules that are at the same time predictable and flexible enough to cope with unexpected events.

NOTES

1. This chapter draws on the results of the OECD Economics Department project on regulation and performance. Special thanks go to the other members of the team – Olivier Boylaud, Rauf Gonenc and Faye Steiner – as well as to Stefano Scarpetta, but any errors or omissions are the author’s responsibility. The opinions expressed in the chapter are those of the author and do not engage the OECD or its Member countries.
2. See Chapter 2 of the present volume for an overview of the recent evolution of service industries in the OECD area.
3. The OECD also collected data on labour market institutions and regulations (OECD, 1999*a*). The methodology described in this section has been applied to the subset of data contained in OECD (1999*b*) to construct indicators comparing employment protection legislations across countries (Nicoletti *et al.*, 1999).
4. International benchmarking has been conducted frequently by the European Commission to monitor and stimulate the process of European integration. The Australian government has also systematically benchmarked domestic regulation and performance in several areas and industries against policy practices and outcomes of commercial partners. See, for instance, Bureau of Industry Economics (1996) and Productivity Commission (1999).
5. An analysis of the cross-country patterns of regulation highlighted by the summary indicators, as well as details on sources and methodologies used for their construction, can be found in OECD (1999*c*), Nicoletti *et al.* (1999) and Gonenc *et al.* (2000).
6. The role of private interest motivations in explaining administrative burdens on business start-ups has been recently analysed empirically by Djankov *et al.* (2000).
7. For a discussion of how non-economic objectives can continue to be achieved in more competitive environments at minimum cost for society, see Gonenc *et al.* (2000).
8. See Gonenc *et al.* (2000) and the references therein for more information on the evolution and current status of market structures in the service and electricity supply industries of OECD countries.
9. For details on how these indicators were constructed, see Gonenc *et al.* (2000), Boylaud (2000) and Gonenc and Nicoletti (2000).
10. This ordering is purely illustrative, since data for the seven industries was not available for all countries and the criteria for classifying countries into the four categories of policy approaches were somewhat arbitrary, especially for borderline countries.
11. The cross-country standard deviations of the summary indicators of regulation in competitive industries range from 0.9 in road freight to 1.7 in mobile telephony, while they are around 2.5 in network industries.

12. Costs may be easier to allocate in electricity supply because the “product” is relatively homogeneous. Telephone networks deliver several different kinds of service (local, long-distance, mobile, data transmission, etc.). Therefore, in telecommunications, where information requirements are high, more incentive-based measures may be required to promote efficiency.
13. Examples of this kind of benchmarking are provided in Gonenc *et al.* (2000).
14. The country-specific reports included the effects of service deregulation in Germany (Lipschitz *et al.*, 1989), the Netherlands (Van Sinderen *et al.*, 1994) and Australia (Industry Commission, 1995). The EU study was performed by Emerson *et al.*, 1995.
15. The OECD study combines static input-output effects with a dynamic macro simulation framework.
16. The most significant correlation found by Bassanini *et al.* (2000) is between the indicator of administrative regulations and the catch-up in TFP growth.
17. These problems are reviewed in Bosworth and Triplett (2000).
18. The most economically relevant performance concept, distribution margins, is hard to estimate and depends on a host of local and country-specific factors (such as land-use regulations and real estate prices). Regulations on outlet start-ups and siting are often designed and implemented at the local level, making the information difficult to collect.
19. For instance, one estimate (Pellegrini, 2000) sets the real income gain to be obtained from liberalisation in Italy to over 1% of GDP.
20. For instance, the OECD International Regulation Database reports that in at least seven OECD countries professional associations representing incumbent firms have a say on decisions concerning entry at the local level.
21. A survey of this evidence can be found in Boylaud (2000).
22. Some estimates set the *ex post* real income gains to USD 16 billion (1990) in the United States (Winston, 1993) and the potential gains from reform up to USD 8 billion (1990) in Japan (Yamauchi, 1995).
23. The wish to protect the regulated rail industry has often been an explicit motivation for trucking regulations, especially in the United States. Indirect evidence on the role of incumbents and unions is provided by the fact that in 11 OECD countries professional road freight associations participate in regulatory decisions concerning pricing and licensing (OECD International Regulation Database), and by the existence of significant wage premiums in the regulated road freight industry, which declined significantly after liberalisation (Rose, 1987).
24. These comparisons are generally made on the basis of posted prices that do not reflect the large discounts made by mobile telephony companies, especially in competitive markets. Therefore, they are likely to undervalue price differentials among liberal and regulated countries.
25. The choice of technology may be related to the regulatory and market environment over even relatively short time spans. However, no attempt was made to endogenise technology in the empirical analysis.
26. The negative effect of time to privatisation on productivity levels may reflect a “reverse causality” relationship, whereby governments accelerate the privatisation of the less productive companies.

27. See Gonenc and Nicoletti (2000) for a survey of regulation, competition issues and empirical research in air passenger transportation.
28. See, for instance, Borenstein (1992).
29. See, for instance, Evans and Kessides (1993), Abramowitz and Brown (1993), Kim and Singal (1993), US Department of Transportation (1999) and Marin (1998).
30. Statistical analyses of the US transport industry, including “before/after” comparisons of various safety indicators as well as multivariate regressions, support this conclusion (see *e.g.* Oster *et al.*, 1992; Rose, 1992). It is difficult, however, to separate the effects of reforms from the impact of contemporaneous enhancements in safety regulations.
31. The persistence of bilateral agreements on extra-EU routes originating within the European Union prevents network rationalisation as extensive as that in the United States. Moreover, airport congestion and dominance are more widespread than in the United States.
32. For each country, the efficiency gap was estimated by Data Envelope Analysis (see Gonenc and Nicoletti, 2000).
33. For instance, most EU countries just met the implementation deadlines of the European Commission Electricity Directive to establish a single internal market for electricity in Europe.
34. For example, England and Wales unbundled its electricity supply industry (ESI), privatised generation, introduced transmission price caps and introduced a spot market in electricity under implementation of the Electricity Supply Act of 1990. New Zealand also unbundled its ESI and introduced a spot market with the Energy Act and Company Act of 1992. Norway unbundled its ESI, introduced unconstrained choice of supplier and extended its wholesale electricity pool to other Nordic countries with the Energy Act of 1990. Sweden reformed its ESI according to a similar pattern with a bill passed in 1996. Progress has been slow in some countries owing to the issue of remunerating “stranded costs”, that is, costs of investments undertaken under regulation, but no more profitable in a competitive environment.
35. Many authors have concentrated on the implications of US regulatory frameworks (*e.g.* Comnes *et al.*, 1996) or the UK experience with liberalisation (*e.g.* Newbery and Pollitt, 1997). Wolak and Patrick (1997) discuss markets in England and Wales, Norway, New Zealand and Victoria, Australia, including an empirical description of performance in each country.
36. Several studies looked at the effects of entry regulation in telecommunications markets, generally in the context of the regime change implied by the 1983 break-up of ATT. See, for instance, Ying and Shin (1993) and Oum and Zhang (1995) and, more recently, Gort and Sung (1999).
37. However, it was unclear whether the significant price reductions that followed liberalisation were the result of these pressures or of changes in price regulation that imposed a significant rebalancing of prices (see Taylor and Taylor, 1993).
38. In some cases, prospective privatisation appeared to be associated with relatively low productivity; at the same time, there is evidence that the presence of foreign operators in domestic markets is associated with relatively low productivity and relatively high prices. These results could be explained by an endogeneity problem: on the one hand, low productivity may make privatisation urgent and, on the other, foreign operators are attracted by situations in which there are margins for productivity gains and the possibility to gain market shares through price reductions (but since their role remained marginal over the sample period, these efficiency gains and price reductions do not show up at the industry level).

39. Studies of the effects of alternative forms of price regulation in telecommunications include Kridel *et al.* (1996) and Braeutigam and Panzar (1993).
40. Examples include an integrated electricity generation/transmission utility that limits the capacity of interconnections with foreign networks to limit competition from foreign generators; or a public telecommunications operator that refrains from investing in innovative technology that would make it easier for competitors to operate through its network (such as devices allowing users to choose without additional numbering burdens a default long-distance operator).
41. In electricity supply, vertical separation of the generation and transmission functions was found to lead to investment in generation capacity closer to optimal levels (Steiner, 2000).
42. This approach has been adopted in the US electricity supply industry.
43. A special case concerns airport landing and take-off charges, which are often cost-based. By failing to signal the value of additional airport capacity to airport operators, cost-based rules prevent the adjustment of airport capacity to its optimal level.
44. This is the under-investment that occurs in the classic hold-up problem arising from firm-specific or relationship-specific investment (Hart and Moore, 1988).
45. If a firm believes there is a chance that there will be free and effective entry at some point in the future, this can remove the incentive for the firm to engage in sunk investments since it may not be able to recover the costs of these investments once the market is liberalised (Armstrong *et al.*, 1994).
46. At the same time, these legal requirements may not provide sufficient incentives for firms to reduce their costs and can lead to x-inefficiency in the use of capital.
47. For instance, *ex ante* provisions for profit sharing between price-capped firms and customers (such as those used in the United States for access charges to local telephone networks) may sometimes help to reduce political pressures to rescind the price cap system in the event of unexpectedly high rates of return (Baron, 1995).

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Chapter 5

INNOVATION IN SERVICES AND THE KNOWLEDGE ECONOMY THE INTERFACE BETWEEN POLICY MAKERS AND ENTERPRISES: A BUSINESS PERSPECTIVE

by

Tom Martin
Director, Irish Coalition of Service Industries

Introduction

This chapter discusses the interface between policy makers and enterprises in relation to innovation and the knowledge economy from the perspective of a coalition of services industries in Ireland.

An overview of the Irish economy is provided and particular focus is placed on identifying the major reasons for the recent trends that have earned Ireland the sobriquet, the “Celtic Tiger”.

First, it gives a short description of industrial development policy in Ireland and highlights the lack of attention to services by successive governments. It also reviews the discrimination faced by services in the past and still to some extent today. A number of challenges facing the services sector in Ireland are itemised and there is a short profile of the Irish Coalition of Service Industries (ICSI).

The following section addresses the main theme of the chapter, the interaction between policy makers and services businesses in Ireland. A number of major issues relating to the interface between the two are identified, including the lack of statistical data on services and the extent to which responsibility for the development of services is dispersed among several government ministries.

A number of recommendations for improving the interface between policy makers and enterprises with respect to innovation are next provided, and the final section presents a new strategy to develop Ireland’s internationally traded services sector.

The Celtic Tiger

Ireland is one of the fastest growing economies in Europe and has averaged over 9% growth in GDP for the last four years. Some commentators would say that Ireland is only playing catch-up with the rest of Europe and its growth looks too dramatic because it started from a small base.

Growth during the early part of the 1990s was sluggish but began to pick up around 1994; since then, year-on-year growth has not dipped below 7%. As Table 1 shows, real growth in GDP has exceeded that of the European Union as a whole spectacularly over the period 1990-2000.

Table 1. Real growth in GDP for Ireland and the European Union, 1999-2000

Year	Ireland	EU
1990	7.6	2.9
1991	1.9	1.7
1992	3.3	1.2
1993	2.6	-0.4
1994	5.8	2.8
1995	9.5	2.4
1996	7.7	1.6
1997	10.7	2.5
1998	8.9	2.6
1999	8.3	2.4
2000*	7.5	3.4

* Forecast.

Source: Eurostat.

The expectations are that the economy will grow by approximately 7% in 2000, but the rate of growth may fall slightly in 2001.

The impact of growth on employment has been dramatic. As Table 2 shows, there has been a significant drop in the unemployment rate to such an extent that Ireland is presently experiencing a chronic labour shortage.

Table 2. Irish unemployment rate, 1990-99

Percentage

Year	Percentage of unemployment
1990	13.3
1991	14.7
1992	15.2
1993	15.5
1994	14.1
1995	12.1
1996	11.5
1997	9.8
1998	7.4
1999	5.6

Source: Central Statistics Office.

The reversal in Ireland’s economic position from the “sick man” of Europe in the 1980s to the “Celtic Tiger” of the 1990s has astonished economic commentators. The factors which are considered to have helped to bring about this transformation include:

- Significant increases in labour productivity.
- A steady acceleration in the working-age population resulting from Ireland’s baby boom in the 1970s and a reversal of the traditional net emigration.
- The increase in women’s participation in the labour market.
- A large pool of unemployed from which the expanding business sector could draw labour.
- An improvement in the average quality of labour arising from improved secondary and third-level education.
- Benefits arising from Ireland’s membership in the EU and its increasing integration with Europe.
- High rates of inflows of foreign direct investment (FDI), particularly from the United States.
- Prudent fiscal policies developed and implemented by the government in conjunction with the social partners.
- A consensus among the social partners that moderate national wage agreements were necessary to sustain economic progress.

One of the main contributors to Ireland’s economic transformation has been the significant inflows of FDI. In 1997, Ireland ranked fifth in the world as a destination for US direct investment outflows. Ireland, with its long-standing favourable tax regime, has consistently sought to attract a small number of dynamic sectors with spin-off potential (pharmaceuticals, computers, electronics, software, etc.). The country’s attraction to foreign investors has also been based on a well-educated and trained English-speaking workforce. Ireland has also benefited from its exploitation of “first-mover advantages”; once it attracts a major company to Ireland, it becomes easier to attract its competitors.

Paradoxically, while services account for nearly 58% of GDP, it was the manufacturing sector that recorded the largest percentage growth in terms of contribution to GDP during the 1990s (Table 3). Manufacturing’s share of GDP rose from 35% in 1990 to just under 39% in 1999. The contribution of services to GDP increased slightly during the decade from 56% in 1990 to 57.4% in 1999. At face value it would seem that the manufacturing sector played a key role in the growth in the economy. It should be noted that the GDP figures for manufacturing include the construction sector which ICSI would consider a service activity.

Table 3. Contribution to GDP by sector, 1990-99

Sector	1990	1995	1999
Agriculture	9.2	7.7	4.2
Manufacturing	34.8	37.5	38.4
Services	56.0	54.8	57.4

Source: Central Statistics Office.

Services have, however, played a major role in the Celtic Tiger particularly with respect to the growth in employment. During the period 1989-98, employment in services grew by 44.7% and within services the number of jobs in internationally traded services increased by a spectacular 381%, again

from a small base. Manufacturing employment was lower at 23.8% and employment in agriculture during the same period fell by a fifth (Table 4).

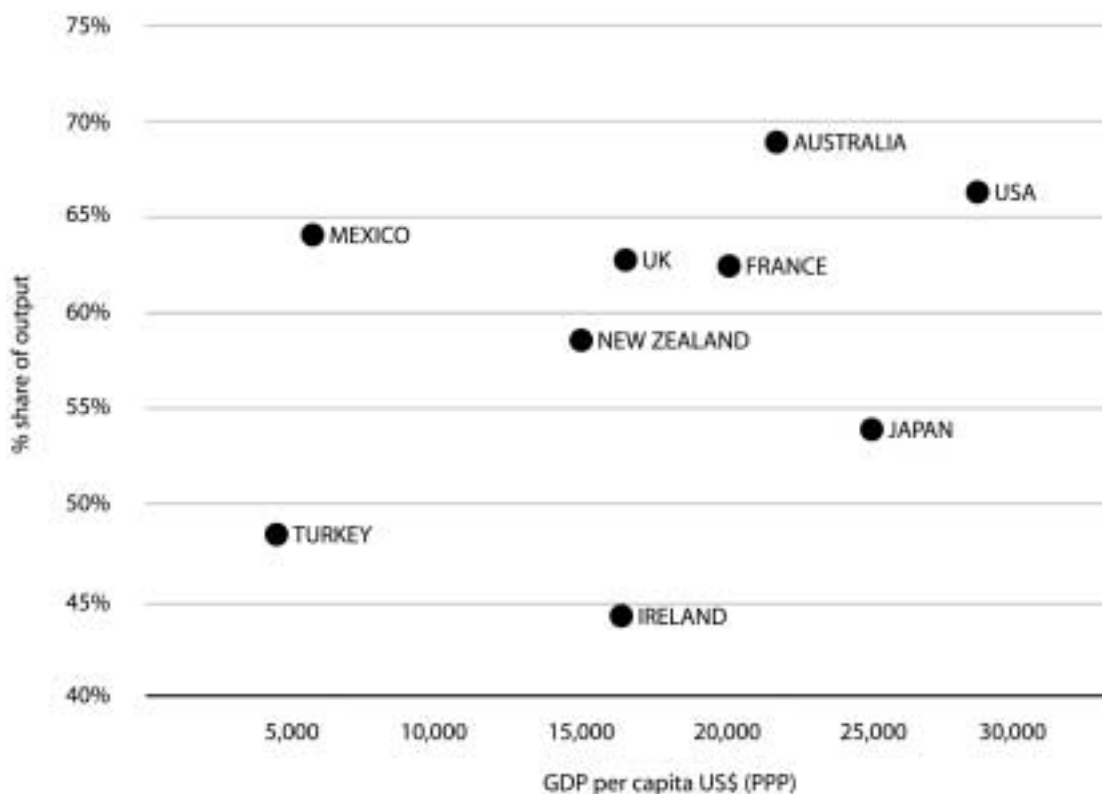
Nevertheless, in Ireland, the share in GDP of services is low by international standards. In 1996, non-governmental services were estimated by the OECD to contribute 45% to GDP. This is lower than the expected contribution to output, measured by GDP per capita, compared to Australia or New Zealand (see Figure 1).

Table 4. Percentage change in employment by sector, 1989-98

Sector	% change, 1989-98
Agriculture	-20.0
Manufacturing	+23.8
Services	+44.7

Source: Central Statistics Office.

Figure 1. The share of non-government services in national output, 1996



Source: OECD, Economic Survey, May 1999.

The services sector in Ireland

Overview

It is hard to credit, but the first comprehensive review of policy for Ireland's services sector only took place seven years ago. Its opening statement was stark:

“Ironically, given the large share of jobs for which it accounts, the services sector has until recently attracted little attention in policies for job creation and job maintenance compared to that given to the manufacturing and agricultural sectors.”

Report of the Task Force on Jobs in Services, 1993

Since then, there has been a belated recognition not only of the value of services to employment creation but also their role as an engine of economic growth in their own right and in enhancing national competitiveness.

Historically, economic development policies since the 1960s have focused on the manufacturing sector as a means of creating much needed employment. In particular, they have been directed at attracting overseas companies – predominantly US multinationals – to locate manufacturing facilities in Ireland and at developing indigenous manufacturing companies.

The policies aimed at FDI have been extraordinarily successful, with the result that Ireland has been, and continues to be, one of the top locations for US investment in Europe.

The incentives which the Irish government has used to attract foreign investment include a generous suite of capital and employment grants, though the main attraction has been, and continues to be, an effective tax rate of 10% on corporate profits.

The result is Ireland's well-documented dual industrial sector: on the one hand, a modern, foreign-owned, large-scale, high-technology sector and, on the other, a more traditional, low-tech, small-scale indigenous sector.

All manufacturing companies, both domestic and foreign, were, however, entitled to an effective 10% tax rate on profits. Effective, because although the profits of manufacturing companies were nominally taxed at the standard tax rate, they were allowed what was termed “manufacturing relief”, which resulted in a real, or effective, rate of 10%. Services companies, on the other hand, were taxed during the 1970s at the standard rate of 50%.

The situation changed slightly in 1981 when the 10% corporate tax rate was extended to include certain internationally traded services such as software, data processing and technical consultancy. However, a company had to export almost 100% of sales to qualify for the reduced tax rate. Throughout the 1980s, the government gradually reduced the standard corporate tax rate to 43%. Canada is the only other OECD country whose tax code distinguishes between manufacturing and services companies.

The different tax treatment of the services and manufacturing sectors is perhaps the most obvious example of a policy bias towards manufacturing. The intent of the policy was not to discriminate against services but to provide an incentive to manufacturing. Commentators believe, however, that the effect may have been to limit the size of the services sector and, indirectly, inhibit its employment performance.

The government came under pressure from Ireland's partners in the European Union who were concerned about the generosity of Ireland's aid package, which they saw as unfair competition in the market for overseas investment and which technically breached the EU's rule that all companies should be taxed equally. The Irish government responded by announcing a 12.5% corporate tax rate that will apply to both manufacturing and services companies. The new rate will take effect in 2003, although companies in the important International Financial Services Centre in Dublin will remain at the 10% rate for a further two years. In the meantime, in anticipation of the new rate, there has been a gradual reduction in the rate of corporate tax paid by services companies.

Taxes on corporate profits were not the only area where services and manufacturing were treated differently. At the beginning of the 1990s, most state aid was aimed at the manufacturing sector, although, as mentioned above, a limited number of internationally traded services firms were eligible for support from state agencies. While government policy at the time clearly favoured the manufacturing sector, many of the grants available, *e.g.* capital grants, were not, in any case, appropriate to the services sector.

Provision of training programmes by the main national training agency, FAS, is another area where services companies have faced relative discrimination. A government-sponsored report showed that, during the first half of the 1990s, there was an imbalance in the provision of FAS training, with a number of programmes not available to services sector companies.

The imbalance with respect to services in government enterprise development policies is changing, but there is still a long way to go. Three years ago, the government, in its first services policy document, acknowledged its past failures regarding the sector and declared its intention to extend the range of state support to services firms. At a basic level, all services companies with growth potential would be entitled to advice and information, and internationally traded services firms with growth potential would continue to be eligible for the full range of "hard" as well as "soft" state support, such as the provision of information and advice.

Despite the wide range of national and enterprise development strategy documents published in the last seven years that have stressed the potential of services to generate wealth and employment, remnants of the old manufacturing development mindset remain. Services companies still face discrimination, for example, when selling to the government sector, as they must pay withholding tax on sales of services to the public sector, *i.e.* a deduction equal to the standard tax rate of 24% is made from payments on all services contracts. Companies can offset the tax withheld against their tax bill for the year, but there is obviously a detrimental impact on cash flow. This withholding tax does not apply to manufacturing companies selling to the public sector.

The services sector in Ireland faces a number of challenges:

- Productivity in services is low compared to manufacturing.
- Only 3% of services firms actively export.
- The growth of the economy is attracting foreign services providers to services markets that were previously sheltered from foreign competition. Given the buoyancy of domestic demand, this is not currently a significant problem; it may, however, become an issue if the economy slackens. Research undertaken by ICSI on awareness of the General Agreement on Trade in Services (GATS) suggests that services companies that previously had both a domestic and export market focus are now devoting all of their attention to the domestic market and are even having difficulties in meeting present sales commitments.
- The tight labour market is posing considerable difficulties for services firms, which tend to be more labour-intensive than their manufacturing counterparts; companies in the

construction-related sector are seeking to recruit employees from a wide range of countries, notably South Africa and those of Eastern Europe.

- Services-related inflation is rising faster than the overall inflation rate and this is posing a threat to the competitiveness of Irish services and manufacturing exports. Despite recent economic growth, Irish inflation rates had until recently remained relatively low. The rise in services-related inflation has been attributed to the non-traded and labour-intensive nature of most services.

These issues suggest that an increased focus on innovation policies should be a foremost priority among services sector policy makers and representative organisations.

The Irish Coalition of Service Industries

The 1993 report referred to above identified the need for a co-ordinating organisation for Ireland's services sector. It highlighted the sector's need to represent its interests to policy makers in Ireland and in the European Community, now the European Union.

ICSI was established in 1995 to fill that co-ordinating role and provide the appropriate forum to:

- Gain greater recognition within Ireland of the contribution of services industries and to improve the image of those industries.
- Ensure that services obtain equal treatment with other sectors (manufacturing and agriculture) by the national government and the European Union.
- Improve the legislative framework in which the services sector operates.
- Develop an information exchange to remove barriers to trade in services.

Its membership consists of trade associations representing services firms and it is, therefore, a confederation of trade associations. The sectors represented by ICSI member organisations include construction, professional services, transport-related services and exporters of services. (For details on ICSI, see Annex 1).

Interactions between policy makers and businesses

This section addresses issues relating to the interface between policy makers and businesses, particularly in the context of encouraging innovation and related policies that help to develop the services sector. Since its establishment in 1995, ICSI has been pressing for equality of treatment for the services sector with manufacturing and agriculture. ICSI interacts with policy makers at various levels and in different ways. There appears to be some way to go before there is a coherent national policy towards innovation in services. A number of issues and constraints need to be tackled before it is possible to unleash fully the potential of services to create wealth and employment.

Services sector statistics

One of the many difficulties faced by policy makers when dealing with the services sector is the lack of statistical data. While this is true of many OECD Member countries, it is particularly true of Ireland. Given the predominance of agriculture and manufacturing in Irish economic policy, it has

taken – and will continue to take – some time for data collection in Ireland to catch up with the new view of services as the driver of economic development.

The first and latest census of services businesses in Ireland was carried out in 1988. While there have been improvements in the availability of statistics on the sector, the situation is still somewhat short of ideal. In some sectors, census data are updated on an annual basis while in others they are updated in rotation over a three-year period. Moreover, there are significantly fewer data on services than on the agricultural and manufacturing sectors.

It is recognised that the services sector poses considerable difficulties for statistical collection agencies. Problems can arise for measuring the output of services firms; for example, is the output of a bank its deposits, its loan book or some other measure? In addition, the ever-changing nature of the services sector makes consistent categorisation over time a problem.

One suspects that the difficulties with services sector statistics – their lack of availability, of timeliness and of detail – must make policy makers regret the days when they only had to deal with the manufacturing sector.

How can one construct policies for a sector where the information is three years out of date? How can one even conceive policies for a sector such as e-banking which is only in its infancy?

The lack of data on services is equally a problem for ICSI and other services sector trade organisations: how can they argue for equality of treatment for services when the data on which to base their case are out of date or do not exist?

Fragmented government structure

Responsibility for services is dispersed throughout government, and this makes it difficult to formulate a national innovation policy for services and for those organisations such as ICSI which must interact with it.

The main economic ministry in Ireland, the Department of Enterprise, Trade and Employment, has responsibility for a wide range of locally and internationally traded services. However, another ministry is responsible for tourism, another is responsible for arts and culture and yet another is responsible for construction. Responsibility for a wide range of energy-, transport- and communication-related services lies with yet another ministry.

This situation has a number of implications for the development and implementation of innovation policies for services. First, it reduces the likelihood of a national system of innovation for services being created, given the need to co-ordinate the approaches of multiple ministries and their associated agencies. Second, the development of linkages between sectors which can provide the stimulus for innovation in services is likely to be sub-optimal when policy formulation is spread among a number of government departments. Third, there is the issue of time and resource constraints on services sector representative bodies that must deal with multiple government ministries.

Government ministries often have both a development and a regulatory role; while in some ministries the development role appears to be foremost, in others the opposite is the case. In the latter case, the ministries may not give high priority to the development of innovation policies for the services sectors for which they have responsibility.

The industrial development policy legacy

Previous sections have outlined past government policies which clearly favoured the manufacturing sector from the viewpoint of fiscal and state support. Today, policy makers are recognising the potential of services for creating wealth and jobs. However, the industrial development infrastructure and old habits of mind are slow to embrace the new reality. A government report had to remind state agencies to give services higher priority in terms of allocation of resources.

The old mindset is still occasionally glimpsed; for example, in response to ICSI's request for improved data on services, it was asked, "Why do we need more information on pizza parlours and hair-dressing salons?" The legacy of the past is also reflected in the terminology associated with innovation policies; policy makers talk of industrial R&D, a term which is alien to services companies. Little mention is made of project teams, which are often the mechanism used in services companies to drive innovation.

Earlier policies for agriculture and manufacturing have resulted in the development of what might be termed an innovation support infrastructure consisting of state research institutes and training/education bodies. With a few exceptions, services lack this support infrastructure, though the need for it is urgent and immediate.

Not all services are small businesses

Equating the needs of services with the needs of small businesses is a view often encountered by ICSI when dealing with policy makers. While it is true that 85% of services companies are small businesses, the requirements for services sector development policies are fundamentally different from those of small businesses in general. The difficulty is that, after a period of time, the small business support paradigm tends to revert to one that reflects the needs of manufacturing companies and the traditional industrial development mindset makes an unwelcome return. ICSI contends that approaches for small manufacturing businesses are not applicable to policies aimed at developing services. Innovation policies for the manufacturing sector tend, for example, to refer to R&D departments, whereas much of the innovation activity in services companies is team or task-based.

As an organisation, ICSI has participated in the Small Business and Services Forum set up by the government to oversee the implementation of policies friendly to small businesses and has argued, unsuccessfully, for the establishment of a similar forum specifically for services. The implication is that the services sector is a residual sector to be included with small businesses for administrative tidiness.

Encouraging innovation in the Irish services sector

This section sets out a number of recommendations for improving the interface between services sector policy makers and businesses, with regard to development policies in general and innovation policies in particular.

A minister for services

Ireland has a minister for agriculture, food and rural development who oversees a sector which contributes less than 5% to GDP. Is it not time for a minister for services to sit in the Cabinet to articulate policies for a sector which represents almost 60% of GDP and employs more than two-thirds of the total work force? If nothing else, the position might serve to remind policy makers of the huge

importance of services in modern economies. It might also bring home to policy makers that services are more than personal services, such as the pizza parlours and hair-dressing salons that some public servants are so fond of mentioning. The services sector does indeed have pizza parlours and hair-dressing salons but it also has the software, multimedia and e-banking enterprises which the Irish government has been working hard to promote.

Additionally, a minister for services might concentrate the minds of state agencies responsible for enterprise development on the importance of equal treatment, in terms of staff and resources, of the services sector and traditional sectors.

More importantly, a single ministry for services might help to create linkages/synergy between sectors that the present structure cannot accommodate. The development of policies for services would have greater coherence and complementarity. One positive outcome might be the interaction of sectors which traditionally might not be associated with each other. A dedicated ministry for services would greatly facilitate the interaction between policy makers and services businesses in developing and implementing innovation policies.

Interactions between key players and informants

It may be impractical to have a single ministry in charge of services, as it would virtually include every existing ministry with the exception of those concerned with agriculture and manufacturing. Ways of facilitating cross-services sector initiatives should be adopted through foresight groupings, task forces, forums, select committees, etc. The intention should be, first, to bring together the key actors and informants so that coherent policies, grounded in the needs of businesses and matched with the resources of the state, can be formulated and, second, to encourage linkages and synergy between sectors.

As an example, the recent technology foresight project undertaken in Ireland has identified biotechnology and information and communication technologies (ICT) as the main focus for future investment. These findings are welcome, as both of these sectors have a strong services component. Moreover, the fact of bringing together policy makers, businesses and academics in the foresight projects is, in and of itself, of great value. The technology foresight process can lead to important benefits for participants in terms of exchanging information, learning the terminology and seeing the “bigger picture”.

More and better statistical data

Development policies for services are only as good as the data they are based on. There is an urgent need for statistical agencies, not just in Ireland but throughout the EU and the OECD area, to improve the collection of data on services. It is not good enough that the last census of services was carried out in Ireland twelve years ago.

There needs to be a substantial shift in resources so that more meaningful and detailed data can be collected on the services sector. Improvements are needed in the frequency and depth of the data collected. Private sector organisations play a very small role in data collection with on the services sector. While they presently only collect the views of services firms on sales trends, there is potential for greater private sector involvement.

A national approach to innovation

Ireland has only recently awakened to the potential of services. The first major review of services sector policies only took place seven short years ago. The difficulties noted by the authors of that report – lack of statistical data and fiscal discrimination against services companies – have not gone away, although in the latter case a more equal future is in sight.

As a nation, Ireland has begun to appreciate the employment potential of services, as evidenced in recent enterprise development policy documents, and, in response, a number of policy initiatives have been developed (see below). However, it would appear that the government has sought to target certain sectors – tourism, cultural services, software and ICT-based services – for development and broad support. The emphasis has been on developing policies for these sectors and on creating linkages between companies within those sectors.

Nonetheless, the Irish government tends to give less attention to encouraging innovation in services than it does to sectors such as agribusiness and manufacturing. In short, the government needs to lay down appropriate systems and structures to support the innovative process across a range of services sectors. By picking certain sectors with perceived growth potential, there is a tendency to overlook the need for development and innovation policies in sectors such as energy, transport and public services. A more coherent national approach to services innovation is needed, and appropriate research/training structures, like those that have successfully been developed in agribusiness for example, are needed for services.

New policy initiatives for knowledge-intensive services businesses

An informed perspective on Irish policies with regard to services would suggest that Ireland is playing “catch-up” with the rest of the OECD area. Government policy makers and agencies are beginning to develop policies specifically for services and, in particular, internationally traded services.

Enterprise Ireland, the main state agency for the development of indigenous companies, has recently launched a new policy document, “Opportunities for Ireland’s High-technology Internationally Traded Services Sector to 2007” (ITS 2007). The strategy document was based on a major review of the services sector by PricewaterhouseCoopers. The two core objectives of the strategy are:

- The development of internationally traded services businesses in the regions.
- The development of sectors that present the best opportunities.

A key element of the ITS 2007 strategy is the development of a series of regional infrastructural initiatives or technology hubs known as “Web-works”. Their main objective is to generate a critical mass of high-potential start-ups in the regions, particularly high-performance companies in R&D and exports. Each Web-works will concentrate on one technology, broadly defined, and will house companies in one of the four target sectors: informatics, e-business, digital media and health sciences.

Each facility will have high-bandwidth telecommunication capacity and will provide flexible office accommodation to suit the needs of start-ups. A key element of the Web-works concept is to facilitate networking among companies that can lead to mutual learning and sharing.

It is anticipated that some Web-works could evolve in response to existing local clusters of knowledge-intensive companies, while others would develop strong links with third-level colleges to facilitate the spin-off of high-technology campus companies.

Dublin is not forgotten. It will be the location of a digital media district which has been enhanced by the decision of the MIT Media Lab to set up a facility in the capital. The district will provide access to state-of-the-art digital production and post-production facilities. Additionally, incubation and business services centres will be established. Underpinning the digital media district will be a high-speed telecommunications infrastructure to support digital music, cinema delivery and webcasting. The digital media district will seek to build on Ireland's strengths in traditional content creation by linking these with new media/information technology expertise.

The ITS 2007 strategy document also places considerable emphasis on technology transfer and the exploitation of technology generated by third-level institutions. New state-funded technology infrastructure will be developed to focus on commercial exploitation of technologies in the software, informatics, e-business and digital media sectors. Detailed plans for the implementation of the ITS 2007 programme were to be announced by Enterprise Ireland by the end of 2000.

Although the ITS 2007 strategy has not been discussed by ICSI, it is worth making a number of comments:

- It represents one of the largest commitments of resources ever made by government to the services sector.
- The commitment to the development of services enterprises in regions outside of Dublin is welcome.
- The strategy seeks to develop linkages between traditional and new technology sectors *e.g.* the digital media district, and this is to be welcomed.
- The emphasis placed on networking to encourage mutual learning and sharing among companies appears appropriate.

Issues that might nonetheless be raised in relation to the ITS 2007 document are:

- Will there be similar strategies for other services sectors?
- How will linkages to sectors not within the remit of Enterprise Ireland be developed and facilitated?
- What specifically will the strategy do to assist the innovation process?

While the ITS 2007 strategy is a step in the right direction, questions such as these suggest that Ireland has still some way to go before it has a fully functional national innovation strategy for services.

Summary

This chapter has traced the origins of the "Celtic Tiger" and has examined some of the reason underlying Ireland's recent rapid growth. An overview of enterprise development policies in Ireland over the last two decades brings out the policy bias against services, particularly with respect to tax policies. Some issues relating to the interface between policy makers and enterprises are examined from a private sector perspective and a number of suggestions are advanced for improving the development of innovation policies for services. Finally, the chapter provides a synopsis of a new initiative to develop Ireland's high-technology, internationally traded services sector.

ANNEX 1. IRISH COALITION OF SERVICE INDUSTRIES (ICSI)

The activities of ICSI include:

- Making representations to government and public sector agencies on issues of concern to services companies.
- Developing policy papers for consideration by policy makers and parliamentary committees.
- Serving on government committees.
- Carrying out projects such as Services 2000, to alert services companies in Ireland to the General Agreement on Trade in Services. The results are posted on ICSI's Web site: <http://www.icsi.ie>.

The work undertaken by ICSI is the responsibility of a board of directors drawn from member organisations.

In terms of its membership, ICSI differs from sister organisations around the world in that its membership is made up of trade associations which represent services firms. The membership of the US Coalition of Services Industries, on the other hand, consists of large corporations, principally from the financial services sector. The very active Hong Kong Coalition of Services Industries is part of, and draws its membership from, the Hong Kong Chamber of Commerce. ICSI's closest counterpart organisation in the United Kingdom is the British Invisibles which focuses almost exclusively on the marketing of one sector, the financial services in the City of London.

ICSI has been working to develop links with similar organisations around the world and was a founding member of the Global Services Network. The GSN is an informal forum led by the private sector which brings together the global services community of business people, government officials, academics and others who are committed to increased trade and investment in services and to a rules-based, multilateral trading system. GSN members are dedicated to building global support for liberalisation of international services trade through multilateral negotiations under the auspices of the World Trade Organisation.

ICSI also has links with the European Services Forum, the European version of the GSN and with the World Services Congress, both of which seek to further liberalise trade in services.

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Chapter 6

KNOWLEDGE AND COMPETITIVENESS OF EU BUSINESS SERVICES: SETTING UP THE ANALYTICAL FRAMEWORK

by

Gérald Petit¹

Directorate-General for Enterprise, European Commission

Summary

Business services – among which is the class of “strategic” business services – have grown rapidly in OECD countries and have generated strong employment in the recent past. This chapter gives an overview of how Council mandates for improving the potential of EU-based services, and particularly business services, have been made operational in the Directorate-General (DG) for Enterprise of the European Commission. Starting with background information to policy actions, it briefly recalls conceptual issues in order to set the frame for business services. Salient aspects of the subsequent work programme of the DG are then developed and illustrated by two issues pertaining to the development of a better analytical framework for policy making. This leads to concluding remarks from the perspective of knowledge as a prime source of wealth creation.

Introduction and background to EU policy actions for business services

Business services have grown rapidly in OECD countries and have generated strong employment in the recent past. With positive spillover effects on firms across the whole economy, “strategic” business services (information processing services, R&D and technical services, human resource development services, etc.) have been prime movers of these developments. Their key characteristic is the delivery of tailor-made solutions based on the management of highly specialised knowledge throughout the value-added chain (see, for example, OECD, 1999a; OECD, 1999b).

In a working document presented to the Industry Council (Commission Services on Industrial Competitiveness and Business Services, 1998, p. 7), the Commission recalled that business services are a major component of overall economic performance: “their key importance lies in the dynamic links and contribution to the competitiveness of European enterprises, both in manufacturing industry and other Services sectors outside Business Services”. Among the heterogeneous group of business services, the same document (p. 11) also distinguishes those sectors of “strategic” importance.

A follow-up Communication of the Commission to the Council (European Commission, 1998) identified a number of subsequent challenges for enhancing the competitiveness of EU business services and their potential to create employment. The corresponding key messages of the

Communication were endorsed by the Council (1998), which delivered the following measures as operational conclusions:

- Improve the statistical regulatory framework at both Community and national levels in order to remedy the major shortcomings in existing statistics on business services.²
- Collect data and analyse the links between qualifications, skills, labour conditions and human capital productivity in order to understand how employment in the business services sector is created, how this affects job creation in other sectors of the economy, and to identify future needs.
- Ensure the systematic data collection, monitoring and carrying out of analyses on services adding value to industry by establishing a network of existing parties without adding administrative burdens.
- Undertake a review of barriers to entry to the Single Market with a view to their removal.
- Promote the creation of co-operation networks between business services suppliers.
- Endeavour to secure the opening of third-country markets in the context of the GATS 2000 round of negotiations.

In addition, the Presidency conclusions of the Lisbon European Council (2000) extended several of these considerations to all EU services, stressing in particular the issues of skills gaps, barriers to trade in services and the liberalisation of infrastructure utilities (see in particular §§4 and 17).

This chapter next recalls conceptual issues briefly to set the frame and give an overview of how Council mandates for services, particularly business services, have been made operational in the Directorate-General for Enterprise of the European Commission. As an illustration, the current state of play on two issues, both pertaining to the development of a better analytical framework for policy making, is then described: assessing barriers to trade for business services in the internal market and analysing the impact of knowledge-based services on manufacturing industries. This leads to concluding remarks from the perspective of knowledge as a prime source of wealth creation.

Business services: definition(s)

The following is a characterisation of business services:

Business services can be defined in the following way: they are real activities (not financial) that influence first the competitiveness of companies (they are not incompatible with the service provision to consumers) through their use as intermediary inputs in the value chain, and via quality and innovation gains resulting from the interaction between supplier and client and service.

(Rubalcaba-Bermejo, 1999, p. 26)

This precise definition also relates to a specific mode of production. First, business services are defined as intermediary inputs through the entire value chain, which accounts for the flexible way in which their production needs to be organised, often involving networks of different suppliers and customers. Since production needs to be flexible and sometimes organised from different locations and at different times, this first feature also refers to the fact that business services are large users of ICT and ICT services. Second, value added is based on significant interaction the supplier and the client; thus, production requires expertise and management skills and is always tailor-made. Finally and specifically for “knowledge-based” services, this interaction process is likely to generate positive

externalities when properly organised (*i.e.* a network of users of a particular service can also become a tool that can potentially improve the quality and scope of that service).

From a practical point of view, the statistical definition of business services based on the NACE classification is given in Annex 1. This definition is similar in broad terms to that used by the OECD (Service Statistics on Value Added and Employment) but there are coverage differences in the details (Rubalcaba-Bermejo, 1999, pp. 36-37).

Making business services operational in the Directorate-General for Enterprise

The Mission Statement of the Business Services unit of Directorate-General Enterprise reflects the various Council mandates outlined above. It addresses all types of business activities and all firm sizes.³ Owing to the generic nature of service activities, it relates to many policy domains. Since for most activities (and visibly for high-skilled business services) economic performance crucially relies on the use of knowledge, the mission statement strongly relates to the development of a proper analytical and policy framework for understanding and measuring the role of intangible assets.

More specifically, the unit sets out to: *i*) develop policies to stimulate competitiveness in the services sector, with continuous review of the main factors affecting competitiveness in services; *ii*) review and evaluate the impact of relevant Community measures which affect the competitiveness of services in order to take appropriate recommendations and joint actions; *iii*) monitor key trends and developments in services, disseminate relevant information and develop appropriate instruments for that purpose; *iv*) contribute to the development of the services dimension in international trade and in the GATS; and *v*) evaluate the impact of employment and social policies, ensuring their coherence with business competitiveness.

Accordingly, the unit's work programme comprises: *i*) policy development on services, which includes communications, follow-up reports to the Council and annual contributions to the Commission Competitiveness Report for services; *ii*) economic and statistical analysis, which relates to developments of the "knowledge" economy in general and knowledge-based business services in particular and also includes participation in the development of performance indicators; and *iii*) "horizontal" policy activities: competition and trade policies (WTO+GATS), enterprise aspects of employment and social policies and dialogue with the business community.

Such a programme hinges on the development of an adequate analytical framework for policy making. Two examples illustrate this development: assessing the extent of barriers to trade in services in the internal market (their removal being a political priority) and analysing the impact of knowledge-based services on manufacturing industry performance (in turn, addressing the need for better analytical classifications and data collection for business services).

A better analytical framework for policy making: examples

Addressing barriers to trade in services in the internal market

Recent background

The Lisbon Council Presidency "asks the Commission, the Council and the Member States, each in accordance with their respective powers, to set out by the end of 2000 a strategy for the removal of barriers to services; to speed up liberalisation in areas such as gas, electricity, postal services and transport... The aim is to achieve a fully operational internal market in these areas." (2000, para. 17).

This mandate has wide operational scope in terms of activity coverage, policy areas and policy-making levels. It suggests a two-tier action, a call for a concerted strategy to be then translated into an operational action plan. To begin with, however, it calls for a better understanding of the nature and extent of barriers to trade in services. For this, an analytical framework may be developed in several ways, *e.g.* by approaching the various actors (firms, professional associations, national authorities, etc.) involved and/or by reviewing the impact of all existing legislation that pertains to business services, at national and other levels.⁴

A Commission study of barriers to trade in business services in the internal market

Following the Industry Council Conclusions of 1998 (Council of Europe, 1998) and prior to the Lisbon Council Mandate, the Commission had launched a study designed to provide initial assessments of existing legislative, administrative and other barriers to trade directly or indirectly affecting selected business services at EU and national levels. The study was to be performed using a survey, interviews and case studies. Its aim was also to provide quantitative indications as to how barriers affect the cost effectiveness and value added of the business services selected. The project was set up in partnership between the internal market and Directorate-General for Enterprise .

First, it should be stressed that the study is not designed to construct a representative sample of firms according to their activity, size or origin, so as to be able to draw quantitative conclusions about the nature and extent of barriers to trade in services in EU member states.⁵ Its aim is primarily to form a general picture as to which barriers are perceived by which actors, for which activities and to what extent. The study could help in the development of a strategy for the removal of barriers to trade but further analyses are likely to be necessary in order to prepare a detailed action plan.

The scope of the study is as follows: IT consulting, labour recruitment, leasing and renting of equipment, contract R&D, technical testing, accountancy and audit, tax services and engineering-related consultancy are covered; these activities are surveyed both from the perspective of service providers and users and across all EU member states; among providers, small and medium enterprises are at least half of the sample; among users, a balance is kept between manufacturing and services sectors enterprises, reflecting their respective share in economic activity.

Provider firms are first queried about their perception of the competitive situation on their domestic and EU markets (if relevant) and, in the latter case, about details concerning their trading partners (nationality, mode of delivery, sales abroad relative to total turnover, etc.). Barriers to trade are then classified into three categories: those pertaining to delivery from the home base, those pertaining to establishment abroad and those of a more “horizontal” nature (socio-cultural, market-related, administrative barriers not elsewhere mentioned, etc.). A final section of the questionnaire is devoted to perceived costs of barriers to trade, such as the impact on home and export market competition, sales, firm organisation, etc. A total of 300 responses is targeted for business providers across the selected activities and for all EU member states.

For services users, the nature of perceived barriers to trade is expected to depend less on their sector of activity than in the case of providers. Clients are queried about their reasons for purchasing business services in other EU countries (availability, price and quality compared to home producers) and about difficulties in obtaining cross-border service (language, commercial practice, uncertainty about after-sales service, etc.). A section of the questionnaire is also devoted to perceived costs of barriers to trade and to potential benefits of their removal. A total of 200 responses is targeted for business service users across all EU member states.

Besides firms, trade associations at EU and national levels and national authorities are interviewed about the issue of barriers to trade. Furthermore, surveyed firms willing to participate in in-depth analyses of their perception of barriers to trade will be the subject of case studies. These case studies can indicate whether the business model applied by a firm is a sub-optimal choice and if so, to what extent this is due to the existence of barriers to cross-border development or to other causes (e.g. misleading perceptions of barriers, management constraints, etc.).

A final report on study findings is expected towards the end of the year. The scope of the study is limited but its methodology may yield interesting information about how different actors perceive the issue of barriers to trade in business services. Such information could be the starting point for collecting more focused input in view of a concrete action plan.

Analysing the impact of knowledge-based services on manufacturing industry performance

Pilat (see Chapter 2 in the present volume) recalls that attempts have been made to develop taxonomies of services that are more closely tied to prevailing market structures. One chapter of the European Competitiveness Report⁶ (a Commission staff working paper) deals with external services and industrial performance from the point of view of the input-output relationship of services with other industries within a given economic territory and is based on a contribution by Peneder (2000). His approach leads to a classification of manufacturing industries according to service inputs which is then related to measures of industry performance.

A consequence of the structural change towards tertiary activities that has taken place in the economies of the European Union, the United States and Japan is that the purchase of external service inputs now constitutes a greater “intangible” part of competitive advantage, based on productivity gains from specialisation and the division of labour. Since markets, and more specifically business-related services, are strongly affected by regulations, this issue relates to all concerns of economic policy reform.

To measure empirically the dynamics of structural change, the growth in output of five aggregate sectors of activity (manufacturing, distributive, knowledge-based,⁷ personal and social services and other activities) is first broken down into three components: changes in technology coefficients, changes in domestic demand and changes in net exports. The contribution of these components to growth is then examined over periods between 1970 and 1990 for EU countries, the United States and Japan, according to data availability. It is found that since the 1970s, structural change has been primarily driven by the growth of knowledge-based services. The main source of structural change has been the increase in domestic demand, with large impacts on knowledge-based and personal and social services. Finally, the technology effect accounted for the biggest share of the growth of knowledge-based services in most EU countries after 1970.

To relate differences in intermediary demand for services and industry performance, a classification of manufacturing industries⁸ according to their relative dependence on different kinds of external service inputs is then derived. Four clusters emerge: industries with relatively high shares of inputs from: *i*) knowledge-based services; *ii*) retail and advertising services; *iii*) transport services; and *iv*) residual industries. Industry performance is then compared across clusters according to several criteria: labour productivity, growth in value added and employment, specialisation of value added and exports within the Triad, etc. The analysis shows that, depending on the performance indicator and the geographic zone, industries belonging to the first cluster often rank highest in terms of performance. It also suggests opposite patterns of production and export specialisation for the EU and the United States, the former having the largest shares in industries with “average” profiles of reliance on external

services (the fourth residual cluster) and the latter specialising in industries of the first group relative to the Triad.

The results are potentially interesting for policy making, but owing to a lack of equivalent EU data, they are based on the assumption that the detailed US input-output framework and data can serve as a benchmark. This example illustrates the potential explanatory power of analytical classifications and the usefulness of developing the input-output framework. On the one hand, services activities classified in the “traditional” fashion are more and more likely to generate many diversified products. On the other hand, traditional “manufacturing” firms diversify their activities towards service delivery, whether by setting a new entity or in house; in parallel, they may outsource their service inputs.⁹

Therefore, jointly updating classifications and production accounting for analytical purposes (international comparisons in particular) can be seen as a priority, lest incomplete or wrong imputations (such as counting a service activity in the “manufacturing” sphere) persist.

Thus, the above analytical exercise calls for more harmonised and complete EU data collection, one of the Council mandates. For business services, practical work on the harmonised definition of statistical indicators (a joint project between Eurostat and the Directorate-General for Enterprise) has just started, with a view to regular data collection in a large majority of member states.¹⁰

An essential element of the construction of analytical performance indicators is the company balance sheet, as adequate reporting of the diversification of activities and of the scope and value of “intangible” assets is called for. More generally, the harmonisation of various accounting frameworks (particularly for intangible assets) so that they serve analytical purposes is a basis for understanding the dynamics of structural change and the role of business services. It is beyond the scope of this chapter to discuss this topic.¹¹

Conclusions: services and the knowledge-based economy

Any package of measures needs to be propped up by an adequate framework for analysing issues in the first place. The salient features of business services recalled at the beginning of this paper would appear to call for specific policy making in these activities (*e.g.* fostering effective use of ICTs, skill upgrading and networking, implementing balanced protection/diffusion of business models, etc.).

Among these features, the interaction between producers and consumers to improve output quality and scope is perhaps the most interesting one. Particularly for high-skilled business services, large decreases in costs of IT capital and network building (Internet) have revealed the large potential impact of such interaction, to the point of questioning “traditional” models of profit making and market entry in the case of system development (“Linux” model).

Technology increasingly blurs the borders between manufacturing and services and production organisation generally shifts from “horizontal” production units to “vertical” networks. The use of labour capital becomes less constrained by physical capital and the labour force is required to have extensive skills in more and more economic activities. Manufacturing firms diversify their production to related services, all activities tend to become intertwined and competition is increasingly based on differentiating products and maximising quality by embodying “knowledge” in the input and the output. The term “knowledge-based” – not a very operational one to start with – tends to apply to all activities, to varying degrees, on a scale that remains to be more precisely defined.

As the characteristics of business services may well be shared by increasing numbers of other activities, the need for “specific” policies for services in the future may be questioned. As knowledge

is becoming a key asset for the competitiveness of firms of all types worldwide, the issue may be more one of designing policies aimed at measuring this resource, accounting for it and fostering its optimal use for best social returns. The apparently spectacular “Linux” business model, in which reputation, networking and organisation are the source of innovation, a powerful capital for market entry and eventually, the assets for future wealth, may well be liable to further extensions.

NOTES

1. The views presented here are the opinions of the author and do not necessarily correspond to the views of the European Commission. The author is very grateful to friends and Commission colleagues for useful comments received on the draft.
2. Within the framework of Council Regulation 58/97 on Structural Business statistics.
3. Note that the general mission statement of DG ENTR (Annex 2) applies to all enterprises irrespective of size, sector or organisation, but gives particular mention to the promotion of a better understanding and use of services, including business services.
4. In the latter respect the OECD (1997) offers a comprehensive analytical approach based on expert legislation review, *e.g.* in the case of professional services.
5. In any case sufficient quantitative data would yet be lacking to construct such a representative sample.
6. In its resolution of 21 November 1994 on reinforcing European competitiveness, the Council invited the Commission to report regularly on the competitiveness of European Industry. The 2000 Competitiveness Report is the fourth one issued after the Council resolution. At the time of writing, the draft Report was in circulation from DG ENTR for feedback from all other Commission services.
7. Here knowledge-based services comprise financial, business and communication services.
8. 100 NACE 3-digit manufacturing industries are units of analysis. Only US input-output data (1992) presented a sufficient high level of disaggregation (498 industries x products) to carry out the exercise. Therefore the US technology matrix has to be considered a benchmark.
9. Mogensen and Thumm (2000) provide a recent discussion on the effects of outsourcing based on a number of interviews and accompanying questionnaires with firms of five industrial sectors automotive, pharmaceuticals, white goods, food & drink and domestic electrical appliances.
10. At present, Germany and Greece do not at all take part in this project. Note that priority actions discussed in the framework of this project include a better breakdown of turnover by product and client for business services.
11. See *e.g.* Brookings Task Force on Understanding Intangible Sources of Value, (2000) for a recent and comprehensive discussion on the implications of incomplete intangible accounting.

ANNEX 1
DEFINITION OF BUSINESS SERVICES ACCORDING TO THE NACE REV.1
CLASSIFICATION¹

Classification of NACE activities	Services	Most important activities
72.1 – 6	Computer	<ul style="list-style-type: none"> - Hardware consultancy - Software consultancy - Data processing - Database activities
74.11, 74.12, 74.14	Professional	<ul style="list-style-type: none"> - Legal activities - Accounting and tax consultancy - Management consulting
74.13, 74.4	Marketing	<ul style="list-style-type: none"> - Market research - Advertising - Architectural activities
74.2, 74.3	Technical	<ul style="list-style-type: none"> - Engineering activities - Technical testing and analysis
71.1, 71.21–23, 71.31–33	Leasing and renting	<ul style="list-style-type: none"> - Renting of transport and construction equipment - Renting of office machinery incl. computers
74.5	Labour recruitment	<ul style="list-style-type: none"> - Labour recruitment and provision of personnel
74.6, 74.7	Operational	<ul style="list-style-type: none"> - Security activities - Industrial cleaning
74.81–84	Other	<ul style="list-style-type: none"> - Secretarial and translation activities - Packaging activities - Fairs and exhibitions

1. This definition is in accordance with the EUROSTAT publication 'Business Services in Europe' from 1995. It should be noted that NACE classes 70 (real estate services), 73 (research and development) and subclass 74.15 (holding companies) are not included in this definition.

Source: [COM98].

ANNEX 2

ENTERPRISE DIRECTORATE-GENERAL MISSION STATEMENT

The mission of the Enterprise Directorate General is to address the entire business environment to enable enterprises to strengthen their competitiveness, grow and develop in a way that is compatible with the overall EU goal of sustainable development.

The Enterprise Directorate General should work to:

- a) Promote entrepreneurship as a valuable and productive life skill.
- b) Promote innovation and the ability to manage change productively.
- c) Encourage a regulatory and business environment in which innovation and entrepreneurship can flourish.
- d) Enhance the competitiveness of enterprises in the knowledge-based economy.
- e) Improve the financial environment for enterprises.
- f) Ensure that business support networks and services to enterprises are provided coherently and efficiently and facilitate co-operation between enterprises in accordance with EU and national competition rules.
- g) Improve access to markets for both goods and services.
- h) Promote a better understanding and use of services, including business services.

Source: <http://europa.eu.int/comm/dgs/enterprise/mission.htm>.

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Chapter 7

SUMMARY OF THE ISSUES

by

Thomas Andersson

Deputy Director, Directorate for Science, Technology and Industry, OECD

Introduction

I am delighted to be given the opportunity to offer some concluding observations on this seminar. Services and innovation are very broad topics, and one of the most attractive and useful features of this event is that it has focused so sharply on the interplay between the two, *i.e.* on innovation in services. This represents a huge and difficult challenge since this area has so far been insufficiently explored. The progress made here has shown that much can – and should – be achieved in this realm.

This meeting may prove to have been a very important one for several reasons. One is the lack of appropriate forums to address the issues we have been grappling with; the second concerns the room for improvement that characterises this area; and the third is the creative and focused set-up that we have benefited from here. Nevertheless, it is difficult to provide very definite or comprehensive conclusions. I will attempt to point to certain findings which seem particularly useful at this stage; however, it should be kept in mind that this is just the beginning of the process that will eventually shape the outcomes. The process will require an ongoing effort in various groups such as the Industry Committee and other relevant OECD bodies. It will also be necessary for OECD Member countries to continue to work on this matter at home as well as in co-operation with each other in the appropriate multilateral organisations.

The first section below sets out the rationale. I then turn to the questions of definition and measurement. Third, I address the driving forces and barriers to innovation in services. The fourth section attempts to sum up some implications for policy. This, of course, is the true test of what we have achieved here – our ability to undertake work with real policy relevance. Finally, I will make a few concluding observations on policy implementation.

The rationale

Is innovation in services a worthy subject for debate? One can only conclude that the deliberations which have taken place over these two days have underscored the tremendous importance of this subject. There are several reasons for this.

The most fundamental has to do with scope. We know that the services sector accounts for approximately 70% of value added and employment in the OECD countries. However, the area we have addressed here goes beyond the services sector *per se*. Services are being undertaken, and are

equally crucial, in other sectors, including manufacturing. In fact, the economy is becoming more and more service-oriented, with distinctions between services and non-services making less and less sense. Another aspect is that services are increasingly crucial for the employment performance of the economy as a whole. This is not only evident in the number of employment opportunities directly involved in services. Although services remain more labour-intensive than manufacturing, there is a rapid process of skills upgrading, and matching supply and demand for different categories of labour presents a major challenge. From a dynamic perspective, services are expected to continue to grow in importance, with growth very much driven by the demand side; however, the ability of the supply side to respond is vitally important.

Meanwhile, the evidence shows that innovation is becoming increasingly decisive for competitiveness and performance in services. It is probably fair to say that innovation now holds the key to performance. As is already the case in manufacturing, there seems to be less and less scope for making a living purely out of standardised production, low prices and low costs. On the other hand, services have some specific features. Some are well-known, such as the stronger emphasis on immediate consumption, and the presence of barriers to trade and storage. For various reasons, services can also serve as a catalyst for the development of other activities. In some instances, services are of strategic economic importance; this is partly because they often have an idiosyncratic element, and can make a crucial difference to a package of products (some of which will be more standardised). Services are often the key to adapting broader product categories to specific customer needs.

Furthermore, innovation in services is characterised by properties that are different from those of other activities (I will come back to this later). There are important ongoing changes in the nature of services as well as in the innovation taking place in services. We have evidence that research and development is becoming more important in the services sector, and also that this is true of other forms of innovation, including incremental innovation and innovation associated with organisational change. We also have observed that services are becoming more tradable, perhaps more cyclical in nature, so there are indications of significant ongoing changes. This underscores the importance of gaining a better understanding of this area and the issues involved. Today, however, there appears to be a lack of awareness regarding innovation and services, and this is often coupled with misconceptions. For instance, it is not clear to the general public that services are quite skill-intensive. It has also been pointed out that many people view services as an area just for SMEs. It is true that SMEs are important in services, but there is no equivalence between services and SMEs.

Finally, we can point to the lack of a policy framework – at least a comprehensive policy framework. Speakers have talked about fragmentation and the lack of a single government portal for addressing relevant policy issues, yet, as I have said before, many policy issues need addressing.

Definition and measurement

While there does seem to be a strong rationale for addressing this topic, the question remains as to whether there are relevant and useful definitions that can lay the foundation for an operational treatment. Do we have adequate definitions for services? Our chairman pointed to an interesting definition used in Australia in the past: “services do not produce a thing”. We probably all agree that that definition does not provide a notion that we can build on for the future. Also, we can no longer use traditional observations, such that services are non-tradable, non-storable, etc., since this is increasingly untrue in any general sense. It is too early to draw any definite conclusion from this workshop in terms of definitions. However, it is important not to be restricted to an outdated or too limited perception of services or of innovation. As regards the latter, it is clear that innovation in services goes far beyond research and development. Organisational change, incremental improvement, and other activities that require fairly small fixed costs, seem to take on considerable importance.

Owing to the heterogeneous nature of services, innovation takes very different shapes in different areas, and we also observe a blurring of the services sector and evolving linkages between various kinds of services as well as between services and manufacturing. In his presentation, Jeremy Howells made a very valuable contribution on encapsulation, the implications of which should be carefully examined in the context of definitions. We may need a better categorisation of services which takes account of encapsulation and the growing importance and role of intangibles. Earlier, it was remarked that, in services, the capital walks out the door every evening. Perhaps this is not always true, since people are increasingly called upon to adjust their working hours in a flexible manner; nevertheless, it is a good illustration of the situation we need to consider.

Measurement issues have popped up time and time again over these two days. Services and innovation in services, the performance of services and the link between innovation and performance are all very difficult to measure. However, this cannot wholly explain the lack of data in this area. It is stunning to find out how much we do not know about the services sector. We do not have comparable measurement even of very basic things. In the area of transport and logistics, for instance, where we have a newly established division at the OECD, basic information on levels and changes in costs and prices, which would permit meaningful comparisons across countries in this most international of areas, is simply not available. To remedy this situation, there is a need for broader awareness of what is lacking, together with a better articulated demand for improved information on services and on innovation in services. I will not, at this stage, try to list what we really need to know. That is something that will have to be dealt with in the relevant forums.

Another important observation that was made, inspired by Jeremy Howells' framework, has to do with the level of observation and measurement. Many of the goals of an innovator in services concern increasing the flexibility, speed or reliability of a product, perhaps in terms of delivery or logistics, or improving the long-term relationship between the firm and its customers or providers; that is, the purpose may be to provide a better package for an activity as a whole. This implies that it may often not be possible to gauge the effects on an individual product; rather the innovation needs to be studied in the context of a much broader package and with a view to the nature of what is being achieved. There may not be any immediate positive effects for the product itself, but the innovation may enable a marked improvement in inter-firm relationships over a period of time. This aspect is becoming increasingly significant as co-operation between actors increases, and as competitiveness becomes more and more dependent on organisational innovation and change. So, if one measures the value of all services in a piecemeal way, one would miss out on a very important part of the story. We need to invent complementary measurement tools that can bring together the impacts at different levels.

Another interesting and important aspect concerns intangibles. We know that the measurement and disclosure of intangibles is impeded by incentive problems both within organisations and between organisations and external resource providers. I will return to that issue below.

Driving forces and barriers

Improving our understanding of innovation in services is very much a question of getting a better handle on the driving forces as well as the barriers and how these are changing over time. This meeting has helped to paint a fairly clear, although complex, picture of the driving forces. Skills upgrading and human capital are the cornerstones of a successful renewal and upgrading of service activities. On the negative side, educational systems which aim at, and are measured by, quantitative output rather than quality, and which fail to encourage entrepreneurship and creativity, represent one of the most formidable long-term barriers to innovation in services.

Meanwhile, recent years have seen an acceleration stemming from changes in a number of interrelated factors. The expansion of information and communications technology (ICT) and the evolution of the Internet are creating tremendous new opportunities for accessing information. In combination with ICT, rapid progress in a number of technologies, the globalisation of goods and factor markets and extensive liberalisation and regulatory reform are opening up many new opportunities for services activities. At the same time, these factors are creating increased competition and more pressures for adjustment. These are particularly hard on SMEs, which have long been predominant in some services activities and have been partly sheltered from globalisation and enhanced competition. Within the next few years, many SMEs will face a completely different situation, calling for adjustment by firms, their owners and workers and also by the many regions and municipalities in which they constitute the backbone of the economy. There is good reason to expect that these changes will become much more widespread and will reshape the services sector in many countries and societies that have yet to undergo much modification in this area. Insufficient readiness, together with a lack of information on new opportunities and how to tap into them, will represent a major barrier for innovation in services.

Organisational change is of tremendous importance both as a response to developments in other, underlying factors and also as a further driver of innovation. Organisational change takes place particularly within large firms, but also increasingly in smaller ones. Today, it typically leads to a stronger focus on “core business”, enhancing firms’ capacity to excel in a narrower band of products. The increased tendency towards outsourcing is one element of this trend. Another one is the establishment of more continuous and mutually beneficial relationships between firms. Organisational change serves to improve co-operation both within and between organisations; it is often essential for reaping the gains of innovation as well as for promoting successful innovation.

Together, these new factors stimulate more dynamic processes of change, speed up innovation and the diffusion of technology and emphasise the strategic importance of access to and use of information for incremental innovation. So, here we have essential driving forces of innovation. At the same time, barriers to the flow of information, to competition, to creativity and skills upgrading, and to mobility stem innovation in services. These barriers are multifaceted and the forms they take are influenced by country and cultural specificities.

Policy implications

Innovation in services has unique features, with organisational change and incremental improvement strongly present. Given these features, this meeting made a clear case for the role played by competition. Generally speaking, in services, there seems to be less of the traditional Schumpeterian concern that market power would be a prerequisite for innovation than there is in manufacturing. This implies that policy makers should strongly emphasise the general business framework and regulatory reform. Various aspects have been covered in this meeting, including the importance of conditions that are conducive to effective entry. Regulations need to be consistent and designed so as not to distort investment decisions, *e.g.* steps should be taken to remove regulatory risk that would otherwise give rise to underinvestment. An important aspect is how best to implement policy frameworks that are sufficiently stable to allow planning for the long term while at the same time flexible enough to allow for rapid adjustment to change. This seemingly paradoxical need can be met through more transparent policy frameworks, so that actors in the marketplace can better anticipate how regulators and governments are likely to respond to change. In fact, this means rendering policy more understandable. If, on the contrary, policy is driven by political whim and is impossible to predict, the result will be underinvestment, more short-term investment decisions, less innovation and less organisational change. It is less clear whether reform of intellectual property rights (IPR) regimes is important for strengthening innovation in services. This is partly due to the

apparently lesser emphasis on market power in services as compared to manufacturing. As suggested by Messrs. Battistelli and Pilat, intellectual property rights could become too strict, impeding rather than supporting innovation. This is not least the case because of the strong role played by incremental improvement, imitation and organisational change in service innovation. However, in areas such as those strongly affected by counterfeiting, a weak IPR regime does create major problems. Further work is needed to resolve when and how reforms to IPR regimes are important and helpful rather than deleterious. Moving too fast in this area could be costly. These issues are especially tricky for countries and regions where IPR regimes are weaker or more prone to inconsistencies and where the need for reform is thus particularly strong.

That being said, while there is less emphasis on R&D in services, it may nevertheless be the case that the social returns to innovation are higher than the private returns. One can see this, at least implicitly, in the very strong development not only of competition but also of co-operative relationships. This includes co-operation through strategic alliances, with cost sharing and joint efforts to build up the capacity for more effective internalisation through better use of technologies and information. Policy frameworks should not be formulated in such a way as to limit desirable co-operation of this kind. On the other hand, there is the need to avoid the kind of co-operation that stifles competition and leads to higher prices at the expense of consumers.

To the extent that the social returns from innovation are higher than the private returns, there is indeed a case for policy measures that can facilitate or support innovation in the services sector. To my mind, this meeting sends the strong message that governments cannot continue to rely on support of research and development in traditional manufacturing activities as the sole focus of their policies to promote innovation and competitiveness. This is too costly and entails foregoing or neglecting the opportunities which flow from other kinds of innovation in the services sector. Innovation policies need to be rethought in this perspective. Support of innovation in services can be conceived in ways other than research and development, such as policy measures to support clusters or the development of groups of firms, rather than individual firms. Ireland, for instance, has applied this kind of approach, but a number of other countries, especially in Europe, are also looking at the cluster approach as a way of strengthening innovation. In any case, policy needs to be based on a clear-cut rationale, based on market or policy failure, and measures need to be subjected to critical evaluation.

Another potential policy measure is to improve the measurement and disclosure of intangible assets. The present view of the OECD, I would say, is that it is too early to require reporting and disclosure of intangibles through traditional accounting. While intangibles are difficult to measure and heterogeneous, at least in some countries and industries there is now spontaneous experimentation in reporting of intangibles. Back-to-back with ordinary accounting procedures, such firms advertise their investments in human capital, in R&D and in a range of other intangible assets related to brand names, valuable customer relations, etc. This is very clear in the “green” area, with respect to the treatment of the environment, where many firms try to present themselves as good for the community and society in the broader sense. Intangibles are one part of this argument, and firms are seeking to create goodwill through this kind of reporting.

To date, reporting of intangibles has been completely *ad hoc* and has not been undertaken in a way that would allow for comparisons across firms. There is a certain trade-off here. On the one hand, it is very positive that this is a spontaneous, creative initiative and that firms are not locked into what they can do through this kind of reporting. On the other, there is a cost to the lack of comparability. And, since one cannot really follow up, evaluate and compare firms, it is of limited use to the market place. As yet, this kind of spontaneous action by private firms is not a fully satisfactory – in fact, it is a far from satisfactory – response to the lack of proper measurement and disclosure of intangibles that leads to biased incentives both within firms and between firms and their external resource providers. Thus, there is room for improvement.

Now, can – and should – governments try to improve this situation? At the OECD, we are currently working with industry and with governments through a task force with an Australian chairman. The ambition is to propose a framework that is not overly restrictive but that would facilitate comparable reporting and provide a stronger incentive for private firms to go ahead with their experiments in reporting – and do it in a more comparable way. The objective is to obtain more of a market framework for the development and use of information in this area. We believe that this is the way to go at this particular point in time, although further down the road, a more ambitious approach may be required.

Several other policy areas are worthy of mention. Without going into detail, the development and maturing of venture capital markets is of tremendous importance for the ability to establish new firms, for the growth of new firms and for the development and use of new technologies in new firms. As discussed here, new technologies can be developed in existing or in new firms. A problem arises not because one way is inherently better than another, but because the creation of new firms is often impeded by the need to overcome information deficiencies and agency problems between those with the ideas, those with the finance, and the entrepreneurs. Basically, this is about harmonising interests and establishing trust. Mature venture capital markets can be very effective in achieving this. In the United States, an edge in this area has provided an enormous advantage and played a very important role in making that country a leader in many new technologies. However, other countries are now following suit, with governments making efforts to improve the functioning of these markets. It is not a question of putting public funding in place; the challenge is to ensure that market institutions work better and to remove the barriers. This, I think, is very important for the development of services activities, as these tend to be intangible and suffer from a scarcity of traditional collateral.

We then have the issue of how to support the quality of human capital. Of course, basic education is the key. However, the policy challenge now crucially embraces lifelong learning. This is partly in order to take care of those who are already in the workplace, but also to put in place a framework for continuous learning, which is essential for the development of and innovation in the services sector. In this respect, various institutions and incentive structures play a role which needs to be carefully examined.

Public procurement represents another important policy domain. Through public procurement, government can act the part of a demanding customer with a view to developing competitiveness in services through innovation. Given the size of governments, including the many different public authorities, public procurement could represent a far more prominent driving force for renewal and innovation in services than is the case today.

Remote areas require a mention – of course, the issues vary between locations – big cities, rural areas and so forth. Services play a key role in the economy of many remote places and can enable diversification away from dependence on agriculture and basic industries. Now, and most importantly for the future, ICT is opening up new opportunities, reducing the importance of distance and allowing services activities to be located anywhere. At the same time, there are also spatial clustering effects driven by the availability of the workforce and limitations on labour mobility – many regions are losing their younger members and traditional skills are dying. That is, of course, extremely worrying for many regions, but then again there are also opportunities. So, the basic challenge is about turning this into a virtuous rather than a vicious circle. The OECD's Territorial Development Service is looking at the experience of different locations, including individual towns and villages. While traditional support of sunset industries has seldom worked, today there are many success stories of regions applying development strategies to obtain new sorts of dynamism. Part of the solution is policy at national level which allows for decentralisation, that is, policy which leaves room to manoeuvre at the local level as university-industry linkages evolve. Although there is a need for individual solutions, there is still a case for learning from the experience of others, and there are many

positive initiatives in individual communities that can be looked at. So, new opportunities exist for remote areas as well.

Policy implementation

Finally, there is the challenge of policy implementation. I very much appreciated our discussions on this topic. We came back to it time after time and it is a reflection of the high quality of this workshop that so much attention was paid to policy implementation. The solution is probably not a minister for services, although there was a call for one, perhaps not seriously meant, but I think that that proposal underscores the need for putting in place a framework for more comprehensive policy making. There is a need for some sort of institutional set-up that can more forcefully push for consistency and credibility, provide a stronger voice in government for obtaining the data and the regulations that take into account the special barriers encountered by the services sector and perhaps provide the necessary support for innovation in services where their needs differ from those of manufacturing. This institutional set-up must rely on interaction between key players, not only industry but also users and consumers, in order to obtain a treatment of services and conditions for services that can take the economy-wide benefits into account. Some countries have already moved towards establishing high-level boards and agencies which are responsible for innovation in the broader sense, with services as one component. Finland is a good example of a success story.

These exercises show that high-level backing within government is absolutely necessary. It may have to emanate personally from the prime minister in order to ensure effective co-operation by ministers, agencies and so on. While a top-down responsibility chain is called for, a top-down spirit is not. What is needed is a spirit that encourages openness, not least in order to involve users. However, information needs to flow in both directions, top-down and bottom-up; this is crucial to the success of the exercise. Perhaps it is time to consider how this could be developed in the context of services. Having a minister responsible for 60% of the economy is obviously not the solution, but services issues are currently handled in a fragmented way; there is no services portal, although there are issues which specifically relate to services. I read this meeting as a strong call for taking a good look at what can be done and how it can be achieved.

A final remark on the need for shorter cycles, for the ability to respond more rapidly to changes in demand. This calls for a more flexible and more responsive policy framework. We should view this as an important point of departure for future deliberations.

CONCLUDING REMARKS

by

Patricia Kelly
Head, Services and Emerging Industries Division
Department of Industry, Science and Resources, Australia.

It has been a great pleasure to be here and to have been a part of this workshop over the last couple of days. I would like to thank everyone for their participation throughout the proceedings. The workshop would not have been as insightful or as productive without the combined experiences and the ideas that have been so freely shared by the participants. I would especially like to thank the speakers and the break-out leaders for their valuable input into the success of the workshop.

I would like to reflect briefly on a couple of things which echo the points made by Thomas Andersson (see Chapter 7). One theme concerns the comments made by a number of participants, that it is curious that our analysis should be at such an early stage in a sector which is, in fact, such an old one. Why is it that we have had to discuss such fundamental questions as how to define services and how to understand their dynamics? I doubt that a workshop on agriculture or manufacturing or mining would begin by asking such questions, but the answers relate to the fact that only quite recently have services been recognised as occupying a pre-eminent place in the broader economic context. Jeremy Howells' presentation (see Chapter 3) highlights this in a very insightful way.

Many of us have commented that the growth of services industries is vital to economic growth, to employment growth and increasingly to growth in trade. Services growth and innovation in services are becoming an important aspect of comparative advantage. Indeed, growth in international trade in services and the impact of globalisation have been issues addressed in many presentations. Services are also more dynamic than ever and we have heard again and again that their dynamism is driven by such factors as unprecedented developments in ICT, widespread deregulation and the forces of globalisation. The key theme is that services industries are not only innovative but also that they are leading innovation. That is not widely recognised in many of the innovation strategies and policies that we implement in our countries.

In this context, we heard that there has been a shift in the focus of R&D expenditure from traditional sectors such as agriculture and resources to service industries. We have realised that a lot of innovation in service industries is not being captured by conventional measures.

This leads back to the three objectives that were set for this workshop. One was to define the role of innovation in services, the second was to define the opportunities for and the impediments to innovation in services and the third was to identify the role for government in increasing innovation and productivity in services. As the head of a division that deals with industry policy for service industries, I have certainly gained a great deal of valuable information and ideas from this workshop,

not least from the summary by Thomas Andersson (see Chapter 7) which crystallises very well many of the policy themes.

What have we learned? We have not found all of the answers, but I think we have clarified the major areas that are candidates for government action (again, see Chapter 7 for a comprehensive list). I would like to draw attention to several of these areas. One fundamental policy challenge facing the sector is the need to develop a new mindset for services policies that recognises the important differences between services and other industries. That is not to deny that there are also many similarities, but, as was noted in the workshop on generic or sector-specific policies for services, there is a need for both generic policies and policies specifically for the services sector.

A second challenge is to recognise that many services sectors cut across traditional boundaries. We find ourselves facing limitations imposed by outmoded and fragmented organisational structures; if we are to progress, we need to take an approach that encompasses the whole of government. We have heard some very positive suggestions. Tom Martin's suggestion for a minister for services (see Chapter 5) is an interesting one. Perhaps what is needed is a minister for service industries co-ordination. We certainly need much greater co-ordination and interaction between all of the areas of government that deal with services. Services need a champion, who might be a minister with a co-ordinating role across key areas of government. A ministerial council might also be a possibility.

Third, as well as cutting across traditional administrative or government boundaries, many services developments also increasingly defy traditional classification boundaries between manufacturing and services, and this is compounding the problem of lack of data. A range of suggestions have been made about how to address all of these changes. A key issue is the need to pay serious attention to data and statistics. It is an area where all agree that there is a problem. There are some quite difficult issues and some quite technical and complicated work is needed to address them. I think that one of the messages to government is that serious attention should be devoted to this area.

Fourth, governments need to be more flexible in developing policy. It was suggested that we need shorter policy implementation cycles so that we can better adjust to fast-moving technological and organisational innovation in services. And, as Thomas Andersson notes, there is a bit of a paradox here. It was also suggested that we need greater long-term policy stability. This is not necessarily contradictory. The message seems rather that we need to establish a long-term policy vision but also have the capability to respond in a timely way to the needs of service industries for appropriate regulation, IPR protection, etc.

Fifth, the issue of effective protection for intellectual property rights was raised and highlighted. There may be a careful balance to be struck, but it is certainly an area worth looking at in some detail. The role of competition policy was also raised as an important issue driving innovation and growth in services, and education and skills are another key source of innovation and of comparative advantage in the services sector.

The analysis and ideas that we have shared over the last two days will help us all deal with these challenges. We need to continue to raise the profile of key services industry issues and to draw our colleagues into the debate and take it forward.

Finally, I would like to thank you once again for your participation. I would particularly like to thank our speakers, our break-out leaders and our overseas and interstate guests. Also I would like very much to thank our convenor and the organisational team in ISR. I would particularly like to thank the OECD for jointly organising this workshop with us. Their expertise and their overarching perspective, and their enthusiasm, have been much appreciated.

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