

Smarter Services Future Jobs and Growth for the Smart State

Prepared by a Working Group of the **Smart State Council**

November 2006



Dear Premier

Please find attached the Smart State Council working group report on *Smarter Services: Future Jobs and Growth for the Smart State*.

The report identifies several opportunities to strengthen Queensland's competitive advantages in this domain: improving the industry-readiness of university graduates in services-related fields, by ensuring that new recruits are commercially productive as soon as possible; creating a significant leverage point for Queensland firms by developing iconic status for smart services-related initiatives in infrastructure and ICT-enabled service delivery; and ensuring that industry development strategies in Queensland recognise the unique requirements of smart services sectors, in areas such as market intelligence and finance, to cement export capabilities and job creation opportunities in this dynamic domain.

This report provides timely focus on an increasingly important component of Queensland's Smart State transition.

I commend it to you.



Professor Peter Andrews
Queensland Chief Scientist and
Chair, Standing Committee
Smart State Council

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This paper was prepared by an independent working group for the Smart State Council. The views expressed in this paper are those of the group and do not represent Queensland Government policy.

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SMART STATE COUNCIL

The Smart State Council was established in June 2005 as a central advisory body to provide high level advice to the Queensland Government on emerging Smart State issues and trends, and to propose measures to position Queensland to respond to challenges and opportunities.

The Smart State Council is chaired by the Premier of Queensland and comprises Government Ministers, the Queensland Chief Scientist and representatives from Queensland's business and research communities.

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1. INTRODUCTION

Services make up around 70% of the Queensland economy, with three out of four employed Queenslanders currently working in a services industry¹. Over the past decade, almost all employment growth in OECD countries has occurred in the services sector, as new competitive strengths, including lower-wage workforces, have emerged in rapidly developing countries such as India and China. It is now generally accepted that growth in services, especially knowledge-intensive services, contributes significantly to high-value job creation in mature economies, compared to growth in capital-intensive manufacturing and primary industries. As globalisation continues to create new competitive pressures - and opportunities - for many Queensland firms, services industries will increasingly represent an important source of job creation and innovation for the Queensland economy.

Services as a type of economic activity have typically been difficult to characterise, and are often defined as what they are not; that is, services are generally understood to be 'not manufacturing' and 'not primary or resource industries'. The way in which innovation occurs in services, the types of knowledge (including research and development – R&D) that are important and the extent to which services can be traded globally are also only beginning to be understood.

However, it is increasingly recognised that innovative services industries hold the key to 'strengthening economic growth and improving the foundations for the future performance of OECD economies'². The aim of this Smart State Council report is to investigate the sources of competitive advantage in the services sector in Queensland, and opportunities for its future expansion as a key contributor to Queensland's emerging knowledge economy.

2. WHAT ARE SERVICES?

According to current OECD and ABS definitions, the services sector includes a wide diversity of economic activities, ranging from personal services such as hairdressing to scientific research; services, in other words, include everything "from fast food to brain surgery"³. Clearly, the types of skills, technologies and knowledge that underpin innovation, and drive future economic growth, varies widely over such a heterogeneous group of economic activities.

It is also increasingly recognised that the boundaries between industries are shifting and becoming less distinct, as knowledge continues to become more important as a source of economic value and growth. Widespread diffusion of information and communication technologies (ICTs) and increasingly globalised markets have opened up significant opportunities – and competitive pressures – for the creation of new specialisations and sources of competitive advantage, with many services becoming more 'product-ised'⁴ and many manufacturing firms,

¹ ABS 2005

² OECD, 2005 (p2)

³ Wöflfl (2005)

⁴ Mainly through the adoption and adaptation of ICTs, as discussed in section 2.2.

especially in developed economies, focusing on services for increased differentiation and creation of customer value⁵.

The 'weight' of services in developed economies, however, is now recognised as representing an unambiguous shift in the organisation of capital, employment and knowledge⁶. Unpacking the diversity of services and what makes them unique is therefore vital. In order to make a more useful distinction between different types of services activities, the OECD has recently refined the general classification with the notion of 'knowledge-intensive services' (KIS). KIS are considered to be knowledge-intensive because they use more R&D, more technology⁷, and more highly skilled workers compared to other types of services industries.

The OECD defines knowledge-intensives services as:

- *Market Services:*
 - Post and Telecommunications,
 - Finance and insurance
 - Business activities (excluding real estate), which includes:
 - Scientific research, computer, legal, accounting, architectural, marketing, mining and operational leasing services.
- *Non-Market Services:*
 - Health
 - Education.

Under this approach, service industries such as tourism, wholesale and retail trade and accommodation, restaurants and cafes are excluded from the definition of knowledge-intensive services, even though innovation does occur in these industries, and they are an important source of employment. However, their growth opportunities on a global scale are often limited due to the generally non-tradable nature of the services involved. Where global expansion does occur in non-knowledge intensive services industries, it is often primarily through recruitment of local, and typically non-highly skilled, employees⁸.

In addition, while it is recognised that the education and health sectors are knowledge-intensive in some respects, these sectors are typically classified as *non-market* knowledge-intensive services as, in most OECD countries, they are largely provided by public sector agencies^{9,10}.

⁵ The 7 manufacturing firms included in the 2006 BRW Fast 100 list, for example, cited an increased focus on services activities such as branding, distribution, R&D, life cycle support and maintenance as a key driver of their recent growth.

⁶ As discussed, for example in *The Growth of Services*, OECD 2005.

⁷ Typically embodied in physical capital.

⁸ Such as international expansion of hotel chains, café franchises and retail outlets.

⁹ Although it is recognised that some education services, such as corporate and customised training courses, are delivered by the private sector.

¹⁰ Appendix A contains a full definition of services, and market- and non-market knowledge-intensive services. In addition, it should be noted that education is the subject of another Smart State Council report due for release in 2006.

For these reasons, the focus of this report is on market-based, knowledge-intensive services as they are currently defined; that is, those economic activities, conducted by private firms, that combine technology, knowledge (such as R&D) and highly skilled employees to provide a service to a market.

2.1 Services Are Different

Services are different because, compared to manufacturing and resource-based industries such as mining and agriculture, they are more reliant on people - and the skills and knowledge that they embody - for their growth and success. Services are distinguished by the fact that their delivery requires some form of human involvement, whether face-to-face or, increasingly, electronically. This contrasts with 'goods' industries, where the product is effectively delivered to market once it leaves the farm or factory gate.

Across OECD countries, services now account for more than 70% of total employment and value added. There is ongoing debate in the economics literature with regards to the source of productivity, and therefore sustained economic growth, in these services-based economies, which increasingly also characterise many rapidly-growing, 'developing' economies. The two concepts that are central to this debate are:

- The definition of productivity which suggests that as sectors grow in size and significance they should employ an ever-diminishing proportion of 'labour', as technological improvements allow physical capital to be substituted for human inputs.
- The notion that many services industries suffer from a productivity 'disease' due to their continued reliance on human input, with the classic statement being that 'after 300 years, it still takes four people to deliver a string quartet performance'¹¹.

The current size and significance of services in most modern economies confound these concepts, as evidence grows that services can be highly productive while creating jobs. As well as being the main contributor to employment creation across the OECD, it is now increasingly recognised that the services sector is a key source of productivity growth in many OECD economies, mainly due to the fact that firms in this sector tend to be rapid and productive adopters, and adapters, of technological innovations, especially with regards to ICT. Figure 1 shows that services contributed a significant proportion of labour productivity growth over the past decade in countries including the United States, the United Kingdom, Japan, Canada and Australia.

¹¹ Commonly referred to as 'Baumol's disease' after Baumol 1966.

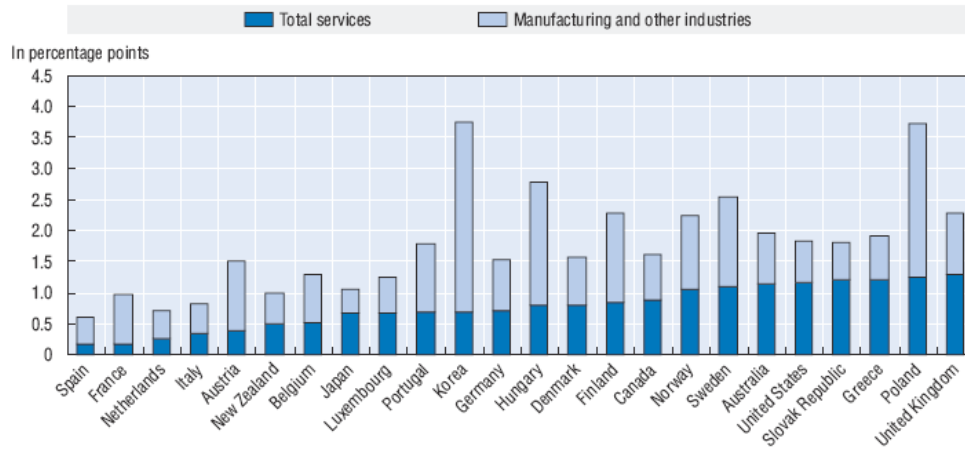


Figure 1: Contribution of the services sector to productivity growth (value added per person employed) 1990-2002¹²

The recognition that services are a significant source of productivity growth overturns the historical perception that services suffer from a productivity ‘disease’¹³. It is the interaction, however, between productivity improvement and employment growth that sets services apart, and it is now acknowledged that, in services, ‘employment and productivity growth can go hand-in-hand’¹⁴. Services firms must employ people- and increasingly highly-skilled people – if they are to grow, but also need to maintain their competitiveness through increased use of technology to automate processes and operations where possible. The ability to both create jobs and achieve productivity growth through technological innovation is the defining characteristic of the ‘shift to services’, which is now recognised (but not yet completely understood) as a key source of economic growth for developed economies¹⁵.

As economic development continues and specialisation intensifies, the demand for customised solutions from businesses and consumers can only grow. Furthermore, the strong performance of services is not only important for their own sake; it also helps underpin growth in those sectors, including manufacturing, that use services as an input¹⁶. The services revolution, therefore, is both real, and of increasing importance¹⁷. As productive knowledge-intensive services firms grow, in other words, so too does the number of highly skilled jobs.

2.2 Services Rely on Knowledge

As well as relying on human capital, the competitive strength of many services sectors depends on a body of knowledge that may be held within a related scientific research base, embodied in

¹² Source: OECD 2005 (p6).

¹³ Or in other words, ‘Baumol’s disease has been cured’, Triplett and Bosworth 2003. DCITA 2005 examines productivity growth in the Australian services sector over the past 17 years.

¹⁴ OECD 2005 (p9).

¹⁵ OECD 2005 and DCITA 2005.

¹⁶ OECD 2005 (p8).

¹⁷ The various approaches to understanding the growing importance of services to economic growth and development are surveyed in Schettkat and Yocarini 2003 (The Shift to Services: A Review of the Literature).

physical technology used in the industry or exhibited in general industry knowledge of a particular application domain. These different types of knowledge are poorly represented by current statistical collections, and the relationship between the knowledge-intensity and innovativeness of services firms and their expenditure on R&D, in particular, is less than clear.

It is now generally accepted in Australia and across the OECD that the productivity growth experienced in the services sector is mainly attributable to the adoption and adaptation of new technologies, especially those related to ICT. Many services firms are recognised as leading-edge innovators in the development of new IT applications, such as FedEx's package-tracking system and the development of interactive television by Endemol. ICT is also allowing brand new business models and cross-over specialisations to be created by services firms, as exemplified by Tata Groups' recent move into bio-informatic drug discovery¹⁸. In general, there is consensus that services firms tend to innovate by adopting, rather than creating, new knowledge and technologies, 'through deployment of new technology, notably ICT, training and investment in intangible assets, e.g. design, marketing or organizational change'¹⁹.

Firms in the services sector do, however, account for a significant proportion of business expenditure on R&D (BERD). In 2004-05, for example, services BERD accounted for over 30% of total Australian BERD, compared to around 41% in the manufacturing sector, with the bulk of services BERD (19% of the economy-wide total) occurring in property and business services. Evidence suggests, however, that expenditure on R&D per se may significantly under-represent the types of knowledge and innovation outcomes pursued by services firms, with process, organisational, and marketing innovation considered to be as important as scientific or technical knowledge development in many cases²⁰.

While there is growing evidence that innovation in services, and the knowledge on which it is based, relies on more than R&D as it is currently defined, there is also an emerging consensus that public R&D can, and should, play a more significant role in services innovation. Recent work by the OECD emphasises that 'public spending on basic R&D, in both public laboratories and universities, does not typically address the long-term knowledge requirements for services, e.g. improving the understanding of how technology should be deployed and used or how people work in groups.'²¹ In Australia, the lack of applicability of much public R&D to services innovation has been reported anecdotally²², in the general context of the very low proportion of business R&D outsourced to the public sector research base²³.

The sources and types of knowledge required for ongoing innovation in the services sector are varied, and only beginning to be understood and reflected in official statistics. It is clear, however, that the value-adding capability of many services incorporates a broad conception of knowledge, and that innovation in these domains can rely as much on the development of new business

¹⁸ As detailed at <http://www.tcs.com/healthcare/Solutions/Overview.aspx>.

¹⁹ OECD 2005 (p19).

²⁰ Business Council of Australia, *New Concepts in Innovation*, 2006.

²¹ OECD 2005 (p19).

²² E.g. in surveys reported by Business Council of Australia, *New Concepts in Innovation*, 2006.

²³ In 2004/05, for example, only 5.7% of R&D conducted by the higher education sector was funded by business (ABS 8112.0 2004-05).

models, organisational structures and ICT-enabled processes as it does on the creation of new scientific or technical knowledge through traditional R&D. Understanding of the way in which innovation occurs in services, and the types of knowledge that underpin this process, is still being developed, but the link between knowledge development and services growth, especially in an environment of increasing globalisation and changing comparative advantage, is clear.

2.3 Services Are Global

Services are becoming increasingly tradable, with knowledge-intensive services exports, in particular, growing in significance for many highly innovative economies (e.g. Luxembourg, Switzerland and the United States)²⁴. The rapid globalisation of services is occurring as firms increasingly source their services inputs internationally (also known as services 'offshoring'), facilitated by the rapid deployment of broadband networks and the growing scope for digitisation of services²⁵.

The reliance of services on knowledge and innovation, combined with the effects of globalisation, means that the locus of many parts of the services value chain is increasingly moving to offshore locations. While some manufacturing firms have managed to retain operations in Australia through increased specialisation in design, branding, marketing and logistics (which are essentially services activities themselves), there is growing evidence that the knowledge base of high value-adding services sectors, especially where R&D is concerned, is increasingly mobile. As well as having implications for jobs, this trend suggests that services firms cannot necessarily rely on local specialisations in the high-value adding part of their operations²⁶.

Global competition will lead to pressures to outsource operational functions, including those that are knowledge-intensive, to those locations which are most cost-effective, especially as the highly-skilled workforces of countries such as India and China become more accessible. The OECD has estimated that close to 20% of jobs in countries such as the US, Canada, Australia and within Europe could be affected by the trend towards global outsourcing²⁷. For the US alone, it has also been shown that up to 50% of current services jobs are potentially 'offshorable'²⁸.

The globalisation of services, while a real and growing phenomenon, currently represents only a small proportion of overall international trade for OECD countries. Figure 2 shows that the trade to value-added ratio of the services sector compared to that in the good producing sectors is currently still low²⁹, and it is estimated that services trade accounts for only about 20% of total OECD trade.

²⁴ See Figure 2 in Appendix B.

²⁵ OECD 2005 (p7)

²⁶ Demos Atlas of Ideas 2006.

²⁷ OECD 2005 (p7)

²⁸ Blinder 2006

²⁹ The trade to value-added ratio refers to the average of exports and imports of services (goods) as a share of value-added in the services (goods) producing sectors, where the goods-producing sector includes agriculture, mining, manufacturing, electricity, gas and water and the services-producing sector covers all other industries.

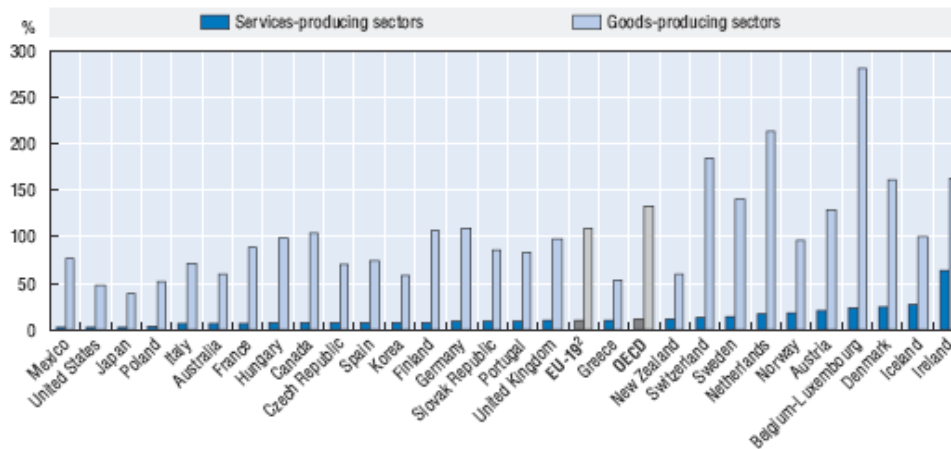


Figure 2: Trade to value added ratios of the services- and goods-producing sectors, 2002³⁰

It is expected, however, that the globalisation of services will continue as more countries liberalise their trading regimes in services, the mobility of highly skilled workers increases and technological development continues to expand the opportunity for digitisation of many services activities³¹. Business models that understand and take advantage of these dynamics are the key to creation of sustainable competitive advantage in the services domain.

The globalisation of services creates both new opportunities and new competitive pressures for existing firms and industries. The rapid restructuring of the sources of comparative advantage - as changing cost structures and the mobility of knowledge bases and human capital lead to increasingly specialised market niches - generates both opportunities and adjustment costs, which 'may not be equally distributed across workers, industries and countries'³².

In this changing landscape, it is crucial that firms strive for, and achieve, global competitiveness. The capability to export to – and compete successfully in – world markets is especially important for Queensland-based firms due to the relatively small size of the domestic market. It is primarily through delivery to world markets that economies of scale and scope, which underpin innovation and productivity growth in services, are usually best achieved. Firms that export are more likely to be exposed to new technologies and ideas, to have more efficient production processes, and to be alert to new opportunities and competitive pressures as the global economic environment continues to change.

Leveraging Queensland's unique strengths to create sustainable sources of competitive advantage is therefore key to generating the revenue growth that leads to high-value job creation in the services sector. Scaling up Queensland's knowledge intensive services sector - by focusing on global exports and competitive strengths - provides a robust route to future high-value job

³⁰ OECD 2005 (p14)

³¹ There is also concern that international trade of many ICT-enabled services is not currently captured in official data collections, implying that current statistical snapshots of trade in services may under-represent actual economic activity in this area.

³² OECD 2005 (p7)

creation, and an important component of Queensland's economic transformation in the context of rapid restructuring of global comparative advantage.

2.4 Smart Services

Strengthening the performance of services is considered crucial to the growth of employment, productivity and innovation in developed economies³³. Fostering the growth of services, however, requires a comprehensive understanding of their nature. Not all types of services activities generate high-value jobs, for example, and similarly not all are conducive to international trade.

At present, the standard industry classification system fails to distinguish those service activities which are both knowledge-intensive and have the potential to be traded globally. In order to provide conceptual clarity, a definition of 'smart services' has been developed based on the following characteristics:

- **Human capital** is an essential component, in that physical capital cannot be substituted for 'labour' to the degree currently possible in manufacturing or resource-based industries (this corresponds to the view that many services "typically involve the provision of human value added in the form of labour, advice, managerial skills and so on" [IBISWorld 2005]).
- There is a reliance on a '**knowledge-base**' which may derive from scientific research, domain knowledge (including local strength in a related industry) and/or technological know-how.
- There is some degree of **customisation** involved in the provision of smart services; that is, smart services cannot be mass-produced (i.e. they are not 'homogenous'). Customisation is here defined as modification requiring human input rather than changes made automatically (and typically by computerised means)³⁴. The customisation characteristic means that smart service providers can influence the price they receive, even on international markets in the presence of global competition.
- There is a **global need** i.e. the service provides a solution to problems that are not unique to the local environment. In other words, there is actual or potential demand outside the local market.

These four characteristics are common to all services which are both knowledge-intensive and potentially exportable. In particular, the 'global need' characteristic of smart services emphasises that they are only potentially exportable (and therefore considered to be 'smart') if a market demand exists outside the domestic context in which the service was initially developed.

³³ OECD 2005

³⁴ A web portal that delivers personalised settings for each registered user, for example, would not meet this definition of customisation and therefore not be considered as a service under this definition.

This definition of smart services is proposed as a more explicit characterisation of knowledge-intensive services that face high potential growth through global exports, and can therefore have a significant impact on the transformation of Queensland's economy. It is suggested that, compared to current classifications, this definition of smart services can provide a more useful conceptual basis for industry discussion, strategy and ongoing policy development and implementation.

2.4 Smart Services In Queensland

Although the current industry classification system provides an incomplete definition of smart services, the statistics that are available can be used to derive a broad sketch of the nature of the knowledge-intensive, market-based services sector in Queensland as compared to other economies³⁵.

A fuller analysis of current data, provided in Appendix B, suggests the following:

- Queensland's total services sector is a slightly smaller proportion to that of Australia and the OECD, and the knowledge intensity of services in Queensland is relatively low by national standards.
- Queensland's knowledge-intensive market services as a sector in its own right is about three quarters of the size of Australia's³⁶.
- Finance and insurance in Queensland remain small compared to their relative size in other Australian jurisdictions. While this sector in Queensland is growing much faster than the services sector as a whole, it is growing more slowly than that for Australia.
- Business services in Queensland have been growing strongly compared to the rest of Australia but still make up a comparatively smaller part of the State's economy.
- Reflecting the strength of resources-based exports from the State, only 20% of total Queensland exports in 2004/05 were generated by the services sector. Within the services exported by the State in that period, only 22% were classified as knowledge-intensive. On average in the rest of Australia in 2004/05, 49.7% of services exports were knowledge-intensive.

³⁵ As specified in the introduction to section 2, knowledge-intensive, market-based services cover post, telecommunications, finance, insurance and business activities (excluding real estate), which includes scientific research, computer, legal, accounting, architectural, marketing, mining and operational leasing services. It should be noted that while education exports represent a significant and growing source of export revenues for Queensland, they are excluded from these statistics to allow cross-country comparison at the OECD level, which defines education, and health, as 'non-market' based knowledge intensive services activities.

³⁶ 17% of GSP in Queensland in 2004/05 compared to 22% of GDP in Australia in the same period.

- In other words, only 4.5% of total Queensland exports came from knowledge-intensive services industries in 2004/05. By contrast, around 10.0% of total Australian exports in the same year were generated by the knowledge-intensive services sector.

While it is likely that data collections (both nationally and internationally) remain incomplete in reflecting the true value of knowledge-intensive services, it is clear from this broad statistical sketch that Queensland has a relatively small knowledge-intensive market services sector compared to other modern economies, and that, even adjusting for differences in industry structure, exports from this sector are at about half the national average.

3. SUSTAINABLE COMPETITIVE ADVANTAGE

Smart services have to be globally competitive if they are to grow in terms of their significance within the Queensland economy. This is true in two respects: first, only the development of cost-effective solutions to global needs will allow local firms to enter export markets and achieve the economies of scale and scope required to remain competitive in these markets; second, the skilled workers on which the delivery of smart services rely are increasingly mobile, as high-value job opportunities expand in countries such as China, India and Brazil. Correspondingly, smart services industries have to be competitive in two ways: in their ability to deliver world-class solutions in a cost-effective manner, and in their ability to attract and retain the highly-skilled people required to provide the human capital and knowledge base on which smart services depend.

Not all services activities can be classified as knowledge-intensive and not all knowledge-intensive services can be successful in global markets. Many parts of the services sector in Queensland can be currently classified as 'knowledge-intensive', however only those firms that have the ability to compete in world markets will be able to contribute to exports and thereby create a significant number of high-skilled, highly-paid jobs.

The notion of 'sustainable competitive advantage' can be used to describe the smart services industries in Queensland which are capable of delivering high-value, knowledge-intensive services to global markets. A potential sustainable competitive advantage exists in those smart services sectors that:

- Are based on an attribute or quality that is unique to Queensland and therefore not easily replicable in other jurisdictions (sometimes referred to as a 'meta-advantage')³⁷
- Already exist in Queensland in the form of a group of firms (typically SMEs) who are already seeking to exploit the opportunity by either exporting or attempting to export
- Face a growing international market for the service

³⁷ Examples include mega-biodiversity, open skies, and a liberal democratic society combined with a successful market-based economy located in a sub-tropical environment.

- Have access to a knowledge-base derived from either a local R&D capability, local non-scientific know-how, or the ability to buy this generic knowledge from elsewhere
- Can source appropriate skills (technical and management) through local, imported or out-sourced means.

In order to identify, and exploit, sources of sustainable competitive advantage, smart services firms need to develop not only technical and domain knowledge, but also 'market knowledge'; that is, the know-how required to identify and understand changing global needs, and to promote, secure, contract, deliver and support the sale of high-value services in international markets that face these needs. The increasing globalisation of services and rapid technological change create a complex business environment in which smart services firms must learn to effectively operate.

As such, the development and maintenance of sustainable competitive advantage in Queensland's smart services sectors relies as much on market knowledge as it does on scientific R&D and technological know-how. This is an important aspect in which skills – the right 'type' of human capital – are vital to the success of smart services firms.

3.1 Snapshot of Competitive Advantage in Queensland Smart Services

Current statistical collections do not provide a complete basis for understanding the potential for smart services to contribute to future economic growth, high-value job creation and export expansion in Queensland. In order to investigate the issues and constraints experienced by smart services firms, focus groups were held with four sectors:

- Infrastructure and Resources Services (including Mining Services)
- Urban Services (including Design, Planning, Architecture and Construction and Engineering Services)
- Environmental Services
- ICT Services.

While these industries do not represent the only services-oriented sectors in which Queensland may have a sustainable competitive advantage³⁸, these four can be unambiguously defined as knowledge-intensive, and to varying degrees export activities by Queensland firms in these areas are already underway. Importantly, potential sources of sustainable competitive advantage in these sectors can be readily identified, as shown in Table 1.

Smart Services Sector	Potential Source of Competitive Advantage
Infrastructure and Resources Services (including Mining Services)	Queensland's mining sector has achieved global competitiveness and recognition as a technology leader and has attracted large multinational firms to the State. This mature base has allowed specialised services-oriented firms to emerge, delivering to both the local mining sector and offshore markets.
Urban Services (including Design, Planning, Construction, Engineering and Architecture)	Queensland's tropical and sub-tropical climates, high degree of urbanisation and rapidly growing population provide a unique opportunity for specialised urban services development that could be exported to rapidly growing urban regions in Asia that share Queensland's tropical and sub-tropical context.
Environmental Services	Queensland's R&D capabilities have generated world-leading technologies and associated services in pollution, water and resource management, and there is a potential to stake a leadership position in environmental services for tropical and sub-tropical environments.
ICT Services	Queensland's sparse population combined with a large geographic area has led to research strengths in remote sensing, distributed data capture and analysis for complex distributed environments. This could be the basis for export of expertise in ICT-enabled services to regions with highly distributed populations.

Table 1: Snapshot of Potential Competitive Advantage in Queensland Smart Services Sectors

³⁸ Other Queensland services-based sectors demonstrating competitive advantage and achieving global success include health and medical services, education, design and creative industries and tourism.

The degree to which these potential sources of competitive advantage are reflected in current activities undertaken by Queensland services firms varies across sectors. The mining and resources services sector, for example, has already established a significant presence and reputation in off-shore markets, while Queensland's ICT services remain fragmented between multinational firms and a large number of high growth SMEs. There are also crossovers in specialisations across sectors, with, for example, many mining and resources services firms relying heavily on information technologies and applications.

The degree to which firms in these sectors are services-based also varies, from the many environmental services firms which base their specialisation around technologies embodied in products and devices, to consulting engineering and architecture firms that deliver 'pure' services.

All firms within these sectors, however, can be said to be 'services-oriented', in that their business models and specialisations reflect the smart services characteristics – the criticality of human capital, the reliance on a knowledge-base, and the requirement to customise delivery to meet globally relevant needs - as previously defined.

4. OPPORTUNITIES TO EXPAND QUEENSLAND'S SMART SERVICES

In order to understand where strategic actions on the part of industry and Government can create the greatest return on investment, a number of opportunities to strengthen Queensland's smart services sectors have been identified. These areas reflect the key issues and constraints reported by industry participants during focus group research, particularly in relation to the expansion of export capability.

4.1 Strengthening the Smart Services Skill Base

Human capital is an essential component of smart services industries, because physical capital cannot be substituted for human input to the degree typically possible in manufacturing and resource-based industries. This characteristic of smart services means that, as firms in these industries scale up their operations to meet global export opportunities, the availability of appropriately skilled employees is crucial. Many firms surveyed commented that while significant opportunities existed to expand their exports, they were constrained in doing so due to a lack of available skills.

Australia's current skills shortage is widely acknowledged, and constraints on the supply of appropriately qualified scientists, technologists, engineers, finance, accounting, project managers are particularly impacting knowledge-intensive services firms³⁹. A significant majority of firms involved in focus group discussions reported that skill availability was the chief issue constraining their future growth expectations. The reliance of smart services on human capital for expansion means that export capability development and skill availability are inextricably linked. The growing importance of services and increasing global competition for skills implies that the solution to this issue is imperative, but also complex⁴⁰.

One aspect of this issue that may be immediately addressable relates to the 'industry-readiness' of Queensland's university graduates, who represent a key source of potential employees for smart services firms. While little evidence was given that the quality of technical and scientific training of Queensland tertiary students is problematic for employers, many firms reported that the commercial awareness and practical workplace skills of university graduates are currently insufficient⁴¹. A high percentage of firms surveyed estimate that a minimum of 12 months of 'on-the-job' training is required before graduates become productive members of firms' operational activities. Allocating resources to conduct this training and supervision is particularly difficult for small-to-medium sized firms experiencing rapid growth into export markets.

There exists, therefore, an opportunity to develop improved university-to-work transitions by increasing the industry-readiness of Queensland graduates, in the disciplines most highly sought by services-oriented firms. This initiative should focus on ensuring that university students are exposed to a commercial environment as early as possible in their studies, through part-time working arrangements on a 'commercial apprenticeship'-type basis⁴².

Due to the relatively small size of many smart services businesses, the fragmented nature of some of these sectors, and the high transferability of many skills required for smart services

³⁹ Current and projected supply of and demand for science, engineering and technology skills in Australia is examined in DEST 2006.

⁴⁰ It is noted that the Smart State Council report on Education and Skills, due for release in 2006, focuses more on primary and secondary education rather than on skills per se, suggesting that further investigation into skills as a separate issue may be required.

⁴¹ The Business Council of Australia's 2006 report *New Concepts in Innovation* also highlighted the need for education and training systems to increase focus on 'employability skills' such as communication, teamwork, problem solving, creativity, cultural understanding, entrepreneurship and leadership.

⁴² Similar to the model of industry placement during the final years of undergraduate study already in use by the architecture and ICT sectors.

delivery, it is proposed that a community of participating students, alumni, firms and industry associations be established in the services domain. This semi-formal community, through regular networking forums and information-sharing sessions, would assist graduates in identifying career opportunities within the smart services sector as a whole – perhaps encouraging them to remain in Queensland - and improve local firms' access to a pool of industry-ready recruits. A multi-firm, multi-sector, student employment and graduate recruitment program could provide a suitable model⁴³. The establishment of a 'Young Professionals' community for the smart services sector could also assist with the attraction of multinational firms, entrepreneurs and skilled migrants to Queensland.

4.2 Developing Iconic Status for Queensland's Smart Services

Iconic status can be understood as the global recognition that develops when regions become leading adopters of innovative, high-value technologies and services. Iconic status arises when well-solved problems create such impact that the outside perception of a region becomes linked to certain capabilities and strengths in that region. Queensland already enjoys high iconic status in several areas, including its mining industry, through continued technology leadership, and for its tourism industry, through global recognition for the State's unique environment accessible through high-quality, diverse tourism offerings.

Iconic status often develops over time as local conditions and firm specialisations combine to create global market successes and established reputations. Milan, for example, has long been known as the home of luxury brands and design, while Austin's status as a leading research and entrepreneurial hub, especially in ICT, is world-renowned.

In many cases, this process can be catalysed by specific projects, events or initiatives that achieve worldwide recognition for their innovativeness and impact, thereby leading to future growth opportunities. Malaysia's Multimedia Super Corridor, for example, is considered to be the 'main engine' behind the transformation of that country's ICT-based and ICT-enabled industries, with the number of Malaysian ICT firms growing from 300 to over 3,400 over the last decade⁴⁴; similarly, the *Lord of the Rings* trilogy is widely acknowledged as the enabler of 'the development of world class capability (including NZ\$100 million in new investment)' in New Zealand's film industry, including 'the creation of a new dynamic entrepreneurial attitude amongst domestic filmmakers'⁴⁵. In Australia, the implementation of the Snowy Mountains Hydro-Electric Scheme, for example, contributed substantially to the cementing of Australia's reputation for engineering prowess in challenging terrain, and the success of the Sydney Olympics generated extensive export opportunities for many businesses involved in its design, management and provision of associated services.

⁴³ Current examples include the joint recruitment initiative recently launched by Boeing, Suncorp and Mincom, the Cooperative Education Program within QUT's Information Technology faculty, and the Queensland-based Cooperative Education for Enterprise Development (CEED) network.

⁴⁴ [MSC Malaysia – Spearheading Transformation through ICT](#), Malaysian Government (2006).

⁴⁵ [Lord of the Rings Case Study](#), Investment New Zealand (2005).

While success in export can be achieved in the absence of iconic status in a particular domain, significant acceleration in the scaling up of export-led growth does rely on iconic status being achieved. The environmental services sector in Queensland, for example, is better known for the effectiveness and quality of its technology-based services in international markets, rather than a strong implementation base at home, due to lower environmental and sustainability requirements in Queensland. Many Queensland-based environmental services firms have achieved success offshore; however, the historical regulatory environment in Queensland in terms of pollution controls, water management and carbon emission reduction has reduced the scope for the creation of iconic status in this area. Focus group feedback indicated that the absence of a strong environmental regulatory framework in Queensland (and Australia generally) presented a challenge for the environmental services sector in establishing global credibility, and thus a world-leading position, in this domain.

Across all smart services sectors, iconic status can be an important springboard for the development of export opportunities, and this is most effectively achieved when local companies leverage the delivery of world-class solutions at home. At present, Queensland has several opportunities to create iconic status through the delivery of world-class services to solve local requirements. Over the shorter term, the South East Queensland Regional and Infrastructure plans provide an historic opportunity to profile Queensland's capabilities to design, engineer, plan, construct, manage and implement urban solutions. Promoting the iconic status of the rapid urban development of the south east corner will cement Queensland's reputation as a leading centre for urban solutions and services, as well as providing direct lifestyle and amenity benefits to residents. Capturing this opportunity to establish a new source of global recognition for Queensland will provide a leverage point for local firms to deliver these services into offshore markets. In India, China and South East Asia, in particular, economic development and population growth pressures, combined with increasing urbanisation, are creating strong demand for rapid and effective urban development solutions. Worldwide recognition for the impact and effectiveness of Queensland's own urban development would position Queensland-based firms well to capture these new market opportunities.

In the longer term, Queensland has the opportunity to create similar iconic status in the creation of innovative solutions to services delivery requirements for sparsely-distributed populations. These include ICT-enabled delivery of essential and basic services such as health, education, financial, entertainment, and communication services, as well as remote resource monitoring and asset management, and emergency management and response systems. A concerted effort to build an effective platform for the delivery of these services to remote and regional Queenslanders - capitalising on our research strengths in these areas - would enhance the quality and accessibility of these services to all Queenslanders. It would also create an additional leverage point for Queensland firms involved in their implementation to offer these services more competitively in overseas markets, once iconic status has been established.

Indeed, in order to establish and maintain credibility on the global stage, it is already the case that many of Queensland's services-oriented firms rely on the achievement of local success and recognition. The ability for knowledge-intensive firms to successfully export their services to the

world appears, in many cases, to be closely linked to their status at home, by reducing overseas marketing costs, easing offshore clients' due diligence requirements, and creating brand new export opportunities.

Focus group feedback emphasised, in particular, the importance of awards and prizes in establishing credibility and recognition in global markets. Concern was expressed, however, that the breadth and structure of Queensland's Government-sponsored awards do not reflect current specialisations and strengths in the smart services sector. Both the Premier's Smart Awards and the Premier's Export Awards, for example, include only one general category for services. An immediate opportunity exists to review current award categories and, potentially on the basis of community feedback, align them more closely with Queensland's emerging smart services strengths.

In summary, the development of iconic status in Queensland's smart services requires celebrating our current strengths and successes, but also looking to the future to ensure that the State's global profile is strengthened and expanded. With strategic focus, Queensland could become a world-recognised leader in smart rapid urban development services, and in ICT-enabled delivery of smart regional services. The achievement of iconic status in these domains would imply that high-value solutions have been delivered by Queensland-based firms for the benefit of the community, and that the impact and effectiveness of these solutions are recognised both at home and in the eyes of the world. By raising Queensland's profile for being 'smart' in these areas, iconic status will also help attract skills and investment into the State⁴⁶. By solving local problems with an eye to global needs, the creation of iconic status will both improve outcomes for Queenslanders, and open new global opportunities for Queensland firms.

4.3 Addressing Industry Development Needs for Queensland's Smart Services

Smart services firms face unique challenges in the development of export capability. There does not appear to be, however, a standard formula for the development of export capability across all services sectors. Focus group evidence suggests that the constraints and issues faced by firms in achieving sustained export success varies with the source of competitive advantage, the degree of industry fragmentation, differences in firm size and demand conditions in target markets.

Opportunities to form partnerships and alliances, in order to create critical mass in export markets, vary in each sector. In some cases, such as urban services, the formation of local consortia across sectoral boundaries to pursue large offshore projects appears promising, while in others, such as IT, alliances with locally-represented, multi-national industry leaders can generate new export opportunities. Highly fragmented sectors, such as environmental services, are dominated by small firms that would benefit from increased knowledge-sharing and networking opportunities.

⁴⁶ As occurred, for example, with the vast influx of skilled workers from India and China into Silicon Valley over the last twenty years, where it is now estimated that one-third of the population of engineers is foreign born and primarily from Asia, and that over thirty percent of the total number of technological start-ups created since 1980 are run by Indian and Chinese entrepreneurs (Saxenian 2000).

In all cases, it was clear that knowledge of global market opportunities and development of the business capabilities required for culturally-varied export markets is most effectively gained through 'on-the-ground' experience. This export knowledge is expensive and difficult for small, high-growth firms to acquire in a timely and efficient manner. Currently, Queensland Government trade offices in offshore locations provide support to all firms wishing to access export markets, while sector specific organisations (such as the Information Industries Bureau) provide support locally on a sector-by-sector basis. What appears to be missing across all smart services sectors is a link between the 'on the ground' identification of export opportunities in offshore markets and knowledge of local industry strengths⁴⁷. Connecting offshore market intelligence with local industry consortia would enable Queensland smart services firms to create critical mass in the pursuit of large, high value export opportunities⁴⁸.

Even where smart services sectors have achieved export success, the level of sophistication in the local demand environment is key to growth and the development of new innovations in many cases⁴⁹. For some sectors (such as ICT and urban services) the Government is a significant consumer of technologies and services, and could potentially be so in others (for example, environmental services). Focus group feedback emphasised that the impact of rules relating to services provision to Government may not be fully understood or recognised for all smart services sectors, in areas such as innovation partnerships, risk management and the need for a diversity of services providers even for whole-of-Government and other major projects. A more standardised and transparent framework that manages risk through a portfolio approach would create benefits for all firms in Queensland's smart services sectors, whether multi-national, Australian or local, large, medium, start-up or small.

Finance requirements for services-based firms attempting to scale up their global operations are also different to manufacturing- and resources-based models. While there is a fledgling venture capital market for spin-outs and start-ups in Queensland, these are typically structured around companies that are technology-product based. Services-oriented firms, by contrast, often do not own defensible IP (e.g. in the form of patents) because intellectual property resides in highly intangible assets such as proprietary processes or in-depth, tacit domain knowledge embodied in key personnel.

While finance requirements vary on a firm-by-firm basis⁵⁰, focus group evidence suggests that the services-oriented business model may be poorly understood by the local investment market, especially with regards to provision of equity finance. It is well documented that a funding gap exists in the Queensland market, in the range of \$500,000 to \$1million, due to a sparse business

⁴⁷ The Peer Group, Corporate Engagement and Export Development programs currently being trialled by the Information Industries Bureau may provide a suitable model for the development of this mechanism across the smart services sector generally.

⁴⁸ Focus group feedback highlighted that private sector services organisations from overseas countries are often supported in competing for export projects by their respective Governments, with the evident aim of increasing potential to expand the scope of the project to involve wider consultancy services across a range of specialisations and providers. Japan, Germany and the USA often utilise this model, thus creating an edge of credibility over 'unsupported' private sector tenderers.

⁴⁹ Sophisticated demand was highlighted as one of the drivers of regional innovation systems in the Smart State Council report on Smart Regions.

⁵⁰ Especially where firms operate on a hybrid technology-product/service model.

angel community and high fixed costs faced by venture capital firms in deal evaluation and monitoring, making early-stage investments less cost effective⁵¹. Where such funding is provided it is generally invested in firms with a highly defensible, product-based intellectual property position, although examples of venture capital investment in pure services firms do exist in Queensland.

It is also well recognised that the wider economic benefits of innovation investment accrue in significant part to the providers of risk capital, rather than to entrepreneurs themselves. Focus group discussions highlighted that many Queensland-based, services-oriented start-ups with high global growth potential have been forced to seek finance off-shore, through mechanisms such as private equity channels in the US and listing on the Alternative Investments Market (AIM) in London. This appears to be particularly the case for technology-based firms that generate a significant portion of their revenue from the provision of associated services, such as those providing environmental services and some participants in the ICT and mining and resources services sectors.

While the services-oriented business model can allow organic, client-financed growth as new contracts are secured, there is anecdotal evidence that Australian venture capital and private equity providers are reluctant to provide the investment required for aggressive international expansion where knowledge-based services are concerned. Focus group feedback highlighted that constraints on access to expansion capital are particularly problematic for firms in highly fragmented sectors, such as environmental services, where the absence of large, established players means that external sources of investment must be relied upon rather than financing expansion through risk-sharing alliances and partnerships⁵². The requirement to go off-shore for finance can lead to a lower economic return for Queensland, as profits are re-invested outside the State and firms often face re-location demands to suit investor requirements, thereby diminishing the job creation benefits of the smart services sector.

Overall, there is an opportunity for Queensland to ensure that industry development strategies and efforts take full account of the unique requirements of smart services sectors. Issues such as consortia formation, links to export market intelligence, provision to Government and finance requirements, as highlighted by focus group discussions, are best addressed on a sector by sector basis. While Queensland Government industry development policies currently target a number of so-called priority sectors, these may not accurately reflect current and emerging specialisations in the export-oriented, smart services domain. Reframing industry development strategies around sources of sustainable competitive advantage, including recognition of services as a key driver of future job creation and economic growth, will bring Queensland's economic development strategy in line with current best practice⁵³.

⁵¹ This investment gap is described in more detail in the Smart State Council Report on Business Expenditure on R&D and Access to Capital.

⁵² The partnership model of funding and risk-managing international growth appears to be prevalent in more established industries, such as urban services and resources and infrastructure services, where small firms often achieve expansion in partnership with a 'big brother' firm under supply agreements or joint ventures.

⁵³ As exemplified by the 2005 OECD Ministerial Report *Growth in Services*.

Appendix A: Services Definitions

The **services sector** encompasses the following industry classifications as defined by the OECD ISIC revision 3: wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods (G); hotels and restaurants (H); transport, storage and communications (I); financial intermediation (J); real estate, renting and business activities (K); public administration and defence, compulsory social security (L); education (M); health and social work (N); other community, social and personal activities (O); private households with employed persons (P); extra-territorial organisations and bodies (Q) (OECD Glossary 2006).

Knowledge-intensive services are defined as: education, health, postal and telecommunications, finance and insurance and business services (excluding property services) (OECD Science, Technology and Industry Scoreboard 2005);

- where business services includes: scientific research, computer, legal, accounting, architectural, marketing, mining and operational leasing services (ISIC divisions 64-67, 71-74, 80 and 85).

Tradeable Knowledge-intensive Services are defined as: education related travel services, royalties and license fees, total confidential items, as well as communication, construction, insurance, financial, computer & information, Government, other business and personal, cultural and recreational services (Source: DSDT).

Appendix B: Detailed Analysis of Smart Services in Queensland

Queensland's services sector represents approximately 68% of our economy in 2002, less than Australia at 71% and the OECD at 72%. In 2005, the total services sector (i.e. knowledge- and non-knowledge intensive activities) contributed approximately 70% to Queensland's Gross State Product (GSP), behind only the ACT (89%), NSW (77%) and Victoria (73%). These shares are roughly equivalent to the size of the overall services sectors in other OECD countries, as shown in Figure 1.

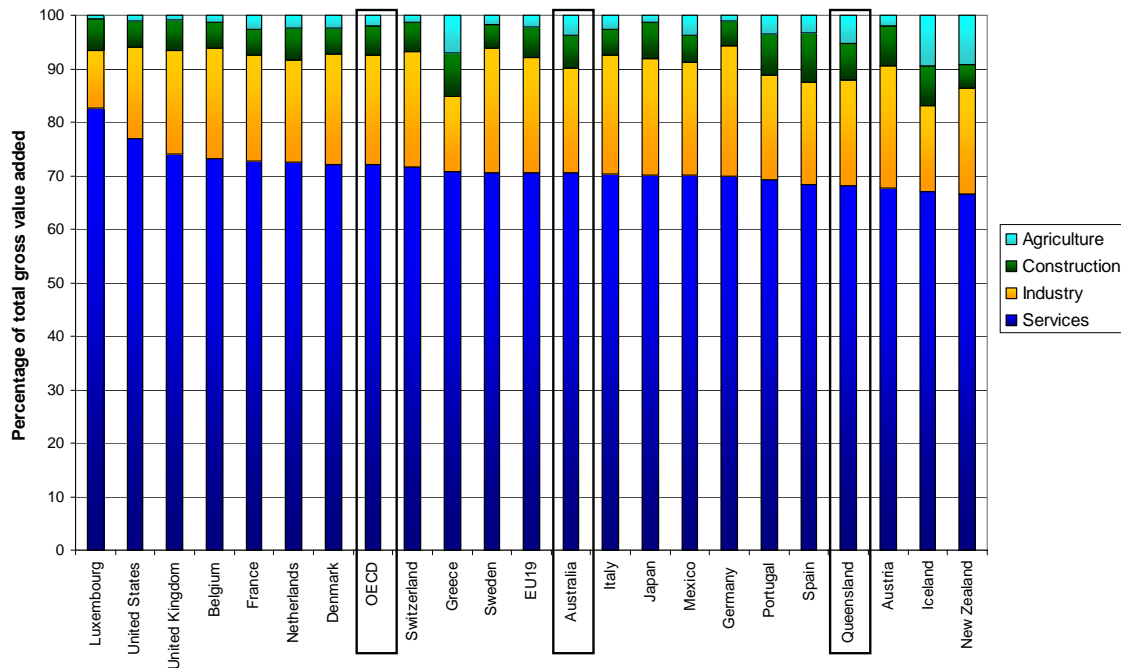


Figure 1: Services, Industry, Construction and Agricultural industries as a Percentage of Gross Domestic / State Product (2002)⁵⁴

However, looking at the composition of services within the Queensland economy tells quite a different story. In 2004/05, only 24% of all services activities within Queensland were knowledge-intensive, compared to 31% on average for Australia and 33% and 35% for Victoria and NSW respectively (excluding health and education in all cases).

Ignoring the relative size of services shares overall (which can distort comparisons between the absolute size of KIS sectors), Figure 2 shows that knowledge-intensive market services contributed just over 16% to GSP in Queensland in 2002, compared to the OECD average of 20% and an Australian average of 22%.

⁵⁴ Calculations based on Monash Estimates and OECD Science, Technology and Industry Scoreboard 2005.

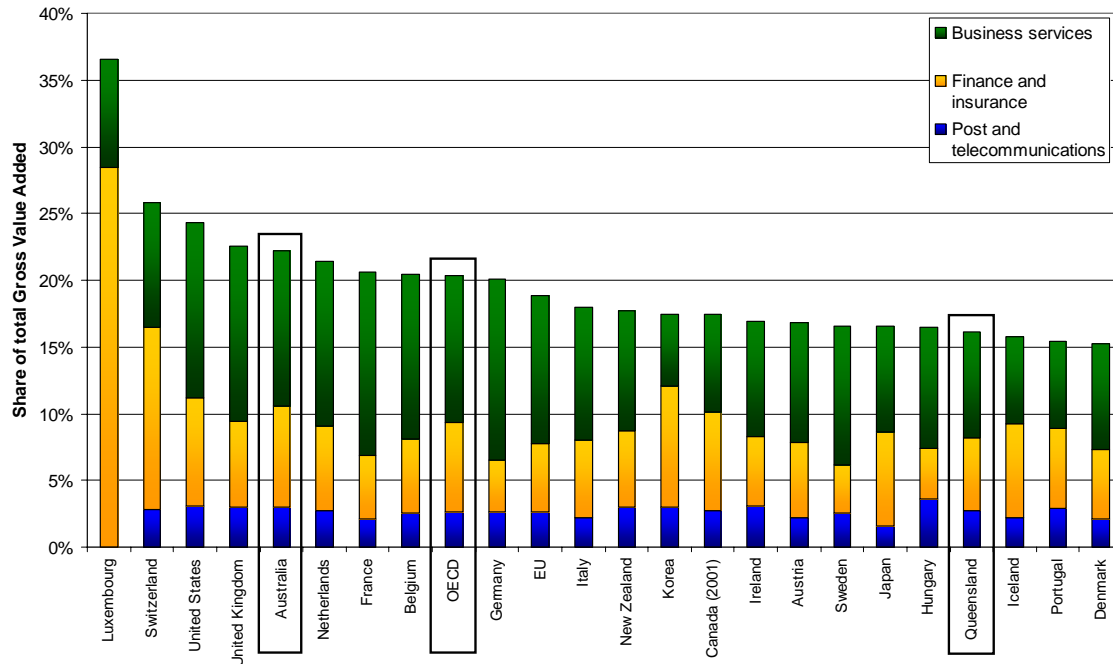


Figure 2: Knowledge Intensive Market Services as a percentage of Gross Domestic / State Product (2002)⁵⁵

In 2004/05, knowledge-intensive market services continued to contribute less to Queensland’s total economic output compared to the rest of Australia across all major categories, as shown in Table 1.

	Queensland	Australia
Post and Telecommunications	2.86%	3.04%
Finance and Insurance	5.71%	8.55%
Business Services	8.38%	10.53%
Total	16.95%	22.12%

Table 1: Percentage of GSP/GDP contributed by Knowledge-Intensive Market Services, 2004-05⁵⁶

The biggest discrepancy in the share of knowledge-intensive services contribution in Queensland compared to the rest of Australia is in finance and insurance, where Queensland has an especially small concentration of deposit-taking financiers and providers of services to insurance. Within the business services category, Queensland has relatively small contributors in mining exploration, scientific research, computer services, and marketing / business management services compared to the rest of Australia, but a relatively strong concentration in machinery/equipment hiring and leasing.

From 1996/97 to 2004/05, business services grew strongly in Queensland at an average annual rate of 8.42% compared to 6.59% in the rest of Australia. In the same period, Queensland’s finance and insurance services grew at 8.64% on average per year, however this was outstripped

⁵⁵ Calculations based on Monash Estimates and OECD Science, Technology and Industry Scoreboard 2005.

⁵⁶ Calculations based on Monash Estimates.

by average annual growth in financial and insurance services in the rest of Australia in this period of 10.21%.

Reflecting the dominance of mining and agricultural exports in Australia, the contribution to Australia's total exports from the services sector was 22% in 2004, above the 20% share of services in total exports from the European Union in the same period but below the 34% and 28% services share of exports from the United Kingdom and the United States respectively.

Within Australian jurisdictions, there is a very wide distribution of the services share in total exports, as would be expected when the diverse nature of State and Territory economies is taken into account. In 2004/05, fully 100% of the ACT's exports were services-based, compared to 6% in Tasmania and 7% in WA. Queensland's services sector contributed 20% to total exports in that period, around the same as the national average of 22% but well below the share contributed by the services sectors in NSW (41%) and Victoria (31%).

While Queensland's share of services in total exports is around the national average, as shown in Table 2, Queensland has the third lowest proportion of knowledge-intensive services exports as a proportion of total exports compared to all other Australian States and Territories.⁵⁷

	2000-01	2001-02	2002-03	2003-04	2004-05
ACT	82.1%	83.9%	86.7%	86.0%	84.6%
NSW	19.5%	18.1%	21.1%	22.5%	20.6%
VIC	10.9%	11.7%	14.2%	14.7%	15.3%
NT	6.7%	9.4%	9.6%	12.4%	11.4%
Australia	9.3%	9.1%	10.2%	10.9%	10.0%
SA	5.8%	5.8%	6.5%	7.0%	7.2%
QLD	4.2%	4.3%	5.2%	5.3%	4.5%
TAS	2.8%	3.1%	3.2%	3.3%	3.2%
WA	2.3%	2.7%	2.7%	2.7%	2.3%

Table 2: Knowledge-Intensive Service Exports as a % of Total Exports

While these statistics do not provide a complete insight into 'smart services' in Queensland because they are based on the current industry classification system, they do suggest the following:

- Queensland's total services sector is a slightly smaller proportion to that of Australia and the OECD, and the knowledge intensity of services in Queensland is relatively low by national standards.
- Queensland's knowledge-intensive market services as a sector in its own right is about three quarters of the size of Australia's smaller in Queensland than in Australia on average⁵⁸.

⁵⁷ Note however that this may reflect a disproportionately higher rate of non-knowledge intensive services or 'non-market' knowledge intensive services exports (such as education) in Queensland compared to other Australian jurisdictions.

- Finance and insurance in Queensland remain small compared to their relative size in other Australian jurisdictions. While this sector in Queensland is growing much faster than the services sector as a whole, it is growing more slowly than that for Australia.
- Business services in Queensland have been growing strongly compared to the rest of Australia but still make up a comparatively smaller part of the State's economy.
- Reflecting the strength of resources-based exports from the State, only 20% of total Queensland exports in 2004/05 were generated by the services sector. Within the services exported by the State in that period, only 22% were classified as knowledge-intensive. On average in the rest of Australia in 2004/05, 49.7% of services exports were knowledge-intensive.
- In other words, only 4.5% of total Queensland exports came from knowledge-intensive services industries in 2004/05. By contrast, around 10.0% of total Australian exports in the same year were generated by the knowledge-intensive services sector.

⁵⁸ 17% of GSP in Queensland in 2004/05 compared to 22% of GDP in Australia in the same period.

Appendix C: Productivity Growth in Services

Across OECD countries, services now account for more than 70% of total employment and value added. There is an ongoing debate in the economics literature with regards to the source of productivity, and therefore sustained economic growth, in these services-based economies, which increasingly also characterise many rapidly-growing, 'developing' economies. The standard definition of productivity growth – where output increases for a given level of inputs, including 'labour' – is only able to explain the rise of services in the context of near-full employment, as experienced over the last decade in many developed economies, to a limited, and therefore unsatisfactory, extent. Two concepts are important to this debate.

First, productivity growth has, in the past, generally been associated with lower labour costs per unit of output, which has typically been ascribed to the substitution of physical capital (via complete automation or partial technological augmentation) for human labour inputs. This view implies that as output grows, employment of human capital will decrease proportionally – in other words, as economic activity in the services sector grows, it should be expected that employment in these industries shrinks, rather than grows, as a percentage of their size.

Second, it was proposed in the late 1960s⁵⁹ that services, by their nature, are unable to produce 'true' productivity improvements due to their inherent reliance on human inputs, with the classic example being the statement that 'after 300 years, it still takes four people to deliver a string quartet performance'. This view has been labelled the 'productivity disease' of services⁶⁰, because growth in revenues and outputs in services tend to be associated with increases in human input, with the implication that innovation through technological substitution is less likely than in other sectors.

The recognition that services are a significant source of productivity growth overturns the historical perception that services suffer from a productivity 'disease'⁶¹. More importantly, it is now acknowledged that, in services, 'employment and productivity growth can go hand-in-hand'⁶². Across the OECD, differences in the level of services employment now account for almost all variation in aggregate employment rates amongst countries, and, on average over the last decade, the bulk of jobs growth in the OECD area has occurred in services industries, with most jobs created involving highly-skilled workers⁶³.

The ability to both create jobs and achieve productivity growth through technological innovation is what sets services apart from manufacturing, agricultural and resource-based industries, where productivity gains typically arise from the increased substitution of technology for labour inputs, rather than the simultaneous increase in the use of both. Furthermore, the strong performance of

⁵⁹ Baumol 1966

⁶⁰ Commonly referred to as 'Baumol's disease'.

⁶¹ Or in other words, 'Baumol's disease has been cured', Triplett and Bosworth 2003.

⁶² OECD 2005 (p9)

⁶³ OECD 2005 (p2 and p5)

services is not only important for their own sake; it also helps underpin growth in those sectors, including manufacturing, that use services as an input⁶⁴.

Services firms generally, therefore, rely predominantly on human, rather than physical, capital, as their primary source of sustainable competitive advantage; and knowledge-intensive services, in particular, require specialised skill sets and domain knowledge for their ongoing growth. As productive knowledge-intensive services firms grow, in other words, so too does the number of highly skilled jobs.

⁶⁴ OECD 2005 (p8)

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