Inquiry into the Australian Service Industries

House of Representatives Standing Committee Economics, Finance and Public Administration

ENGINEERS AUSTRALIA

December 2006

Contact: Leanne Hardwicke
Director, National and International Policy
Engineers Australia
11 National Circuit, Barton, ACT 2600.
Tel. 02 6270 6544, Fax. 02 6273 4200.
email: lhardwicke@engineersaustralia.org.au
http://www.engineersaustralia.org.au

Introduction

Engineers Australia appreciates the opportunity to provide information to the House of Representatives Standing Committee on Economics, Finance and Public Administration’s inquiry into the Australian service sector.

Engineers Australia is the peak body for engineering in Australia, representing all disciplines and branches of engineering. Membership is now approximately 80,000 Australia wide and Engineers Australia is the largest and most diverse engineering association in Australia. All Engineers Australia members are bound by a common commitment to promote engineering and to facilitate its practice for the common good.

The continued evolution of Australia’s economy will be determined by the international success of the services sector. Services play an essential role in determining both the quality and speed of economic progress, and Australia will be unable to compete in the international economy without an efficient and technologically advanced services sector.

Engineering services is just one of a number of professional services now being regularly traded internationally. Accountancy, legal and architectural services also form part of the international trade in professional services.

Higher levels of mobility and expansion in the international delivery of professional services are leading to increased numbers of professionals undertaking activities in countries other than the one in which they gained their initial qualifications and experience. Professional service providers, including engineers, are leading this charge into international markets. Australian engineers have the expertise and capabilities necessary to succeed in providing professional services in the rapidly growing international market place.

However, there are major impediments to the international provision of professional services, such as the non-recognition or limited acknowledgment of home country education, qualification or accreditation/licenses. Other major non-tariff barriers to services trade include nationality and residency requirements; restriction on incorporation; restricted eligibility for contracts including government procurement contracts; and prohibition on advertising. Restrictions on foreign direct investment and ownership; requirements pertaining to a minimum number/percentage of local staff; and restrictions on the international relationship of locally established firms are the most common barriers identified by Australian service providers.

This submission would like to address two of the terms of reference of the inquiry, namely: the future global opportunities for Australian engineering exports; and policies for realising these opportunities. In doing so, the submission provides:

- Information on trade in services generally
- A profile of engineering exporters
- Information on impediments to export of engineering services
- Recommendations to improve trade in services

1. Trade in Services

Globalisation has led to increased economic integration and technical developments that have, in turn, supported the growth of traded services between individuals, companies and governments throughout the world. While international transactions across geographical borders were impossible or prohibitively expensive in earlier times, the ease with which people can now travel and communicate across borders have made international transactions commonplace.

Export of services accounts for 20 percent of Australia's exports, a proportion that is growing faster than the export of goods. While the growth is welcomed, the export of trade in services could be significantly increased.[1]

This section considers the level of support for services liberalisation, and the importance of trade in services, while highlighting the inadequacies of trade statistics, which inhibit an effective focus on individual trade in professional services sectors like engineering.

1.1 Services liberalisation

Despite strong theoretical and empirical support for the benefits of openness, trade liberalisation and globalisation have not been embraced with enthusiasm in all quarters.[2] A primary concern has been that the developing economies may not be able to benefit from a more open trading environment and will fall even further behind developed economies. This concern fails to recognise that developing countries have much to gain from participating in trade liberalisation.

Critics of services liberalisation assert that open markets will bring about a number of unfavourable outcomes. While some critics are concerned with the outcomes for less developed nations, others are voices from workers, incumbent firms and bureaucracies who perceive liberalisation as a threat to employment and profitability. Most of their claims and concerns can be classified under the following categories:

- Liberalisation will reduce the availability, increase the costs, threaten the quality, or skew the distribution of social services such as health and education, or vital utilities such as electricity and water;
- Unlimited entry of cultural products such as films, television programs, and music will undermine, displace and marginalise indigenous cultures;
- Multinational corporations will be the only real beneficiaries of open services markets, and the open markets will give them the means to overwhelm their smaller competitors, especially in developing countries; and
- Liberalisation threatens a country's sovereignty and the right to regulate.[3]

Despite these concerns, Engineers Australia believes that there are significant economy wide benefits deriving from services trade and investment liberalisation for both developing and developed nations. In particular liberalisation that allows the internationalisation of engineering expertise, drives technology transfer and has the potential to boost living standards and support development worldwide.

The global welfare effect of services liberalisation is regarded to be in the same scale as the full liberalisation of barriers to trade in merchandise (agriculture and manufacturing). A study by Dee and Hanslow[4] found that the world as a whole is projected to be better off by more than US$260 billion annually as a result of eliminating trade barriers. Half of the overall welfare gain, US$130 billion, would take place from the liberalisation of services trade.

Developing countries stand to gain relatively more than industrial countries from liberalising their services trade. The gains in welfare (expressed as a percentage of Gross Domestic Product - GDP) from a "hypothetical" 25 percent reduction of service sector protection were estimated to represent 1.2 percent for the United States (US) and Japan and 1.0 percent for the European Union. The corresponding values were 3.0 percent for the rest of South Asia, 2.9 percent for ASEAN countries, 2.5 percent for a group of newly industrialising economies and 1.4 percent for India.[5]

Trade is a particularly important factor in fighting poverty. According to the World Bank, liberalising trade could lift an additional 66 million people out of poverty, and boost global welfare by US$290 billion per year, by 2015[6]. Services will play an important role in building global wealth and welfare as increased services trade leads to investments in human resource development and contributes directly to a country's economic growth and increases productivity. According to a recent publication by the Australian Department of Foreign Affairs and Trade (DFAT), in Australia trade has created jobs, improved living standards and benefited local communities[7]:

- Trade has provided Australian consumers and businesses with access to a greater range and choice of goods and services at competitive prices;
- Trade has lowered our costs of living through access to cheaper imports for every-day items;
- Exporting companies have generated local demand for jobs, higher incomes, better public infrastructure and improved services;
- Trade has encouraged innovation and use of new technology, making Australian businesses more competitive and efficient; and
- International trade has diversified Australia's national income, increased the economies reach to the world's six billion people and reduced vulnerability to global economic downturns.

This has been, or can be repeated in both developed and developing countries around the world and support for the services sector, in particular international trade in engineering services will play a key role in the growth of developed and developing economies alike.

While developed countries currently dominate trade in services, overall many developing countries have shown substantial capability and know-how in a growing number of fields including shipping and port services and construction services. Working in lower cost environments, developing countries have found they have a comparative advantage, particularly in the provision of labour intensive services.

The importance of the services sector to developing countries is indicated by the major contributions services sectors are making to the GDP of developing countries. The World Bank has found that services made up 24 per cent of GDP in Nigeria, through to 88 per cent of GDP in Hong Kong SAR in 2004. Services trade is also an important income source in the economies of the 50 least developed countries.

Services liberalisation and trade negotiations like those that occur through the World Trade Organisation (WTO) provide important opportunities for developing countries. In particular, developing countries can benefit from the market access commitments made by other economies. For example the commitments made by developed countries to improve temporary entry for business people. By gaining experience in efficient services sectors overseas, developing country workers can take important skills and experience home with them. This process, or "technology transfer", plays a critical role in developing domestic service industries.[8]

Barriers preventing services and service providers interacting with local firms have the potential to significantly slow down technology diffusion between countries and service sectors like engineering. With the removal of barriers, the best technologies are selected through market mechanisms, not by trade policy incentives that introduce distortions into the economy.

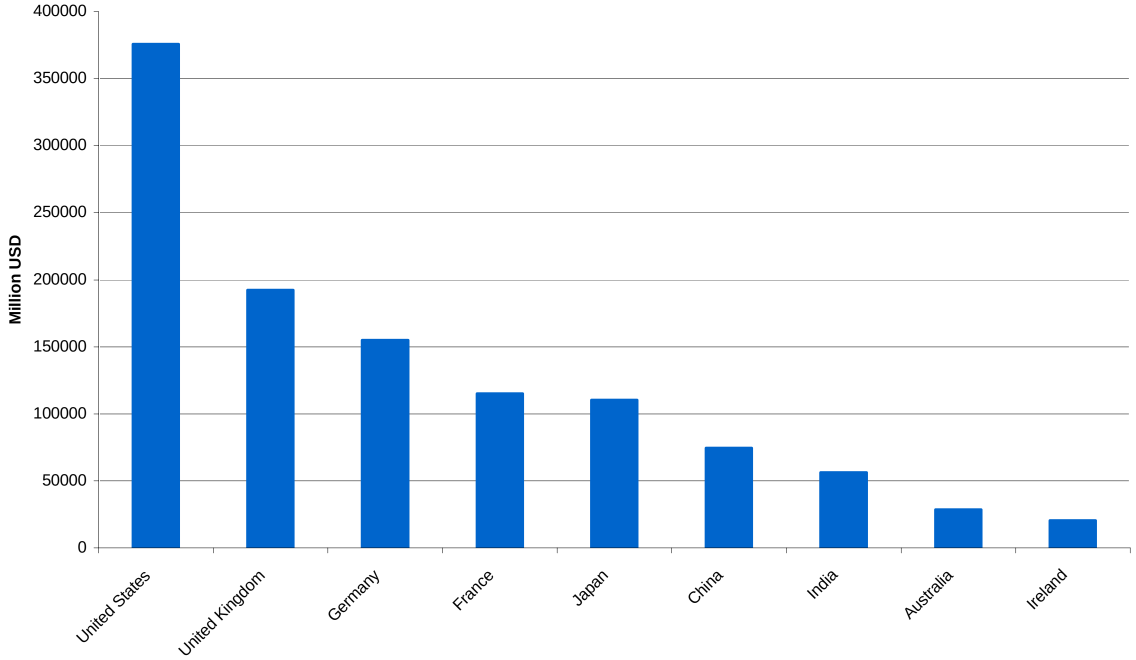
Open services markets can strengthen capacities to learn, adapt to new technologies and allow economies to climb the technology ladder. Technology is behind a growth process where more trade leads to more technology flows and more technology to more trade and growth. Trade facilitates technology diffusion, but technology also acts as a catalyst for trade.

Overall, the potential gains from international cooperation and enhanced trade in the services sector are substantial and obtainable by both developed and developing countries alike.[9]

1.2 Value of trade in services worldwide

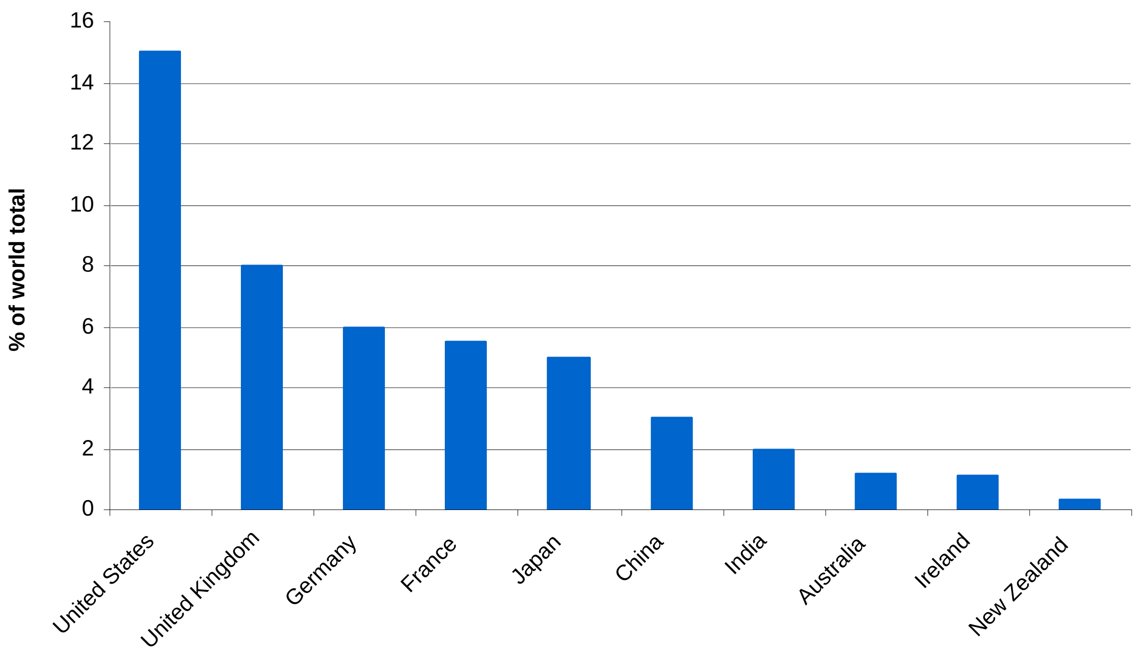
In 2000, world exports of services were US$1435 billion, or approximately 20 percent of total world exports.[10] This figure increased nine percent or US$209 million from 2004-2005 to bring the value of world services exports to US$2.4 Trillion in 2005.[11] Services trade now accounts for the principal share of GDP and employment in both developed and developing economies. A 1997 report found that the services sector is about 40 to 60 percent of GDP and employment for developing economies and 60 to 80 percent for developed economies.[12] Figures 1.1 and 1.2 illustrate the continued significance of exported services for a number of countries.

Figure 1.1: Value of services exports 2005 (various countries)



Source: Organisation for Economic Cooperation and Development, Statistics of International Trade in Services: Partner Country Data and Summary Analysis, 2005.

Figure 1.2: Services exports as a percentage of world total exports 2005 (various countries)



Source: Organisation for Economic Cooperation and Development, *Statistics of International Trade in Services: Partner Country Data and Summary Analysis, 2005*.

1.3 Value of trade in services to Australia

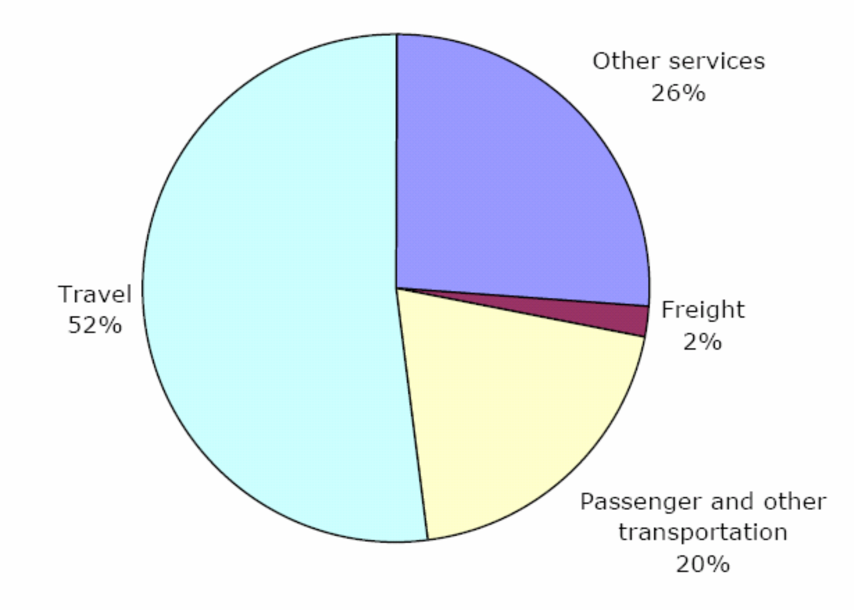
Service exports accounted for 20 percent of Australia's total exports, or $31.2 billion in 2001. Each year to 2005 (the latest data available) Australia's services exports continued to rise, growing twelve percent in 2005 to $37.2 billion and accounting for 1.2 percent of world exports of services.[13]

Four out of every five Australian workers are employed in services industries, of those industries, most have an export focus. Over the past decade, Australia's export industries have created more than 250,000 Australian jobs with Australia's services exports growing more rapidly than agriculture, mining and manufacturing exports.[14] Services industries are now collectively more important than any other sector of the Australian economy, accounting for around three-quarters of gross domestic product. Recent estimates show that as many as 80 percent of firms that export are now from the services sector.[15]

The major components of Australia's services sector are (Figure 1.3):

- Travel;
- Freight;
- Passenger and other transportation; and
- Other services, which include communications, construction, insurance, financial, computer and information services, royalties, personal, cultural and recreational, government and other business services.

Figure 1.3: Exports of services by type (share of total) 2005

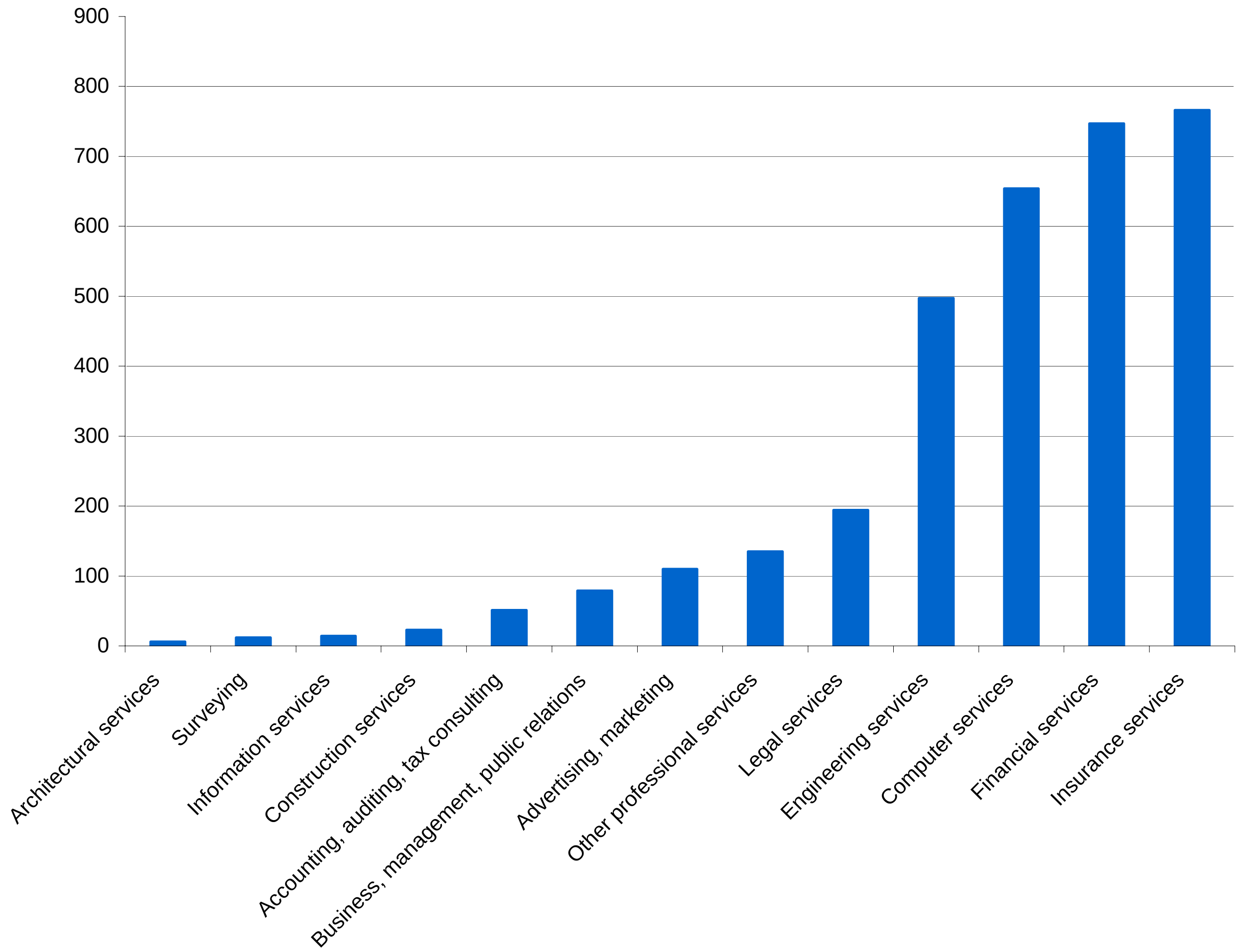


Source: ABS Catalogue 5302.0

Travel services are by far Australia's largest services exports, comprising over half of total exports of services in 2005. The category "other services" contributed to 26 percent of total services exports in 2005 and has been growing annually at around three percent since 1999-2000. This category consists of a diverse set of services including operational leasing services, professional services, other trade related services, research and development, architectural, engineering and other technical services, agriculture, mining and on-site processing and services between affiliated enterprises.

Figure 1.4 lists the value of exports of selected professional services that comprise the bulk of the exports in the "other services" category.

Figure 1.4: Australia's exports of services by type of activity 2000 (A$ million)

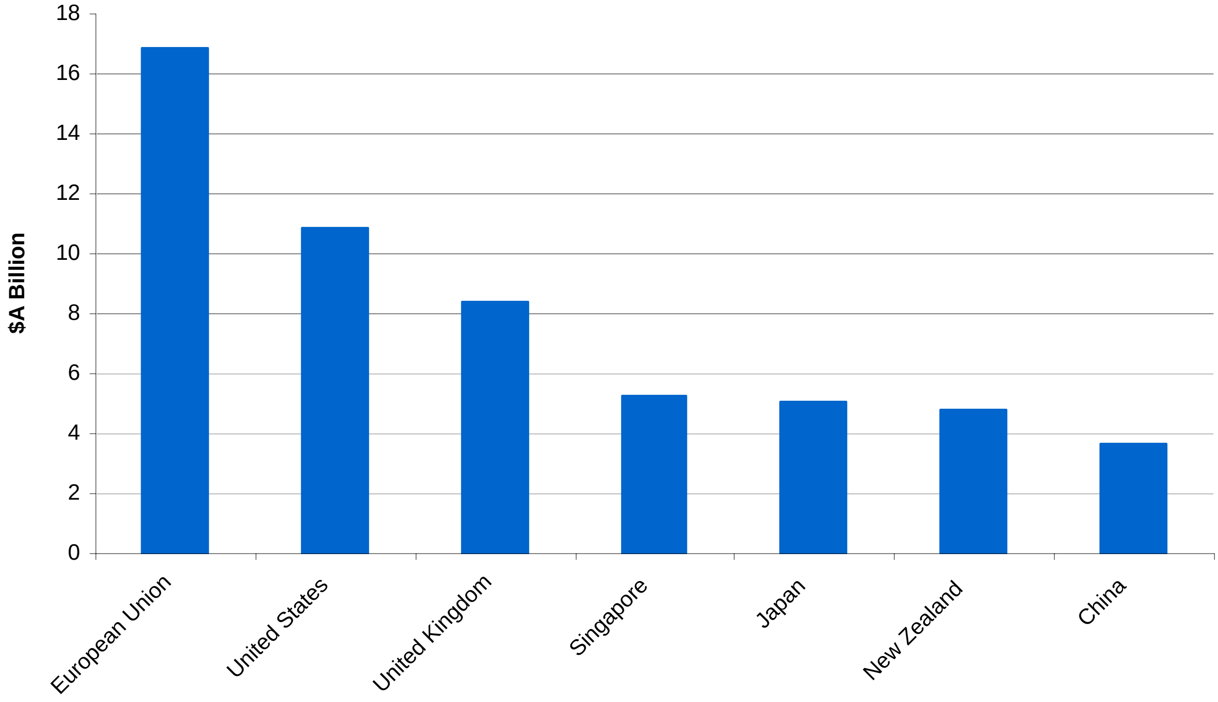


Source: ABS Catalogues 5363.0 and 5302.0

The US was the single largest destination for service exports with exports up four per cent to $4.4 billion from 2004-2005. Exports also rose to other major destinations such as New Zealand (up nine percent to $2.7 billion), China (up 19 percent to $2.5 billion), Singapore (up 12 percent to $2.4 billion, and the Republic of Korea (up 17 percent to $1.2 billion). Services exports to Malaysia and India each exceeded $1.0 billion for the first time, with exports to Malaysia rising eight percent to $1.05 billion and exports to India rising 53 percent to 1.03 billion.

Figure 1.5 illustrates Australia's top seven trade in services partners which considers both exports and imports of services.

Figure 1.5: Top seven trade in services partners: Australia 2005



Source: Department of Foreign Affairs and Trade, Trade in Services: Australia 2005

The growing internationalisation of services trade and the greater ease with which services markets can be contested worldwide have created opportunities for Australia (and other countries) to develop new sources of export growth.

1.4 The statistics problem

Numerous studies analysing the economic impacts of policies affecting trade in goods are available, but far less work has been completed on assessing the potential gains from increased trade in services. This has been due to the difficulties arising from poor information on international service transactions and a lack of comprehensive measurement of restrictions on trade in services.

The quality of statistics on trade in services is notably poor, so that the significance of service transactions in world trade is generally understated. Data on trade in services are not as comprehensive, detailed, timely or internationally comparable as data on trade in goods.

Statistics on trade in services do not include earnings from foreign direct investment and this also undermines the quality of service statistics. Cross border intra-firm service transactions are also not captured. Intra-firm sales are increasing rapidly, and service and foreign direct investment in services is estimated to represent more than one half of all international services transactions.[16] These factors mean that services statistics are significantly underestimated.

DFAT publishes a comprehensive statistical publication on Australia's services trade each financial year. The publication draws on data from the Australian Bureau of Statistics (ABS), the International Monetary Fund (IMF), the WTO and other sources.

However, as a result of the way statistics are categorised, it is difficult to gain a clear understanding of the value of professional services to the Australian economy and of the sectoral composition of services trade. In much of the data presented by the ABS and DFAT, it is difficult to uncover statistics related to individual trade in professional services sectors, like engineering. It is easy to overlook the true value of professional service sectors to the Australian economy because data on these activities is combined into the "other business services" category within the "other services" category.

By not collecting statistics in a form that allows analysis to be easily undertaken, it is difficult to identify areas where trade in professional services is under-performing, or to measure or predict the impact on trade volumes for changes in policy and regulation.

More resources need to be invested in capturing trade in service statistics. In particular the ABS and DFAT need to review the "other business services" category to ensure that this data better reflects the value of trade in engineering services to the Australian economy.

2. Profile of Engineering Exporters

In most official statistics, engineering services are absorbed in the broader categories of business services, other services or construction activity. However, the engineering sector is a diverse and large profession that includes a range of practitioners, such as professional engineers, engineering technologists, engineering associates, and tradespeople.

Engineering is about applying science and technology to develop and implement new technologies, placing engineers in a central role in improving the security and living standards of the community, improving the standards of environmental care and generating wealth for Australia.

The traditional focus of engineering activities has been in infrastructure – the fundamental facilities and systems that allow a modern society to function effectively. These include transportation, communication systems, energy and water supply, and waste removal. However, engineering impacts on many aspects of community life. For instance, the following lists only some of the areas in which professional engineers commonly practice:

Acoustics	Electronics	Naval architecture
Aeronautics	Engineering education	Nuclear
Agriculture	Engineering survey	Petroleum and gas
Arbitration	Environment	Pipelines
Automation and control	Fire safety	Process control
Biomedical	Food technology	Public health
Bridges and viaducts	Foundations and footings	Quality management
Building services	Fuels and energy	Railways
Building surveying	Geotechnics	Risk
Civil	Industrial	Roads and highways
Chemical	Local government	Software
Coastal and oceans	Maintenance	Space
Communications	Manufacturing	Structural
Computing	Materials	Telecommunications
Construction management	Metallurgy	Transportation
Dams	Military	Water resources
Electric power	Mining and tunnelling	

The most commonly traded engineering services are consultancy services typically consisting of design services, planning and design development, procurement services, field services during construction and project management. These services usually fall within three broad categories. For example:

- ***General services:*** Feasibility studies, cost estimations, preparation of drawings, specifications and contract documents and the supervision of construction;
- ***Specialised services:*** Design and development of process equipment, environmental advisory and design services, materials testing, software or systems development and project management; and
- ***Comprehensive services:*** Turnkey services such as build-own-operate-transfer contracts.

With advanced communication systems many of these services can and are being supplied "cross border". For example consulting can be performed on-line, with designs, specification, blueprints and know-how being transmitted electronically. Despite the increased ease with which engineering services can be provided electronically, it seems that while the cross border supply of engineering services is increasing, the bulk of services are continuing to take place through commercial presence or the movement of engineers overseas.

The Australian engineering industry is becoming increasingly competitive at the international level and the ability of Australian companies to provide engineering services to overseas countries has increased throughout the last decade.

Engineers Australia has recently undertaken a survey of individual members and companies[17], working and living internationally, to gain information on:

- The type, size, cost and length of projects being undertaken overseas;
- To identify how many members regularly work overseas;
- What countries they work in; and
- For what period of time.

The aim has also been to try and capture some of the non-tariff barriers operating to restrict trade in engineering services, particularly domestic regulations and licensing procedures that may impose restrictions on trade in engineering services in various countries. The following is a profile of engineering exporters derived from that survey.

2.1 Company type

Australian engineering companies with Australian offices only (34 percent of survey respondents) and Australian engineering companies with offices in both Australia and in overseas countries (35 percent) are involved in offering their services overseas at similar levels. Nineteen percent of respondents were also foreign companies with offices in Australia highlighting that Australia is both an importer and exporter of engineering expertise. Companies falling into the 'other' category made up 12 percent of respondents.

2.2 Number of employees

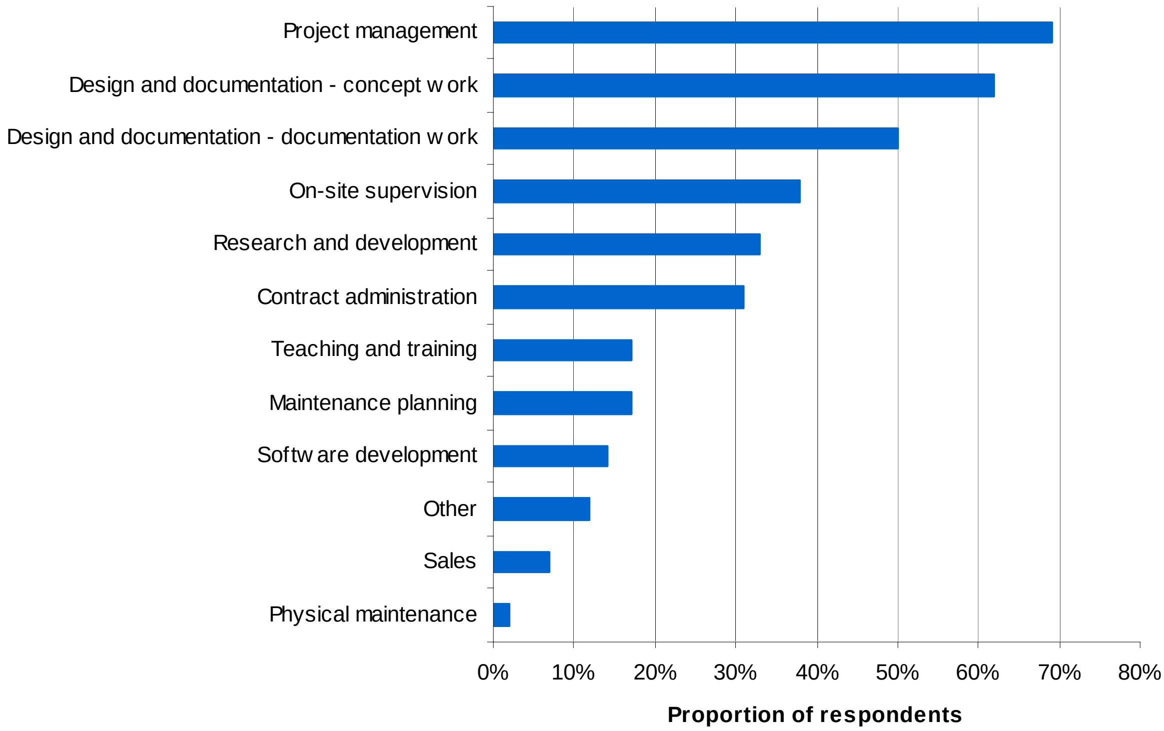
Regardless of company size, all survey respondents had staff located both in Australia and internationally including small companies of up to four employees' to larger companies with over 1000 employees.

Thirty six percent of companies who responded to the survey had 1000 or more employees in overseas offices. Twenty seven percent of companies also had 1000 or more employees located in Australia. On the whole, companies with the largest number of employees were much more likely to be involved in international activities.

2.3 Type of work

Companies with international operations are rarely involved in just one area of engineering work. However the survey results clearly show that many companies (over 60 percent) spend a significant proportion of their time undertaking project management and design and documentation work as outlined in Figure 2.1.

Figure 2.1: Type of work undertaken



Around 17 percent of companies are involved in teaching and training, which is a technology transfer from Australia to the host economy. It can also be assumed that a significant amount of informal technology transfer is taking place on top of this 17 percent, in both directions.

Companies who selected the ‘other’ category indicated they were also involved in:

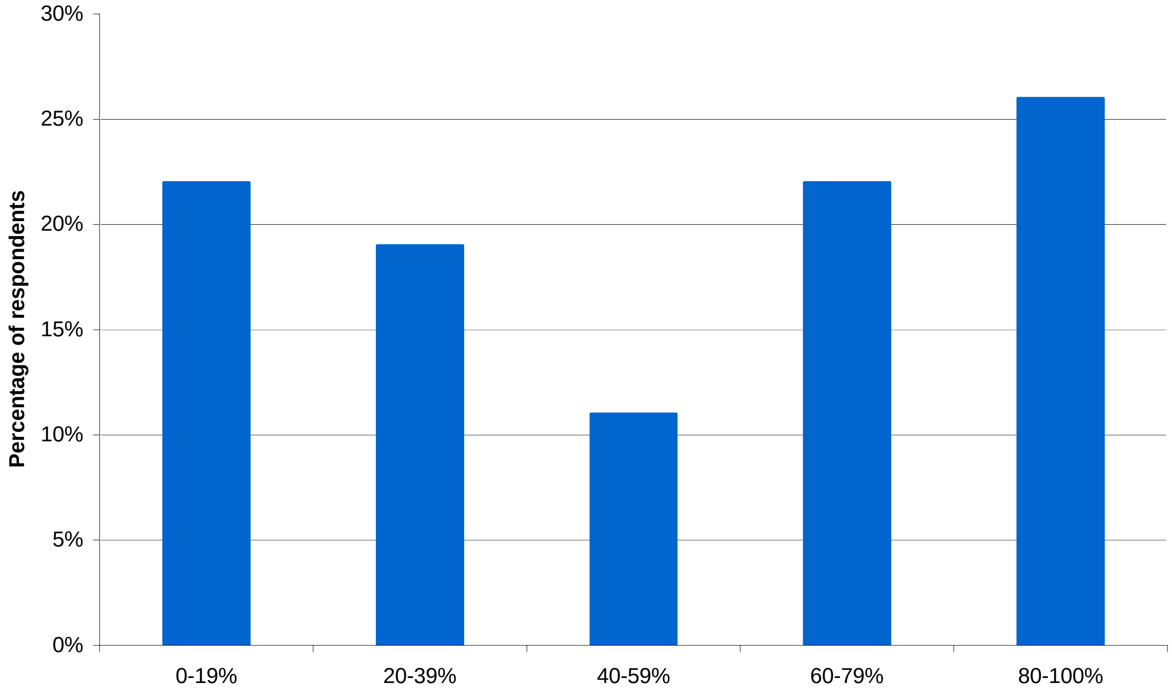
- Site work regarding conveyor belt condition;
- Systems development for civil aviation communications testing;
- Risk management;
- Estimating, tendering and contract valuations; and
- Assessment and assistance to laboratories and certifying bodies

2.4 Percentage and value of projects undertaken in Australia and overseas

The percentage of work done by companies for projects both overseas and in Australia identifies some interesting trends. Over 30 percent of respondents indicated that five to 20 percent of their companies' projects were based overseas. At a similar rate, almost 30 percent of companies also identified that 80 to 100 percent of their work was for Australian projects.

While this may seem confusing, it actually identifies that companies tend to have two distinct approaches to working overseas. One type of company undertakes 80 to 100 percent of its work in Australia and the rest of its work overseas (5-20 percent), while the majority of other companies undertake 80 to 100 percent of their work overseas and the rest of their work in Australia (5 to 20 percent). The value of the international work to companies also reflects this breakdown as shown in Figure 2.2.

Figure 2.2: Overseas work as a proportion of revenue in a financial year

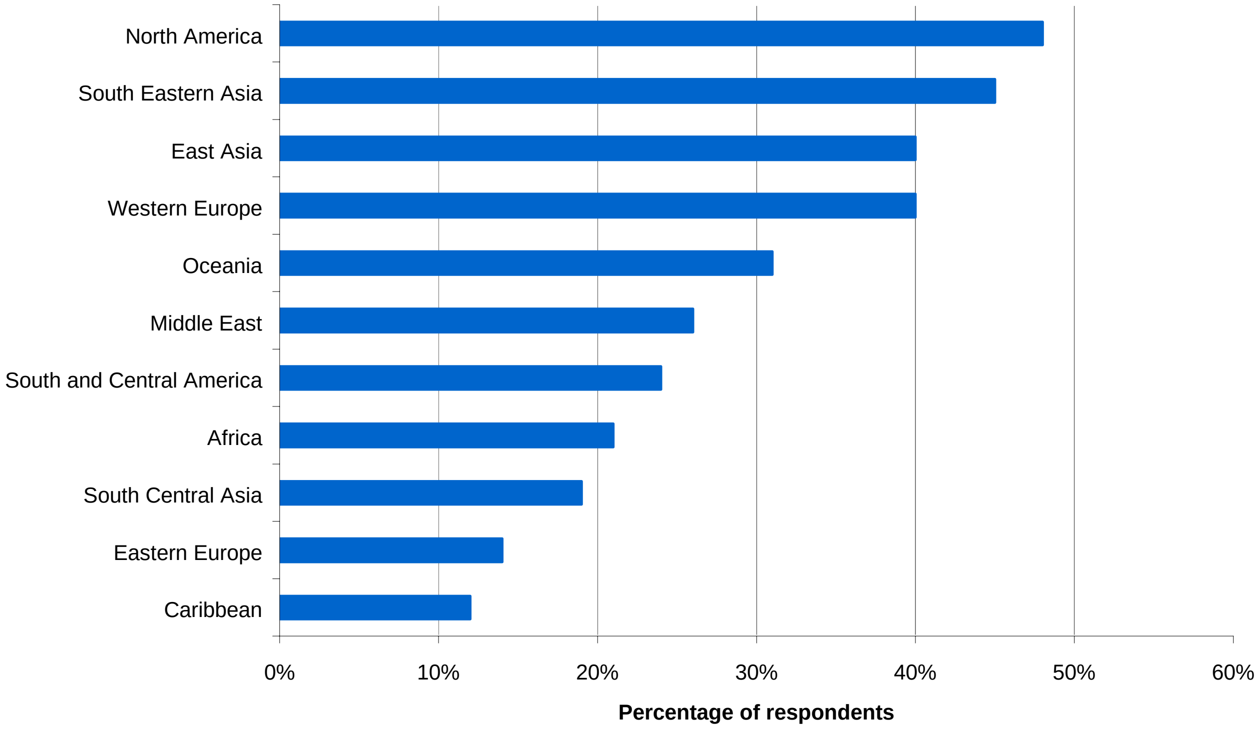


2.5 Regions where clients outside Australia are based

The survey results also confirmed that Australian engineering companies are undertaking work across the globe. While over 40 percent of companies who responded to the survey undertake work in North America and South East Asia, engineering services work is also being undertaken at significant levels in all regions. A high level of engineering work is being undertaken not only in Asia Pacific Economic Cooperation (APEC) countries but also in Western Europe, the Middle East and Central America.

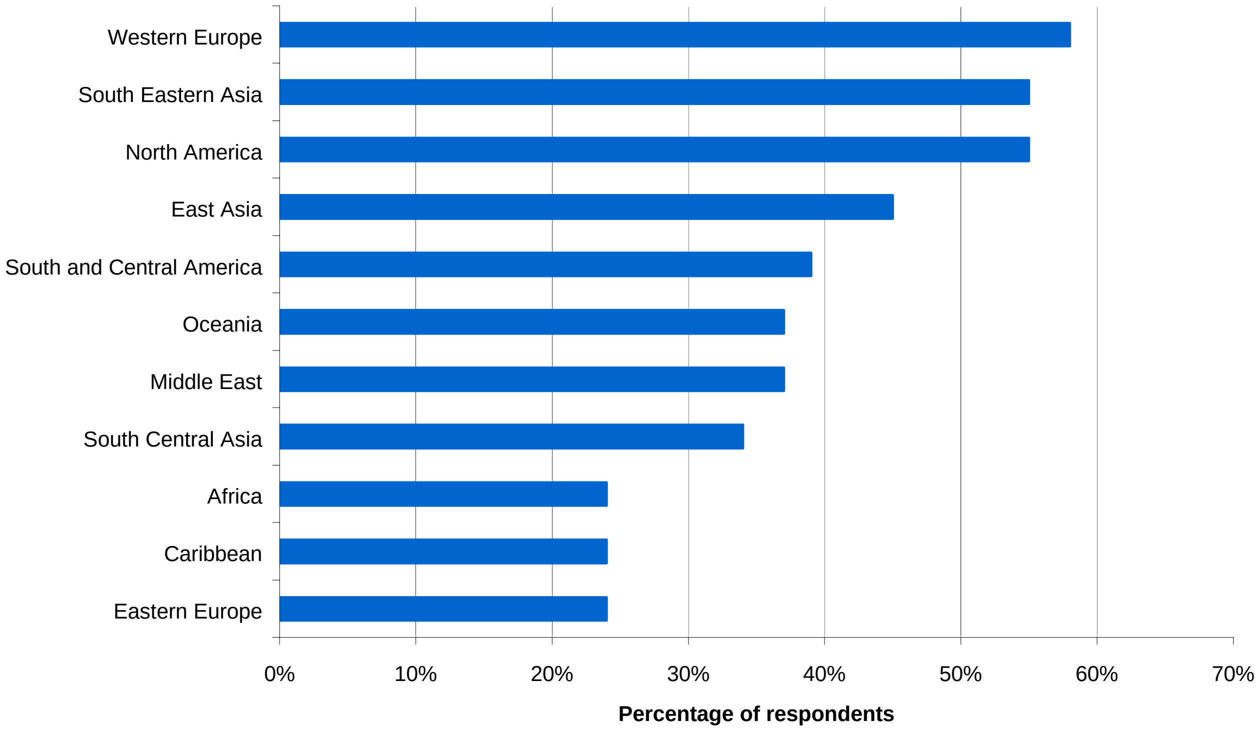
Forty eight percent of companies that responded to the survey had clients predominately based in North America. Forty five percent had clients in South Eastern Asia while 40 percent had their major clients based in Western Europe or East Asia. Eastern Europe and the Caribbean were also represented with 14 and 12 percent of engineering companies having clients based in these regions as represented in Figure 2.3.

Figure 2.3: Region's where clients of companies are based



As Figure 2.4 outlines, over 50 percent of companies who responded to the survey had set up offices in North America, South East Asia and Western Europe to service the needs of these international clients[18].

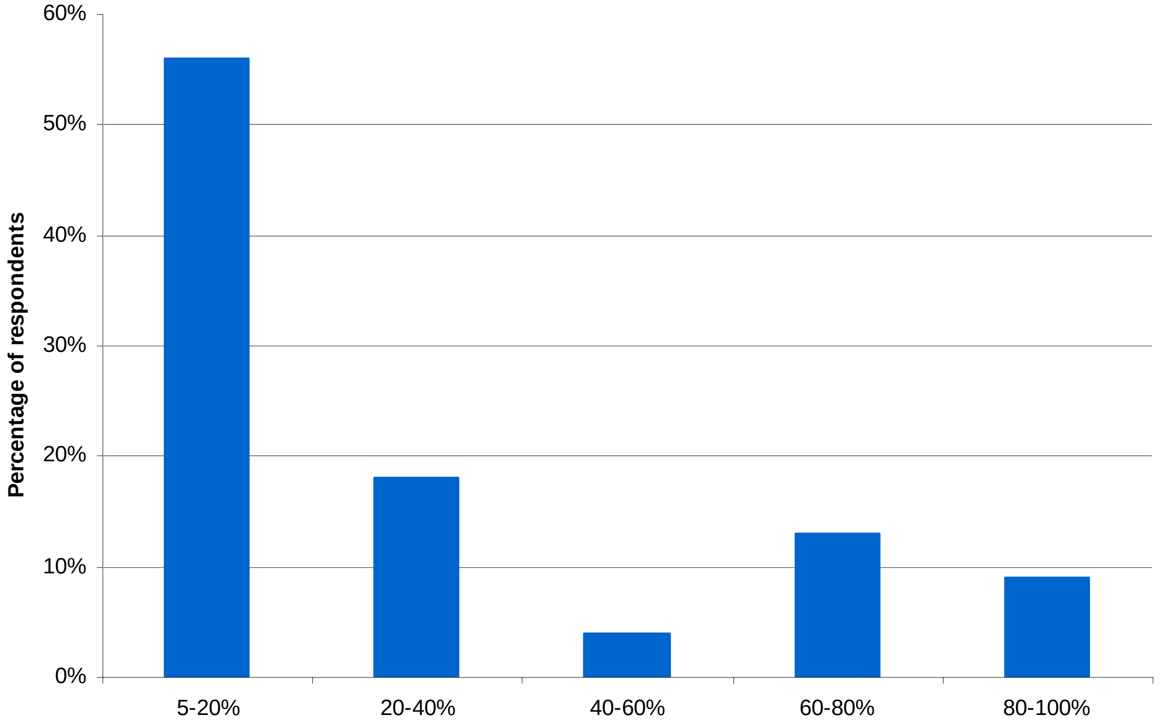
Figure 2.4: Regions where companies have overseas offices



2.6 Use of outsourcing

Forty-four percent of companies that responded to the survey, indicated that they had design work carried out overseas for a mix of Australian domestic, and international projects. Of this 44 percent, three quarters sourced up to 40 percent of their design work from overseas. More than one-fifth of respondents indicated that they sourced between 60 and 100 percent of their design work from overseas. A company, outsourcing all of its design services overseas, would be a significant participant in international trade in engineering services, including technology transfer and investment flows. These results are outlined in Figure 2.5.

Figure 2.5: Percentage of design work sourced overseas

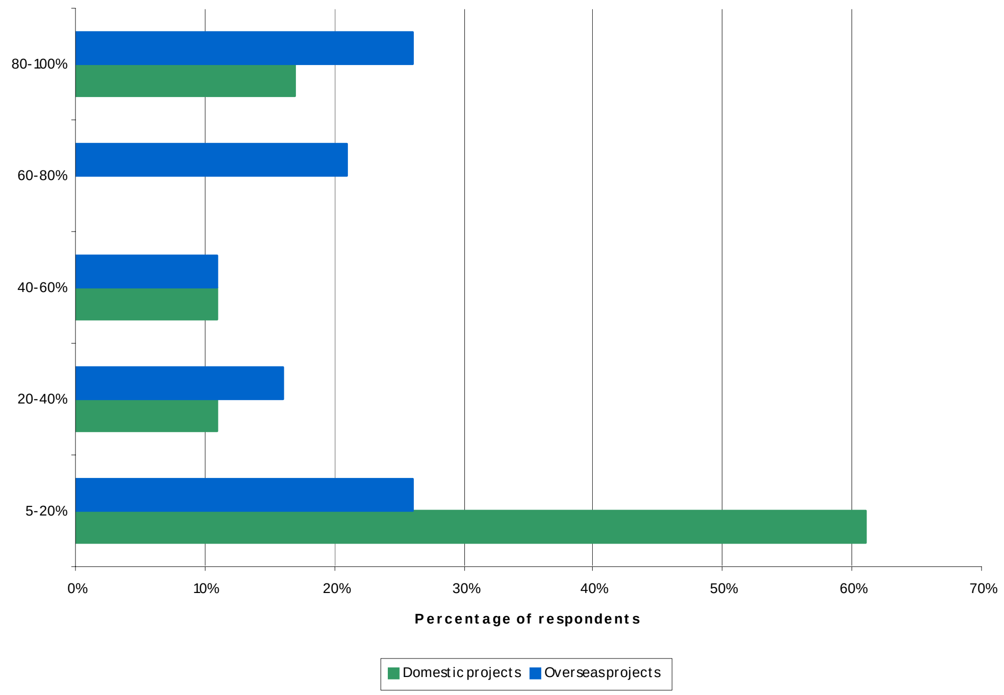


The main overseas providers of engineering design services, to companies that responded to our survey, are based in Western Europe, Asia and North America. Forty percent of companies used providers based in Western Europe; 30 percent of companies used providers in East Asia or North America; while 20 to 25 percent of companies used providers in South, Central or South East Asia.

Combined, 75 percent of respondent companies used providers from the Asian region. Particular countries, outlined by survey respondents as providers of engineering design services to their companies, include: China, the US, Argentina, India, the United Arab Emirates, Germany, the Philippines, Singapore, Malaysia, Korea and New Zealand.

One company also indicated that its policy was to use *"design services in the country where the work is being undertaken"*, which might help explain the distribution of the use of overseas design services in Figure 2.6.

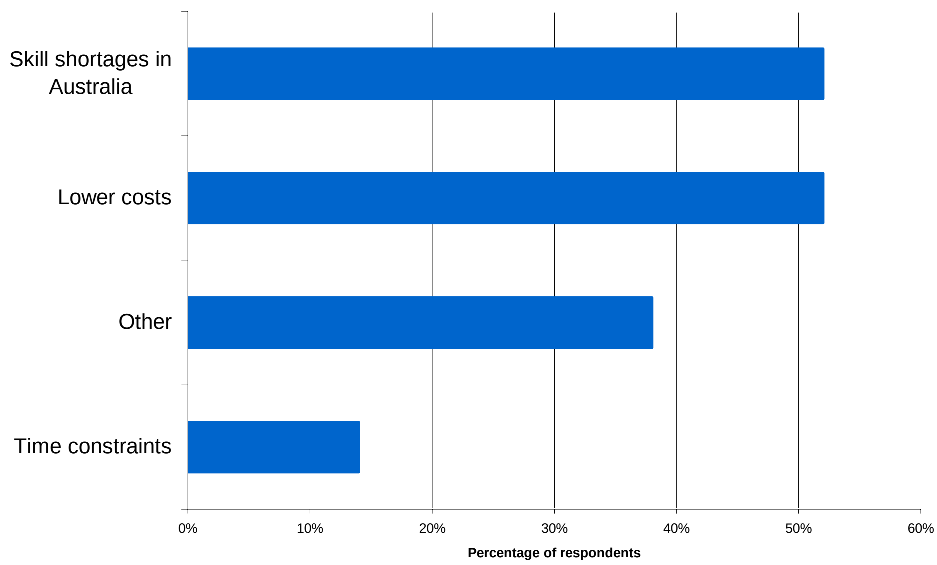
Figure 2.6: Use of outsourcing: domestic and overseas projects



For domestic projects, almost two-thirds of respondent companies used overseas design services for up to 20 percent of the projects they undertake. For overseas projects, a quarter of the companies used an overseas provider to produce 80 to 100 percent of the design work. There seems to be a correlation with projects overseas using higher rates of overseas design teams. However, regardless of whether the project is in Australia or not, overseas design teams are used to a significant extent.

Companies identified that the two key drivers of this shift to use overseas design services were to overcome skill shortages in Australia and to lower costs. Time constraints were cited by 14 percent of respondents as another key consideration as outlined in Figure 2.7.

Figure 2.7: Reasons for outsourcing



Respondents in the ‘other’ category cited an additional set of reasons including:

- To avoid competition over intellectual property;
- To access expert ‘centres of excellence’ and harness the expertise of employees in our own overseas offices; and
- Proximity to manufacturing facilities.

Just over 40 percent of companies used 24-hour design teams around the globe to meet project deadlines. A similar percentage, though not necessarily the same companies, had the management of the design team based in the country where the project was being delivered. Three-quarters of the companies surveyed used 24-hour design teams for up to 20 percent of the time.

2.7 Growth of international work

As the excellence of Australian engineering companies has become more widely known across the globe, the amount of work being undertaken by Australian engineering companies overseas has increased. Sixty four percent of companies, who responded to the survey, said that the proportion of their overseas work is increasing. As this occurs, more Australians are working overseas in the offices of Australian companies, and Australian companies are increasingly accessing overseas design services for both domestic and international projects.

Driving the growth of Australian engineering companies has been the high quality of the projects completed by Australian engineers and engineering companies domestically and internationally.

3. Impediments to Services Trade

The liberalisation of international service transactions poses challenges that are quite different from those in the goods area. Barriers to services trade occur in national economies in the form of legislation and administrative practices and are not found at the border, making them less transparent than tariffs and quotas. It is also much more difficult to assess the restrictive impacts of these barriers and effectively argue for their removal.

A key feature of impediments to trade in services is that they tend to be in the form of non-tariff barriers such as domestic regulations, licensing requirements, migration and labour restrictions and other prohibitions that are difficult to measure.

This section examines how services are traded and the role of non-tariff barriers, mutual recognition agreements, and domestic regulation in both obstructing and facilitating trade in engineering services.

3.1 How services are internationally traded

The WTOs General Agreement on Trade in Services (GATS) describes four ways or “modes of supply” for trade in services.

These include:

- Mode 1: Cross-border
- Mode 2: Consumption abroad
- Mode 3: Commercial presence
- Mode 4: Movement of people

These four methods of delivering services to international markets also result in increased avenues for non tariff barriers to operate and distort international trade in services transactions.

3.2 Non tariff barriers

Market access in services is inherently more complex than market access for trade in goods. Market access for goods can be increased simply by reducing border measures that are imposed on goods as they enter a market, for example reducing tariffs and streamlining customs procedures.

However, market access for trade in services hinges on government policy interventions that are often applied after a service supplier has entered the market. These measures take the form of government regulation and are usually aimed at domestic policy objectives rather than trade policy objectives. As a result, there is usually little consideration of the effect of domestic regulation on market access for foreign service suppliers.

Major impediments to the international provision of engineering services which are also common to other professional services, arise from the non-recognition or limited acknowledgment of home country education, qualification or accreditation/licenses. Nationality and residency requirements; restriction on incorporation; restricted eligibility for contracts including government procurement contracts; and prohibition on advertising also operate as major non-tariff barriers to services trade. Restrictions on foreign direct investment and ownership; requirements pertaining to a minimum number/percentage of local staff; and restrictions on the international relationship of locally established firms are the most common barriers identified by Australian service providers.

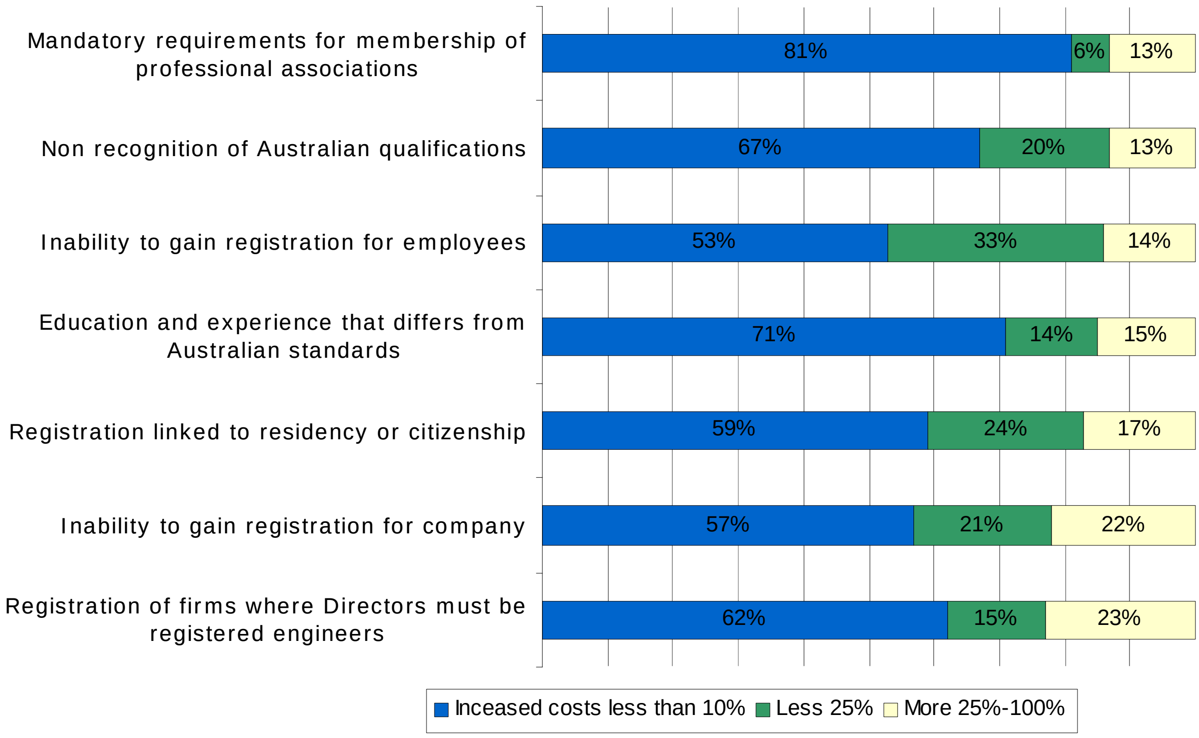
Three broad categories of non-tariff barriers that impede international service transactions have been identified by the United Nations and World Bank[19]. These are:

1. Instruments relating to market access that regulate the entry of foreign service providers into a host country (such as prohibition on foreign investment, or visa restrictions or quotas).
2. Instruments, that effectively provide discriminatory treatment to foreign service providers as compared with domestic service providers (such as exclusion from investment incentives, differential treatment of non-residents, taxes on cross-border supply through higher international telecommunication charges and taxes on foreign tourists).
3. Other measures that are not intended to affect market access or to discriminate against foreign service providers, but to do so in practice (such as some consumer protection laws, licensing procedures and government procurement practices).

Each category of restrictions require different resources and policy interventions to reduce the limitations on international market access for Australian engineering service providers. Restrictions limiting service suppliers from entering and/or operating in a services market have the effect of increasing the price of services and decreasing the quantities of services consumed.

In the Engineers Australia survey when engineering companies were asked *'how much do non- tariff barriers increase the costs of doing business'* 70 to 80 percent of companies believed that non-tariff barriers increased their costs by up to 25 percent. The inability to gain registration for employees increased costs by more than 25 percent for 14 percent of companies, while the registration of companies where Directors must be registered engineers increased costs by more than 25 percent for 25 percent of companies as represented in Figure 3.1.

Figure 3.1: Increased costs of doing business attributable to non-tariff barriers



Engineers Australia believes that the Australian government needs to support initiatives to remove establishment restrictions working to limit the ability of foreign service providers to establish physical outlets in an economy and supply engineering services through those outlets.

Establishment restrictions regulating the entry of foreign service providers into a host country are immediate breaks to trade in professional services. These restrictions may include: unpredictable applications of economic needs tests, restrictive quotas, restrictions on the nature of the services that may be provided by foreign professionals and membership of mandatory professional bodies limited to citizens.

The issue of the mutual recognition of professional qualifications only arises when foreign service suppliers have actually gained access to the market of a given sector. The experience within the European Union suggests that recognition of qualifications remains one of the most significant barriers to the movement of professional service suppliers, but only when establishment restrictions have been removed or met.

3.3 Domestic regulation

As a result of globalisation, the economic performance of one economy is increasingly affected by the quality of the regulatory environment of its trading partners. Accordingly, it is becoming increasingly important that governments introduce, amend and operate their domestic regulation regimes with an understanding of the potential positive or negative effects on international trade. Overall, good regulatory practices support the growth of effective and efficient regulatory outcomes and enhance the operation of domestic economies. This in turn supports the growth of international trade.

Regulation is defined by the Organisation for Economic Cooperation and Development (OECD) as the diverse set of instruments by which governments set requirements on enterprises and citizens. This includes laws, formal and informal orders and subordinate rules issued by all levels of government, and rules issued by non-governmental or self-regulatory bodies to which governments have delegated regulatory powers.[20]

Regulation has been traditionally used by national governments to protect consumers and vulnerable social and economic groups, and promote better economic performance by, for example safeguarding competition in the market place. There are however, costs associated with any regulatory intervention and these will vary depending on how well the regulatory regime is designed, implemented and administered. These costs include, the fiscal costs to government, compliance costs to business and consumers and dynamic costs to economic performance.

Governments throughout the world are engaged in a variety of activities. One of the most important of these is regulation. Regulatory interventions are necessary for a number of reasons, to safeguard the environment, protect lives, consumers and vulnerable social and economic groups and to promote better economic performance. Important pillars of good regulatory practice include:

- ***Efficiency***: Adoption and maintenance of only those regulations for which the costs on society are justified by the benefits to society and that achieve objectives at lowest cots, taking into account alternative approaches to regulation;

- ***Effectiveness***: Regulation should be designed to achieve the desired policy outcome;

- ***Transparency***: The regulation making process should be transparent to both the decision-makers and those affected by regulation;

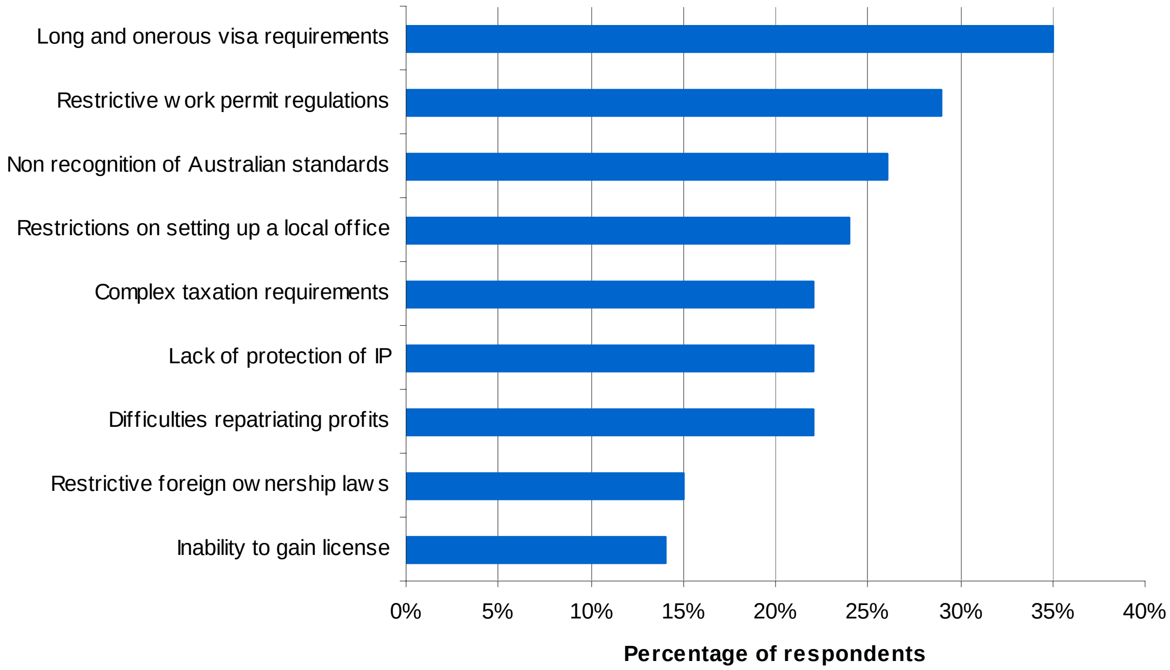
- ***Clarity***: Regulatory processes and requirements should be as understandable and accessible as practicable; and

- ***Equity***: Regulation should be fair and treat those affected equitably.

For international trade in professional services the major costs associated with poor quality regulation are related to a lack of transparency in the regulation making process combined with uneven implementation of regulatory instruments.[21]

Engineers Australia's survey results supports this with both companies and individual engineers indicating that obtaining visas and work permits, the non-recognition of Australian standards, and the inability to become licensed to practice in overseas countries, are the key problems facing them when attempting to undertaking work overseas as outlined in Figure 3.2.

Figure 3.2: Companies ranking of the most significant non-tariff barriers they face when working overseas.



Thirty-five percent of companies indicated that long and onerous visa requirements were the most significant barrier. Twenty-nine percent identified restrictive work permit regulations and 26 percent the non-recognition of Australian standards as additional key problems.

3.4 Licensing regimes

Obtaining registration or a license to practice engineering in an overseas country can be an frustrating experience. This non-tariff barrier frequently prevents engineers and engineering companies from providing services in overseas countries and it is a barrier that is difficult to overcome as the way domestic regulation and licensing regimes are administered varies from country to country.

In most countries, engineering is an “accredited” profession and as a result, engineers are required by law to be licensed before they provide professional services or use the title “professional engineer”. Many other accredited professions such as accountancy and legal services are also subject to licensing requirements. These licensing requirements can often operate as significant barriers to trade in professional services. This is because in addition to having professional qualifications, licensing requirements contain other conditions such as completing practical training, passing examinations and meeting language, good character and reputation, citizenship or residency conditions.

While several OECD countries, including the United Kingdom, Denmark, Australia, Switzerland and Finland, have no, or very limited legal restrictions on the provision of engineering services, the US, Canada, Japan and Singapore operate restrictive licensing procedures. The removal of these hurdles will rely on increasing the international recognition of qualifications and professional experience and the negotiation of professional accreditation and reciprocity agreements. These developments are an important means for professional service providers to gain international market access. A list of international regulatory regimes is set out in Appendix 1.

Divergence in the regulatory environment for engineering services across countries may restrict market access and impinge on the ability of engineers and engineering companies to offer services in foreign countries. As a result, governments are increasingly recognising that advances in market access will result in little additional trade if the harmonisation of regulatory practices and the recognition of overseas engineering qualifications and practice experience are not undertaken at the same time.

Despite this connection there has been limited international movement towards the harmonisation of regulatory practices and the streamlined recognition of overseas engineering qualifications and licenses. A number of factors may be contributing to this situation. For example:[22]

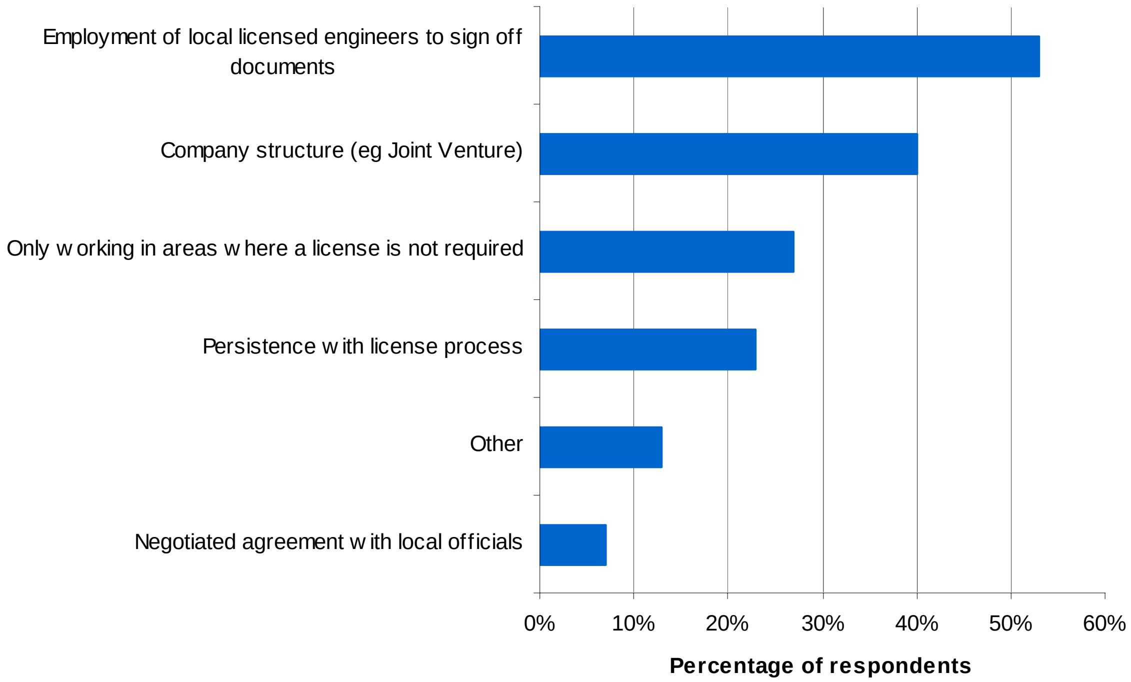
- The wide range of practices between countries in relation to the education and training of engineering professionals- and the equally wide range of cultural influences and assumptions that lie behind these;
- Fear of loss of regulatory sovereignty;
- Recognition could lead to the harmonisation of standards or practices at the “lowest common denominator”;
- The absence of licensing systems or of formal qualification mechanisms in some countries against which equivalence could be judged, and the difficulty of calculating the equivalence of on-the-job and formal training, and the like;
- The fact that many recognition initiatives are led by, or require the close involvement of professional associations. Organised, well resourced and representative associations may be lacking in some countries, and in other cases, professional associations may not always be interested in facilitating the access of additional foreign suppliers to the market;
- Lack of awareness of the possibilities provided by Mutual Recognition Agreements (MRAs) and the perception that MRAs are tools of market invasion instead of means of enhancing opportunities to work abroad;
- The resource-intensive and highly complex process involved in establishing recognition, and the lack of a perceived short-term market gain to balance the costs of developing an MRA; and
- The lack of incentives to negotiate MRAs in the absence of relevant market access guaranteed through binding commitments.

The extent to which recognition of qualifications is a problem is likely to vary by sector and by country. Given the different regulatory environments operating for engineering professionals internationally, the most important issue for Australian engineering service providers becomes the clarity of local regulations and licensing requirements operated by foreign governments. Instability and inconsistent application of regulation increases difficulties for companies operating in markets with which they are relatively unfamiliar. As the survey by Engineers Australia supports, many engineering professionals have been discouraged from pursuing projects in countries where regulations are unclear or ambiguous.

There is much that needs to be done to facilitate trade in engineering services, particularly when the ways companies are dealing with these barriers are considered. Barriers limiting the ability of the company and its employees to be registered in overseas countries seem to be particularly problematic. Fifty percent of companies employ locally registered engineers or choose a company structure - for example, a Joint Venture - in order to overcome registration or licensing problems.

What should be particularly concerning is that 27 percent of companies deliberately avoid undertaking work in areas where they would need to try and obtain ‘in country’ registration for their staff and/or directors, as outlined in Figure 3.3. In some cases, Australian engineering companies are deciding not to pursue overseas opportunities because of the difficulties of gaining registration in overseas countries. In particular one company responded with the comment, “*For a small company like mine doing business overseas has often appeared too hard, hence the priority has been to focus on local business*.”

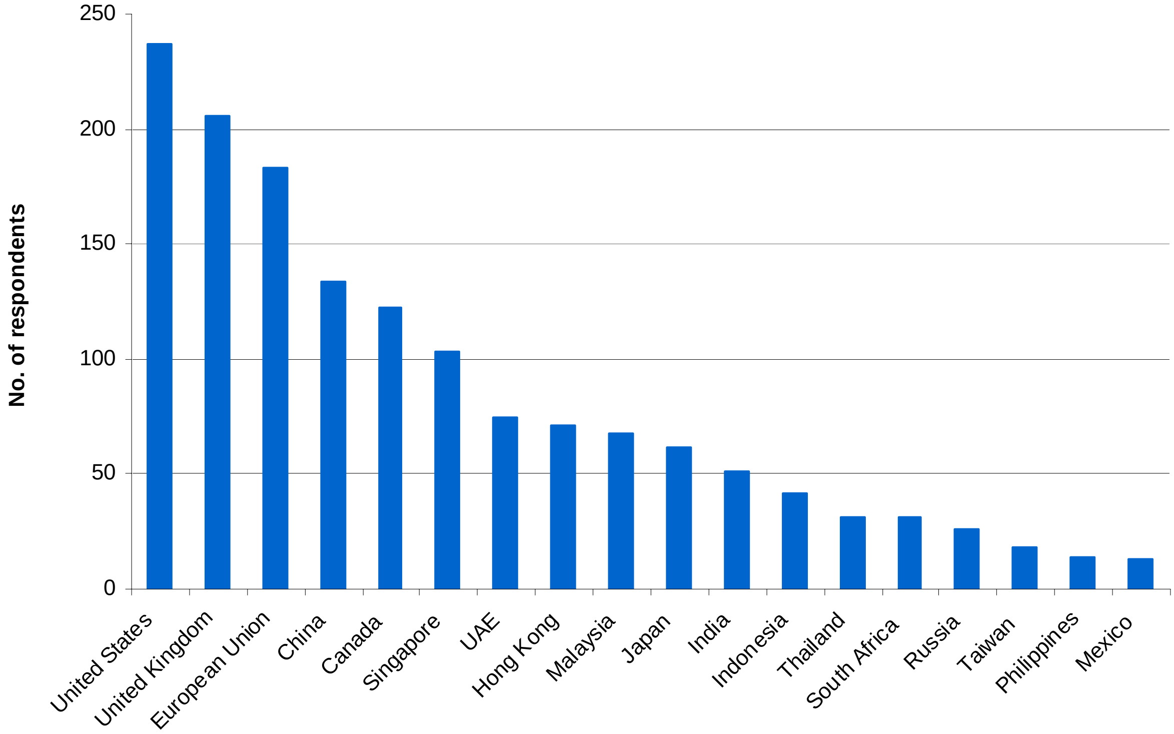
Figure 3.3: Methods used by companies to overcome licensing barriers



When asked to list priority countries for the removal of non-tariff barriers related to licensing, the US and China were most often listed by companies, perhaps reflecting their market sizes. However, it is extremely difficult for Australian engineers to gain registration in the US and the process for registration in China is complex and lacks clarity. The listing of China and the US may therefore also be a reflection of the difficulties faced by companies in attempting to access these markets.

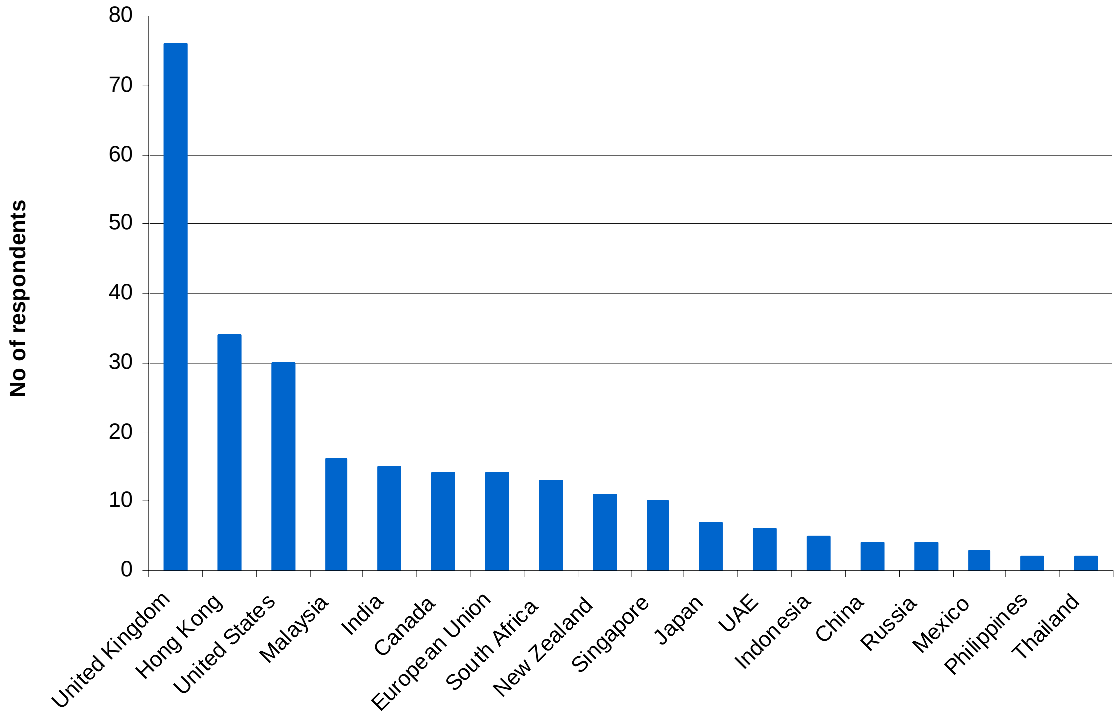
For engineers answering the survey on the international activities of individuals almost every economy in the world was identified by at least one respondent as a priority for streamlining licensing processes. Once again the US and China ranked highly, as did the European Union, Canada and Singapore who also have complex licensing procedures as outlined in Figure 3.4.

Figure 3.4: Countries where licensing barriers should be removed as a priority



The survey of individuals also queried whether individual engineers had managed to gain a license in a foreign jurisdiction. Out of 1006 respondents to the survey, only 197 engineers had managed to gain registration internationally as shown in Figure 3.5.

Figure 3.5: Countries where licenses have been obtained



Common to all discussions about undertaking engineering work in a foreign jurisdiction is the need to obtaining registration or a license to practice engineering in an overseas country. All stories are coloured with frustration. This barrier coupled with restrictions on the temporary migration of labour dramatically impedes trade in engineering services internationally.

3.5 Temporary migration of labour

There is no detailed data on the value of earnings from the movement of service providers overseas. However, it is clear that a large number of Australians work overseas in service industries.

In 1999-2000, approximately 28 000 persons travelled overseas for long term employment, with over 70 percent classifying their Australian occupations as managers, administrators or professionals. Australian balance of payments data shows remittances from persons employed overseas for less than 12 months at over A$900 million in 2001-02. No data are published on transfers from persons staying overseas for longer than 12 months.[23]

The temporary entry and stay of labour is easily constrained through domestic regulation. These restrictions usually operate in one of the following ways:

- ***Disparity in the handling of domestic and foreign personnel:*** Inflexible qualification and eligibility conditions, citizenship or residency requirements, are often imposed on foreign service suppliers;
- ***Recognition of qualifications, work experience and training:*** Market access for foreign service suppliers can be inhibited or reduced in scope by recognition requirements;
- ***Entry is often conditional on commercial presence:*** Foreign personnel are often limited in applying for entry under immigration regulations without some form of business establishment and
- ***Immigration regulation:*** Restrictions on the entry and stay of service providers include conditions on the issuing of work permits, unwieldy application procedures and limitations on the duration of stay and transferability of employment.

Many of these regulations stem from policy concerns such as consumer protection, public interest and security. Regulations such as immigration laws and procedures, labour market policies, or regulation attaching prior conditions to the employment of foreign service providers act as the biggest non-tariff barriers to the international movement of temporary workers.

Time-consuming processes impair and undermine service sectors where personnel need to be shipped overseas at short notice and where delays mean loss of opportunities and business. These include strict eligibility criteria for entry, procedures for the issuing work permits and time consuming application procedures.

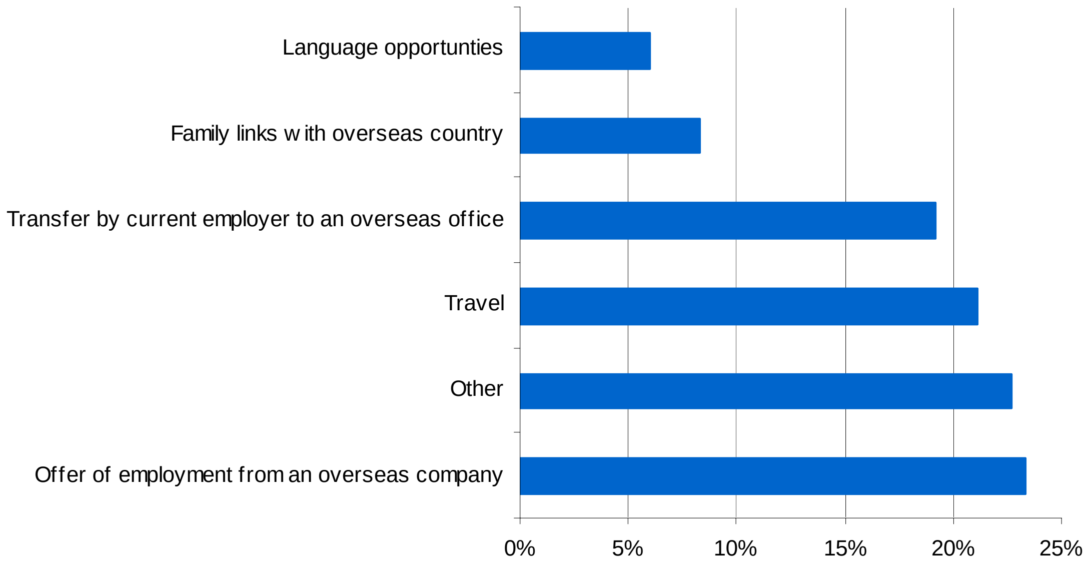
The growth of cross-border investment has also increased business interests in facilitating the temporary migration of labour. Companies establishing a commercial presence in new markets often need to take key personnel with them as experienced staff have a role to play in passing on company culture, practices and standards. Trusted managers are needed to steer business development in the crucial early stages and special technical staff may also be required to ensure that necessary communications and data systems are operating effectively.

Restrictions on the movement of people mainly originate in the immigration and labour market policies of individual countries. This is a result of the temporary movement of labour not being separated from the permanent movement of labour under immigration legislation and labour market conditions.

These restrictions span from strict eligibility conditions for applications for work visas and work permits, cumbersome and expensive procedures for application and processing of visas and permits, to limitations on the length of stay and transferability of employment in the overseas market. All of these restrictions raise the direct and indirect costs of gaining access to foreign markets, thereby undermining the cost advantage of foreign service providers.

A number of questions about temporary migration were asked to both companies and individual engineers in the Engineers Australia survey. Individual engineers were motivated by employment and language opportunities, travel and family links to leave Australia as outlined in Figure 3.6.

Figure 3.6: Motivation for leaving Australia



Reasons listed in the 'other' category include better remuneration, lower taxes, to accompany husband/wife and broader employment opportunities and work experience.

Fifty four percent of individuals who answered the survey worked overseas at least once every 12 months, with almost 70 percent of respondents working overseas at least once in a two year period. Just over 52 percent of individuals normally stayed overseas for less than one year, with over 25 percent staying longer than three years. This movement is outlined in Figures 3.7 and 3.8.

Figure 3.7: How often Australian engineers work overseas

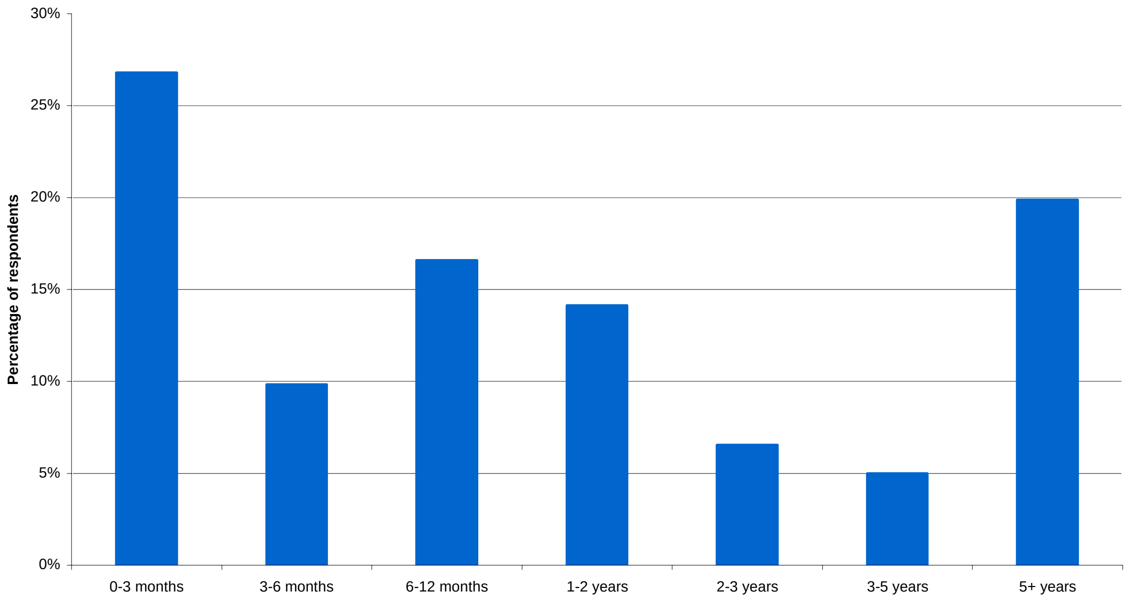
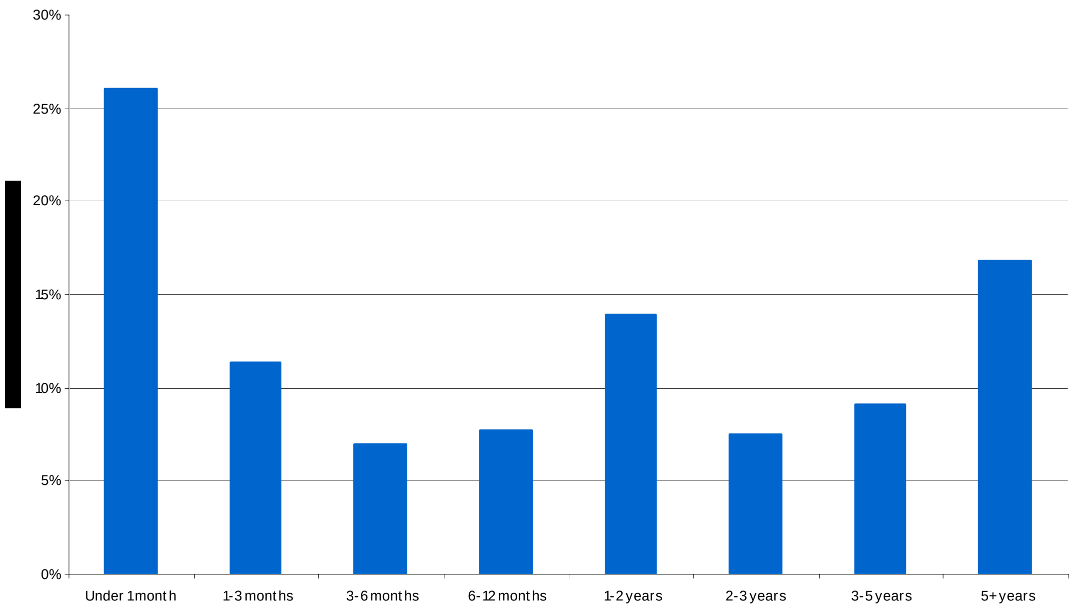
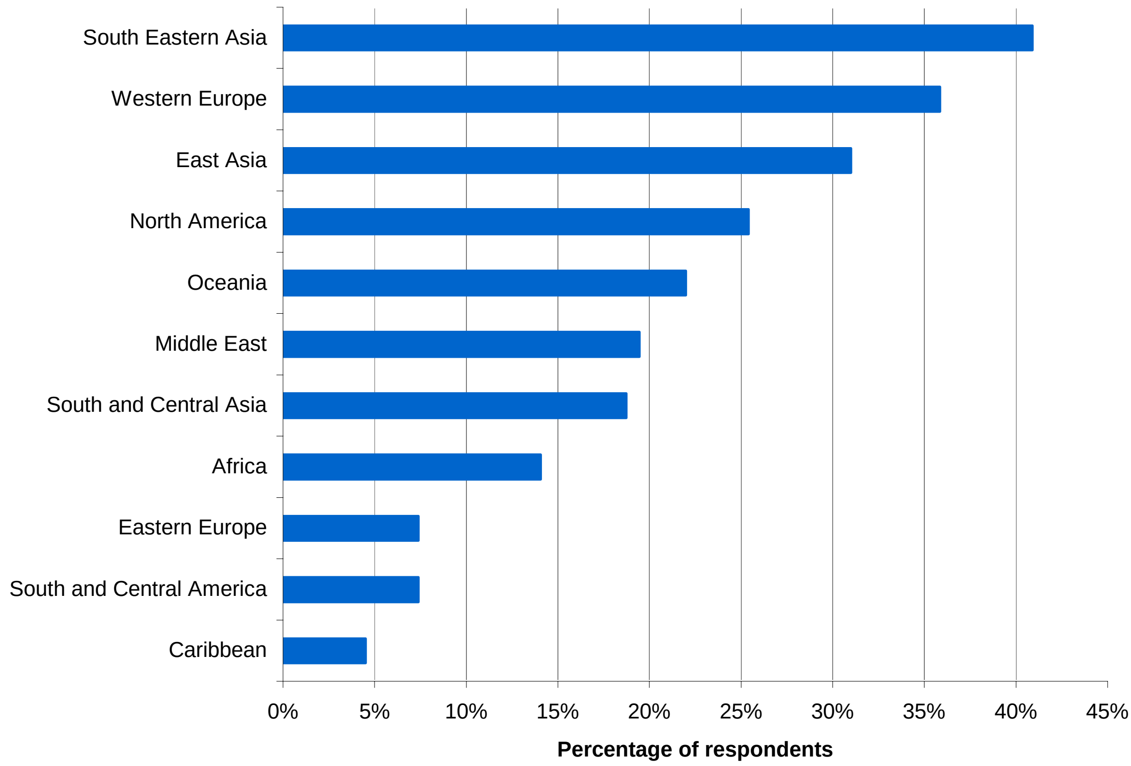


Figure 3.8: Period of time spent overseas each visit



According to the Engineers Australia survey, Australian engineers are working in countries around the globe both for Australian companies with overseas offices and as employees of overseas companies. Understandably, given Australia's geographic location, 91 percent of respondents have worked in the Asian region, as outlined by Figure 3.9.

Figure 3.9: Regions where engineers have worked "in country"



Australian engineers also place great value on the experience they have gained from working internationally. When asked, *"Do you believe your career has benefited from your time overseas"* 94 percent answered, *"Yes"*. Over 400 individual engineers also listed a variety of skills and experience that they have gained overseas that they believe they could not have obtained in Australia including:

- Exposure to a broader scope of engineering projects;
- Access to innovative expertise;
- Opportunity for higher salary and/or lower taxes;
- Higher level of responsibility on larger projects at a younger age;
- Opportunity for working on challenging projects;
- Experience of living in different cultures with different languages;
- Opportunity to travel extensively in other parts of the world;
- Exposure to alternative engineering processes, standards and techniques;
- Increased number of engineering & business contacts at all levels;
- Exposure to a broader range of engineering projects and also more opportunity to work through various phases of those projects, i.e. maintaining input through investigation, design and construction;
- Different range of projects, greater budgets and different clients; and
- Exposure to different business practices, exposure to a wider range of job responsibilities.

Further supporting the global nature of trade in engineering services and the importance of the skills exchange related to the temporary migration of labour, 54 percent of survey respondents regularly had engineers from other countries working with them in Australia.

There is great value, both for individuals, companies and national economies from an international skills exchange via the temporary migration skilled workers. Technology transfer, exposure to overseas markets, technologies and ways of doing things create better engineers and greater wealth for companies which flows into the economies they conduct business with and in. However, limits on the ability of engineers to work internationally, combined with licensing restrictions, interact to make some markets unattractive to Australian engineers and engineering companies.

Overall, domestic regulation related to licensing and work permits play a key role in creating barriers to international trade in engineering services. As the Engineers Australia survey results have supported, overcoming barriers to trade in engineering services must be focused on enhancing the ability of Australian engineering service providers to be licensed in foreign jurisdictions and to legally work. The WTO, regional trade agreements, mutual recognition agreements, professional associations like Engineers Australia and the Australian government all have a role to play in working towards removing barriers to the licensing of Australian engineers in foreign jurisdictions.

3.6 Mutual Recognition Agreements

Mutual Recognition Agreements (MRAs) are instruments that can help to reduce regulatory barriers and facilitate international trade.

In terms of professional qualifications, mutual recognition generally refers to both recognition of the equivalence of the home country's authority, and their ability to certify training through the granting of diplomas or other confirmation of qualifications. Some recognition is extended for academic purposes, to enable enrolment in further study. In other cases, which includes engineering, MRAs deal with the recognition of professional qualifications and the right to practice as a licensed professional.

Regulation is achieved in many countries through a combination of legislation and self-regulation, at both Federal and sub-Federal levels. As a result, a wide range of MRA agreements currently operate between states, between agencies acting under delegated authority laid down in legislation, between professional associations who may be wholly independent of government, or a combination of these. This diversity of regulatory structures has meant that many current MRAs are not binding agreements and under international law, nations would not be required to enforce the terms of the agreement.

A number of recognition agreements, or attempts at moving toward international standards for a given profession, have been initiated and undertaken by industry itself, with little or no involvement by governments. For engineering accredited Australian qualifications and overseas engineering qualifications are recognised through formal mutual recognition agreements with engineering accreditation bodies in other countries. These agreements include the APEC Engineer Register, the Washington and Sydney Accords and the International Register of Professional Engineers. Details of these can be found in Appendix 2.

Beviglia Zampetti argues that MRA agreements reached independently by professional associations are at best a private contract, even if the bodies can be considered part of the governmental structure and competent to enter into international agreements. MRAs, particularly those negotiated between professional associations with no specifically delegated powers, operate as voluntary agreements that can be reversed without engendering legal responsibility.[24]

Engineers Australia does not act with the delegated authority of the Australian government and while professional associations like Engineers Australia need to be involved in MRA negotiations, especially in view of their considerable expertise, the arrangements reached need to be embedded in another, broader legal context, and supported by national governments. One resolution would be to support existing MRAs negotiated by professional associations within the Domestic Regulation Annex of a Free Trade Agreement (FTA). For engineering an example would be the Australian government negotiating with FTA partners to include the APEC Engineer Register into any FTA reached.

FTAs tend to be viewed as an important mechanism for advancing matters related to regulatory cooperation in services trade, particularly in areas such as services-related standards and the recognition of licenses and professional or education qualifications. In reality, progress in the areas of domestic regulation has been slow and generally disappointing at the regional level and FTAs have in many cases failed to incorporate effective MRA provisions for engineers.

Securing a MRA remains an exceedingly complicated and time-consuming task due to the difficult nature of trying to compare registration and licensing frameworks that have been established to meet differences of cultural, social and economic circumstances. Given the level of difficulty in reaching a MRA on professional standards and licensing frameworks, it is disappointing that the Australian government has been slow to support MRAs already negotiated by professional associations, like the APEC Engineer Register, in bilateral and multilateral agreements.

Key examples are the missed opportunities to incorporate the existing APEC Engineer Register framework into the Singapore and Thailand FTAs. This would have capitalised on the substantial work already undertaken between the Government Engineering Boards and Professional Engineering Associations in Singapore and Thailand under the APEC Engineer Register processes. The incorporation of the APEC Engineer Register into these FTAs would have had the potential to result in Australian engineers on the APEC Engineer Register being able to be licensed in Singapore and Thailand. Pursuing other opportunities, Engineers Australia is working to ensure that current FTA negotiations between Australia and Malaysia result in the APEC Engineer Register being used as the mechanism for the mutual recognition of engineering qualifications and licensing within the FTA.

Another important avenue where the Australian government has shown it is beginning to factor in mutual recognition issues when considering FTAs is the example of the bilateral MRA to facilitate mobility for professional engineers between Australia and Japan which was signed in Tokyo on 1 October 2003, by the Presidents of Engineers Australia and the Institution of Professional Engineers Japan.

The arrangement, based on the APEC Engineer Register, enables chemical, electrical and mechanical engineers in Australia and Japan to straightforwardly achieve registration in either country. The arrangement removes the need for re-assessment of qualifications, professional experience and language requirements.

The MRA was supported by the *Trade and Economic Framework* signed by the Australian Prime Minister, Mr Howard and the Japanese Prime Minister, Mr Koizumi in early 2003.

While the engineering profession welcomes this development, Engineers Australia believes there is still a need for the Australian government to review the considerable work done by professional associations in negotiating MRAs. The government will then need to take immediate measures to ensure these agreements are supported and enforceable under international law, and wherever possible included in future FTAs.

4. Findings and Recommendations

As the excellence of Australian engineering companies has become more widely known across the globe, the amount of work being undertaken by Australian engineering companies overseas has increased. The Australian government has a significant and continuing role to play in facilitating trade in engineering services. In particular, the Australian government should seriously consider the following findings.

Counting the value of services trade

The true value of trade in engineering services to the Australian economy is essentially unknown due to problems in the collection of services statistics. Until this is improved, it will be difficult to identify areas where trade in professional services, including engineering is under-performing, or to measure or predict the impact on trade volumes for changes in policy and regulation.

Recommendation: *Significant improvements needs to occur for the collection of trade in services statistics so as to be able to focus on those activities where trade in professional services could be increased.*

Technical assistance to exporters

The Australian government needs to be more proactive in supporting professional service providers by providing information tailored to specific industries and countries on the types of non tariff barriers and regulatory hurdles operating in overseas markets and how they can be overcome.

The Australian government undertakes research into the impediments operating to restrict trade in engineering services internationally in order to participate in WTO/GATS negotiations. Opportunities to also provide this information to Australian services providers should be considered.

Recommendation: *Tailored information and technical assistance needs to be made available on the types of barriers operating in overseas markets, to help Australian exporters of engineering services meet the standards required by other countries regulatory regimes.*

The Australian government needs to identify and promote opportunities to support Australian service exporters to participate in overseas trade fairs and to identify and promote other measures to increase market knowledge, mutual awareness and mutual understanding of trade and investment opportunities between Australian engineering companies and overseas trade partners.

Recommendation: *There is a role for the Australian government to support, facilitate and champion overseas trading opportunities for Australian exporters of engineering services, particularly when the markets they are attempting to gain access to are heavily regulated by overly burdensome licensing regimes.*

Regional Trade Agreements

FTAs have the potential to distort trade flows and threaten the multilateral trading system. The WTO has put in place rules that seek to limit the potentially damaging features of FTAs. The current commitment of the Australian government to operate within these rules confirms the rational focus of Australia's trade policy

Recommendation: *The Australian government should continue to refrain from entering into FTAs that could not be extended to the multilateral setting.*

Mutual Recognition Agreements

The work of engineering professional associations towards international mutual recognition of university qualifications and licensing/registration needs to be supported by the Australian government wherever possible in FTAs under review (Singapore-Australia FTA or Australia-United States FTA) and future FTAs (Australia-Malaysia FTA).

This is particularly important because the MRAs negotiated by Engineers Australia including the APEC Engineer Register need to be embedded into a broader legal context like a FTA to ensure commitments are binding.

Recommendation: *The Australian government should ensure that any FTAs they negotiate include a workable MRA on the domestic regulation of engineering services*

Recommendation: *There is a need to review the work done by Engineers Australia in negotiating MRAs to ensure that these existing agreements are supported and enforceable under international law. Wherever possible, these agreements should be included in future FTAs.*

Appendix 1 International Regulation of Engineering

For the public, the risk of inadequate engineering depends on their exposure to engineering services. Every person's lifestyle is dependent on engineering via transport, communications, manufacturing and utilities. Therefore, every person has some risk exposure to engineering services.

To help mitigate these risks, governments introduce both regulatory and quasi-regulatory regimes. As each jurisdiction has different notions of what constitutes an effective regulatory regime some have implemented registration through a statutory board, while others have introduced co-regulatory regimes with professional associations and government taking on various roles in the registration process.

Other jurisdictions have elected to have no regulatory regime, preferring to leave the profession to self-regulate. Various government agencies keep their own lists of engineers for procurement, certification and employment purposes. These "registers" can be based on subjective and biased or ill-informed judgement as to who is competent to practice as an engineer including:

While different mechanisms to judge the competence of an engineer to be registered/licensed and provide services to the public are used around the world, there is a convergence in the aims of the regulatory measures adopted:

- ***Restrictions on who may deliver a service***: Legislation that reserves the provision of services to qualified and/or experienced persons. This clearly delineates the boundaries of what activities are to be confined to professional engineers, engineering technologists and engineering associates while allowing other activities to be performed by less qualified or skilled persons;
- ***Restrictions as to title***: Provides for a legal restriction on the use of the title "professional engineer". Only those individuals registered or licensed may use the title in the marketplace.
- ***Regulation as to professional conduct***: Provides for the adherence to codes of ethics and disciplinary measures to minimise the incidence of malpractice and unprofessional conduct, and to provide a visible assurance to clients that practitioners can be trusted to act in their interests.

Internationally and particularly for those countries who are members of the Washington Accord, Engineers Mobility Forum and APEC Engineer Register, the outcomes of the different regulatory systems used are substantially equivalent. This means that a licensed engineer in the US, Canada or Australia are all equally competent to practice and provide services to the general public.

The following outlines the registration/licensing processes for engineers used in a number of countries. The similarities and differences of the processes are striking. Given that each country's processes are designed with the same aims in mind, the engineers who have successfully gained registration in each country should be operating at the same level of expertise. If agreement can be reached that this is the case, barriers to trade in engineering services operating through registration and licensing procedures should be able to be removed.

Agreements like the Engineers Mobility Forum and the APEC Engineer Register are working with the aim of reaching the situation where each signatory country will allow the engineers of the other signatory countries to practice engineering in their countries without further assessment.

1. Australia

There is no one single regulatory regime in Australia governing the engineering profession and no national legislative restrictions on the use of the title “professional engineer”. Engineers do not need to be a member of a professional association in Australia in order to offer engineering services to the public.

Government regulation
In all States and Territories of Australia the principal regulatory instruments governing the practice of engineering in Australia include:

- Self-regulation by Engineers Australia, the principal professional body for engineers in Australia www.engineersaustralia.org.au;

- Self and co-regulation by the National Professional Engineers Register operated by the National Engineering Registration Board www.nerb.org.au; and

- Government regulation in the State of Queensland by the Board of Professional Engineers, under the *Professional Engineers Act 2002* www.bpeq.qld.gov.au.

Other than in Queensland, the engineering profession operates under a self regulatory system with two voluntary registration schemes – membership of Engineers Australia as a Chartered Professional Engineer (CPEng), or registration on the National Professional Engineers Register (NPER). Engineers can be registered on NPER without being members of Engineers Australia.

Most States and Territories in Australia also have registration and/or licensing regimes for engineering practitioners in the building and construction industry, with differing education and experience requirements. NPER is used by many as the assessment framework for engineering qualifications in legislation governing the building and construction industry in Australia:

- ***Tasmania:*** designers and certifiers must be eligible to be registered on NPER;

- ***Victoria:*** engineers in the building and construction industry registered on NPER are able to be registered by the Building Practitioners Board without undergoing additional assessment;

- ***South Australia:*** geotechnical engineers must be registered on NPER;

- ***New South Wales:*** building certifiers must be registered on NPER;

- ***Queensland:*** All practicing engineers must be registered by the Board of Engineers;

- ***Northern Territory:*** Engineers must be registered with a government board under the *Building Practitioners Act* in order to work in the building and construction industry;

- ***Western Australia:*** The government has announced a proposal to introduce a registration system for all engineers; and

- ***Australian Capital Territory:*** The Land Planning Authority utilizes NPER for registration of building and plumbing certifiers.

Self regulation - Chartered Professional Engineer (CPEng)
Membership of Engineers Australia is offered in various grades. Membership denotes experience and recognition as an engineer and is a means by which purchasers of engineering services can determine the experience level of the practitioner.

The Chartered Title is exclusive to Engineers Australia and is based on competence. The title is offered at the professional engineer, engineering technologist and engineering officer level. The title stands for the highest standards of professionalism, up-to-date expertise, quality, safety, and capability to undertake independent practice and to exercise leadership within the engineering team.

An engineer who is a member of Engineers Australia at the Chartered level is committed to maintaining the currency of their skills and knowledge and meeting established ethical standards

Self regulation - National Professional Engineers Register (NPER)
Engineers Australia in conjunction with the Association of Consulting Engineers Australia and the Association of Professional Engineers, Scientists and Managers Australia, State and Territory governments and community groups, has established the NPER.

NPER is maintained in the community interest, at no cost to governments or other authorities, and is open to Engineers Australia members and non-members alike. Although Engineers Australia provides the secretariat for NPER, an independent board comprising representatives of the engineering profession, government and the community directs registration activities.

NPER is a simple, consistent national database to which any person or organization can refer when particular engineering and engineering related skills are required. It identifies those persons whose academic qualifications, cumulative and current experience and competencies and commitment to ethical conduct and continuing professional development are of the standard considered appropriate by the profession for independent practice. NPER is divided into areas of practice and registration in an area of practice on NPER is based solely on the demonstrated professional competence of the applicant.

Practitioners seeking renewal of registration must confirm their involvement in 150 hours of continuing professional development over the previous three years. Continuing professional development practices must be related to the practitioner's area of practice.

2. United States

Within the US, there are fifty-five separate and independent jurisdictions (States and Territories) that undertake the assessment and licensing of professional engineers. In each jurisdiction, it is a statutory requirement to be licensed in order to engage in the practice of engineering or to use the title of “Professional Engineer.” The government body in charge of issuing statements in each jurisdiction is the “Board of Registration of Professional Engineers”. An engineer that has been granted a license to practice by a board is considered to be registered in that jurisdiction. To remain registered, the engineer must practice within the regulatory standards and periodically renew their license.

While each State and Territory has its own engineering practice laws, and hence its own registration system for licensing engineers, there are many similarities among the qualification standards. In general, all jurisdictions rely on an assessment system that is founded on the principles of education, experience and individual competency examination; as well as the engineer's adherence to the *Code of Professional Conduct,* which has been adopted by the jurisdiction and codified into law by statute or regulation.

In general there is a four step process leading to registration for US nationals:

1. Graduation from a university degree accredited by the Accreditation Board for Engineering and Technology (ABET), the nationally recognised accrediting organisation for engineering and technology curricula;

2. Sit and pass the Fundamentals of Engineering Exam (FE) administered and developed by the National Council of Examiners for Engineering and Surveying (NCEES);

3. Obtain work experience under the supervision of someone who is already licensed (the type of experience differs from State to State); and

4. Sit and pass the Principles and Practice of Engineering Exam (PE) also administered by NCEES.

There are important differences that exist among each State and Territory and some of the conditions prescribed by State and Territory engineering licensure laws are problematic. For example, requirements such as citizenship and residency, all restrict unnecessarily, trade in engineering services. The information below is a snapshot of some of the areas where the licensing system is being used as a non-tariff barrier to trade in engineering services in the US:

- Only a limited number of US States require US citizenship as a condition for licensure, even fewer require residency in the State. Citizenship requirement: District of Columbia, Guam, Nevada, New York, Texas, Virgin Islands. Residency requirement: Puerto Rico, Texas, Virgin Islands.

- Ten engineering licensure statutes or regulations include provisions that prohibit licensees from bidding their professional services: Alabama, Arkansas, Georgia, Guam, New York, North Carolina, Oklahoma, Texas, Virginia, Washington.

- A majority of the States (58 percent) require business associations that seek to provide professional engineering services to first obtain certificates of authority from the engineering licensure authority: Alabama, Alaska, Arkansas, Connecticut, Delaware, Florida, Georgia, Guam, Idaho, Illinois, Kansas, Kentucky, Louisiana, Missouri, Montana, Nebraska, New Hampshire, New Jersey, Northern Carolina, North Dakota, Northern Mariana, Ohio, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Virginia, Washington, West Virginia, Wisconsin, Wyoming.

- Nine states require business associations desiring to obtain a certificate of authority in the State to have a physical presence in the State: Alabama, Georgia, Kentucky, Montana, Nevada, New Hampshire, Tennessee, Texas, Virginia.

More information can be found at: www.ncees.org

3. Malaysia

The Institution of Engineers, Malaysia (IEM) is a professional learned society serving more than 15,000 members in Malaysia and overseas. IEM is a qualifying body for professional engineers in Malaysia. A Corporate member of the IEM can apply to the Board of Engineers, Malaysia (BEM) (which is a registration body) for registration as a professional engineer enabling them to practice in Malaysia.

The BEM is a statutory body constituted under the *Engineers Act 1967 Malaysia* and reports to the Minister of Works. Vested with wide powers, the Minister may suspend the operation of the *Engineers Act 1967* in any part of Malaysia by notification in the gazette. The appointment of the Board Members and the Registrar is made by the Minister. The Minister also has the final say on any appeal from foreign engineers who are not satisfied with the decision of the Board in rejecting their applications for temporary registration or renewal.

Temporary Registration

Foreign engineers may be temporarily licensed by the Board of Engineers only for specific projects, and must be sponsored by the Malaysian company carrying out the project. The license is only valid for the duration of a specific project. In general, a foreign engineer must be registered as a professional engineer in his or her home country, have a minimum of 10 years experience, and have a physical presence in Malaysia of at least 180 days in one calendar year. To obtain temporary licensing for a foreign engineer, the Malaysian company often must demonstrate to the Board that they cannot find a Malaysian engineer for the job. Foreign engineers are not allowed to operate independently of Malaysian partners, or serve as directors or shareholders of a consulting engineering company. A foreign engineering company may establish a non-temporary commercial presence if all directors and shareholders are Malaysian. Foreign engineering companies may collaborate with a Malaysian company, but the Malaysian company is expected to undertake the design work and is required to submit the plans.

Full Registration

Any candidate who applies for registration as a professional engineer in Malaysia must:

- Be registered as a Graduate Engineer with BEM;
- Have satisfied the three year training requirements of BEM;
- Have passed the Professional Assessment Examination (PAE) of BEM or be elected as a Corporate Member of the IEM; and
- Have been residing in Malaysia for a period of not less than six months immediately prior to the date of the application.

After graduation from a university course approved by BEM (Australian engineering degrees accredited by Engineers Australia are acceptable), an engineer needs to register with BEM as a graduate engineer before taking up employment as an engineer. BEM recognises the experience gained by an engineering graduate only after they have registered as a graduate engineer. As such, it is prudent for an engineering graduate to register as a graduate engineer at the very beginning of their engineering career.

After at least three years of practical experience, supervised by a professional engineer, the graduate engineer can apply to sit for the PAE. At least one year of the three years experience must have been obtained in Malaysia under the supervision of a registered professional engineer. However, under the *Engineers Act* the BEM can, on a case by case basis, exempt either wholly or partly the requirements as to the length of practical experience to be obtained in Malaysia provided that the total practical experience obtained is not less than three years.

After registering as a graduate engineer with the BEM, undertaking three years practical experience under the supervision of a registered engineer, having successfully passed the PAE exam and paying the registration fee, a graduate engineer may gain full registration as a professional engineer.

Further information can be found from: www.bem.org.my and www.iem.org.my

4. Singapore

The Professional Engineers Board (PEB), a statutory board in the Ministry of National Development, is responsible for regulating engineering practice in Singapore. The Board is set up under the *Professional Engineers Act*. Three engineering disciplines, civil, electrical and mechanical come under the purview of the Professional Engineers Board as well as 'such other branches of engineering as may be prescribed'.

All persons engaging in professional engineering works in these engineering disciplines should be either registered with the Board or otherwise work under the direction and supervision of a registered professional engineer of the Board.

There are three basic requirements for registration as a professional engineer.

1. The applicant should have an engineering degree acceptable to the Board;

2. The applicant should have acquired not less than four years post-graduate engineering experience; and

3. The applicant should have sat and passed the Fundamental of Engineering Examination and the Practice of Professional Engineering Examination.

The Board may also refuse to register any applicant who in the opinion of the Board is not of good character and reputation; or is unable to carry out the duties of a professional engineer effectively.

Australian engineers have particular problems meeting requirement 1. Currently, not all Bachelor of Engineering Degrees offered by Australian universities are accredited by the Board. As such, engineers who have graduated from these universities are unable to practice as a professional engineer in Singapore.

The *Professional Engineers Act* sets out which Australian Universities have been accredited by the Board as having acceptable standards. Currently the Act only accredits 14 Australian universities as providing engineering degrees acceptable to Singaporean standards and of these 14 universities, only half of the engineering degrees they offer are accredited by the PEB. For example the PEB recognises only four of the eight engineering courses offered by the Curtin University of Technology and only two of the nine courses offered by James Cook University of North Queensland. This is despite the fact that all bachelor of engineering courses in Australia are accredited by Engineers Australia and operate to the same standards.

Singapore recently became a member of the Washington Accord. As a result it is anticipated that all Australian engineering degrees will be recognised by the PEB as acceptable to Singaporean standards.

Further information can be found from: www.peb.gov.sg and www.ies.org.sg

5. Canada

Since the 1920's in Canada, it is a statutory requirement to be licensed in order to practise engineering. In each province and territory of Canada there is an "Engineers' Act". The authority for administering these twelve acts has been granted to the Association of Professional Engineers in each province and territory.

To be considered for registration in Canada an engineer must:

- Have graduated from a Canadian engineering program that has been accredited by the Canadian Engineering Accreditation Board (CEAB) or from a foreign engineering program that is evaluated by the CEAB as substantially equivalent to a CEAB-accredited program (Washington Accord countries). Individuals who have not completed an accredited or recognized engineering program can meet the academic requirement through an examination program;

- Have a minimum of four years of acceptable engineering experience prior to registration. At least one year must be acquired in Canada or in a "Canadian environment";

- Demonstrate their ability to communicate effectively, both orally and in writing. Methods used to assess language competency include testimony of professional engineers who act as referees in support of the candidate's registration application and specific language tests;

- Successfully complete a practice examination to confirm that they have sufficient knowledge of the ethical considerations and obligations as well as the legal concepts relevant to professional engineers; and

- Provide at least three references from practicing professional engineers who are familiar with details of the candidate's work for the experience claimed.

More information can be found at: www.peng.ca/english/profession/index.html

6. Indonesia

The assessment for entry onto the Professional Engineer Register, administered by the Institution of Engineers, Indonesia (PII), is undertaken by a Panel of Assessors. The system recognises three levels of Professional Engineers:

- ***IP***: the initial entry into the register, minimum 3 years experience post graduation from an approved engineering degree,

- ***IPM:*** the next level requires a minimum of 5 years experience after IP, including 2 years of experience in responsible charge of significant engineering work.

- ***IPU:*** requires a minimum of another 5 years after IPM, plus highly regarded achievement in the public domain.

Applicants must also:

- Have graduated from an engineering degree accredited by the Indonesian National Accreditation Board (BAN);

- Be a member of the Institution of Engineers, Indonesia (PII); and

- Meet the PII Professional Engineer Competency Standards including Code of Ethics and Professional Conduct, Engineering Practice Skills, Engineering Planning and Design, Engineering Practice Management and Communication Skills.

Application forms may be submitted to PII's Bureau of Certification for Professional Engineers at any time. However, the review by the Panel of Assessors, and the interviews for those applying for IPM-level, are conducted every three months. The assessment documentation is maintained in the office of the Bureau of Certification.

Registration is subject to renewal after five years. The individual professional engineer will be audited for their continuing professional development activities every year.

Further information can be found from: www.pii.or.id

7. Philippines

To be considered for registration in the Philippines an engineer must:

- Complete an engineering degree recognised by the Commission on Higher Education (CHED), or a foreign degree accredited by an independent body in the home jurisdiction. If the engineering education of an applicant is not recognised then they must have completed considerable responsible training and experience as engineers including 200 hours in the same field of technical engineering practice; and over 10 years of engineering practice in the same field of technical expertise to be considered for licensure;

- Pass a government licensure examination conducted and given by the Professional Regulation Commission (PRC) and the Professional Regulatory Boards (PRBs); and

- Be a citizen of the Philippines; be at least twenty-one years of age; and be of good moral character.

Foreign professionals (who are not citizens of the Philippines) may not be registered. In special circumstances the Professional Regulatory Boards, may authorize a special temporary permit to foreign professionals who desire to practice in the Philippines.
Further information can be found from: www.prc.gov.ph

8. Thailand

To be considered for registration in Thailand an engineer must:

- Have graduated from a university degree accredited by the Board of Engineering Accreditation (BEA). If the engineering degree completed by the foreign applicant is not recognised by the BEA, the individual will have to undergo an examination. The examinations are held twice yearly in June and December;

- Attend a workshop on professional practice competency issues and immediately afterwards sit (and pass) an examination covering the contents of the workshop;

- Have a minimum of three years acceptable engineering experience prior to registration. The engineering experience must be undertaken in Thailand or a Thai environment for at least two years;

- Have at least one reference from a licensed, practicing professional engineer or senior engineer who are familiar with details of the applicant's work for the experience to be validated;

- Successfully complete a written examination to confirm that they have sufficient knowledge of the ethical considerations and obligations as well as the legal concepts relevant to being a professional engineer. The written examinations are scheduled for 3 times annually in April, August and December; and

- Take an oral examination aimed at exploring if the education, practical and management experiences, and professional development undertaken by the applicant have prepared them to be responsibly in charge of engineering work once registered.

Further information can be found at: http://www.eit.or.th/eng/

9. Japan

There are two main types of engineers in Japan, "Professional Engineers" and Engineers who specialise in building structures – "Kenchikushi"

Kenchikushi
A Kenchikushi plays the dual role of an architect and a building engineer and his/her service varies in the areas of Architectural design, Structural design, Building equipment design and Construction superintendence etc.

Engineers are eligible to practice in Japan after they have been registered under the *Kenchikushi Law* which outlines the qualifications required of a professional engaged in designing buildings and supervising construction work. *Kenchikushi Law* stipulates the use, structure, and height of buildings that only Kenchikushi can design and construct. Those who intend to become Kenchikushi must pass a qualifying examination and obtain a license issued by the Minister of Land Infrastructure and Transport or a prefectural governor.

Under the *Kenchikushi Law*, there are three main types of Kenchikushi engineers:

1st Class Kenchikushi: Those people licensed by the Minister of Land, Infrastructure and Transport to design buildings and supervise construction work. Only a "1st Class Kenchikushi" can engage in the design or supervision of related construction work for:

- Buildings used as schools, hospitals, theatres, grand stands, public halls, assembly halls, or department stores with a total floor area exceeding 500 sq metres;

- Buildings or parts of buildings with wooden construction with a height exceeding 13 meters;

- Buildings or parts of buildings of reinforced concrete construction, steel, stone, brick, concrete block or plain concrete construction with a total floor area exceeding 300sq m or with a height exceeding 9 metres;

- Buildings with a total floor area exceeding 1000 sq metres with two or more stories.

2nd Class Kenchikushi: Those people licensed by a prefectural governor to design buildings and supervise construction work; and

Mokuzo – Kenchikushi": Those people who are licensed by a prefectural governor to design wooden buildings and supervise construction work.

While the 1st Class Kenchikushi can undertake the work of a 2nd Class Kenchikushi and Mokuzo- Kenchikushi, the work of both 2nd Class Kenchikushi and Mokuzo- Kenchikushi is limited by restraints related to floor size, building hight and building materials. Other restrictions on the work of 2nd Class Kenchikushi and Mokuzo- Kenchikushi may also be put in place by prefectural governors.

Since 1986 there has also been another small class of Kenchikushi called, ***Building Mechanical and Electrical Engineer***. This class was established under the *Kenchikushi Law* to cover the design or supervision of construction work on building equipment.

Duties of the three main types of Kenchikushi engineers include:

- The design of buildings conforming to building requirements specified by laws, orders or ordinances;

- The explanation of designs, drawings and specifications to building owners;

- Signing and applying their seals to building confirmation documents;

- Confirming whether construction work is implemented in accordance with drawings/specifications;

- Reporting on the result of their superintendence of construction work in writing to the building owners; and

- Other duties for example, administrative work related to construction work contracts, the supervision of construction work, surveying and evaluation of buildings and agency business related to procedures required by laws, orders or ordinances related to buildings.

When a Kenchikushi or anyone who employs a Kenchikushi intends to engage in the services listed above, they must establish a Kenchikushi Office through registration by the prefectural governor who has jurisdiction over the area where the office is located. The office must be managed by a full-time Kenchikushi but there are no conditions covering citizenship, business format and the founder of the office does not have to be a Kenchikushi.

The Japan Architectural Education and Information Centre (JAEIC) administers the qualifying examinations for all types of Kenchikushi on behalf of the Ministry of Land, Infrastructure and Transport and prefectural governors.

Professional Engineers
Engineers are eligible to practice in Japan after they have been registered under Article 32, Paragraph 1 of the *Professional Engineer Law* as *"Professional Engineers"*. Under the Act, anyone who *"conducts the practice of planning, research, design, analysis, testing, evaluation or guidance that requires advanced professional practical abilities in science and technology"* must be registered. This covers engineering disciplines like: Mechanical Engineering, Ship and Marine Engineering, Aerospace Engineering, Electrics and Electronics Engineering, Metals and Mining Engineering, Water Supply and Sewerage Engineering and Environmental Engineering.

Under the Act, the Institution of Professional Engineers Japan (IPEJ) maintains the register and administers the examination and registration process on behalf of the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT).

Engineers Australia has a MRA with MEXT and the IPEJ covering Mechanical, Electrical and Chemical engineers. Further details on this agreement can be found at: www.engineersaustralia.org.au

10 Europe[25]

France
France has two umbrella bodies, the Commission des Titres d'Ingenieur (CTI) and the Conseil National des Ingenierus et Scientifiques de France (CNISF).

There is a French register of engineers (the Repertoire) initiated by the CNISF. It is now administered by a Comite d'habilitation with members from CNISF, employers bodies and academic organisations.

There are currently three routes to registration on the Repertoire:

- ***Ingeneiur Diplome***: Graduate of a CTI Diploma course: registered automatically;

- ***Ingenieur Reconnu Scientifique***: holds another engineering qualification e.g. Maitrise plus five years experience; and

- ***Ingenieur Reconnu***: holds a BTS or DTU (2 years) qualification, or even no higher education but has 10 - 15 years experience and holds an engineering position of high status within his company

The Repertoire has no legislative backing. The only legally protected title in France is the Ingenieur Diplome.

Germany
Germany's 16 Länder passed engineering laws in 1970 that regulate who are allowed to use the title Ingenieur. This title may be used by science and engineering graduates from German universities, universities of applied science (Fachhochschulen), or an equivalent private engineering college. The title may also be used by those who acquired the title of Ing. Grad, which was common before the 1970 laws. The unlawful use of the expression Ingenieur is an offence.

Apart from certain specialist activities mostly in construction there is no requirement for postgraduate experience and no register of qualified engineers.

Italy
There are two major organisations concerned with engineering regulation. At the national level the Consiglio Nazionale deli Ingegneri (CNI) and at the provincial level the Ordine Provinciale degli Ingegneri (OPI). The CNI is a body set up by public law for the purpose of overseeing the organisation of the engineering sector at national level. It operates under the jurisdiction of the Ministry of Justice.

Each Ordine has its seat in the provincial capital. The OPI is the juridical body responsible for accepting applications for enrolment in the ALBO - register of engineers - and for the maintenance of the ALBO itself. All OPI have the same structure and are self-financed through the annual contributions of their members who elect the Consiglio de l'Ordine (Board) every two years.

By law, any academic title can only be awarded by a university or an Institutis Superiore and abuse of title is a punishable offence. In theory, professional engineers must be members of their Ordine degli Ingegnere which requires them to pass a State Professional Examination.

Austria
Austria's education and qualification system is binary, based on Universities and Fachhochschulen. For a Diplom Ingenieur (Dipl-Ing), the duration of the course is about 5 years: for a Dipl-Ing (FH)) duration is about 3 years.
There is no register: engineers can practice as soon as they graduate but the title Dipl-Ing is protected by law.

Belgium
In Belgium, a distinction is made between two kinds of engineering degrees:

- ***The Burgerlijk Inginieur (Ir):*** An academic engineering degree which is offered by the university engineering faculties (lr); and

- ***Industrieel Inginieur (Ing):*** An engineering degree offered by institutes for higher education.

There is no register in Belgium. Engineers are free to practice as soon as they graduate, however the titles lr. and Ing. are protected by law.

Denmark
There are three types of degrees in Denmark:

- ***Diplomingenior (Diploma engineer):*** 3 1/2 years minimum;

- ***Civilingenior (Graduate engineer):*** 5 years minimum; and

- ***Eksportingenior (Export engineer):*** 4 1/2 years minimum.

There is no register of engineers in Denmark, nor is the use of the term ingenior protected by law. With one or two exceptions, engineers may practice as soon as they graduate. However, the use of the titles Diplomingenior, Civilingenior and Eksportingenior is restricted to graduates of the relevant engineering schools.

Finland
There is no register of engineers, nor is there any protection of title. Professional engineers may start to practice as soon as they graduate.

Greece
The Technical Chamber of Greece (TEE), functions under public law and keeps the Register of all qualified engineers. Registration is a prerequisite for practice in the engineering profession in Greece. The basic engineering title in Greece is the Diplomatouchos Michanicos (the five-year course) and it is protected by law.

Ireland
There is no register of engineers in Ireland and the only title protected by law is that of Chartered Engineer. Legal action may be taken by the IEI against any individual who fraudulently represents himself as a C. Eng.

The Netherlands
There is no register of engineers. Those with the qualification Ir or Ing may practice as soon as they graduate. There is no protection of title.

United Kingdom
In the United Kingdom the Engineering Council is formally recognised by Government, through a memorandum of understanding, as the voice of the engineering profession.

There is no direct engineer registration with the Council. To be eligible for registration, an individual must first obtain membership with a Council nominated engineering institution who in turn will nominate the person for registration with the Council. Registration with the

Council requires completion of an approved engineering course, a requisite period of practical experience and a minimum age requirement.

The Council licenses its member institutions to assess and accredit academic courses at universities and colleges such that their graduates will be eligible for membership of the respective institution and ultimately the Council itself.

Portugal

The Ordem dos Engenheiros is by law the recognised qualifying body for the profession. It has the power to set national standards for the registration of individual engineers by examination or by accreditation of courses. It is the 'competent authority' for the application of the appropriate laws to university level engineers and it confers the title of Engenheiro. Registration is obligatory to be recognised as a professional. The title is protected by law.

Appendix 2 – Mutual recognition agreements

APEC Engineer Register

The APEC Human Resources Development Working Group Steering Committee for mutual recognition of professional engineers developed the initiative for the APEC Engineer Register over the period 1997 – 1998. The intent of the APEC Engineer Register is to recognise the equivalencies in the qualifications and experience of practising professional engineers in the participating economies and to facilitate trade in engineering services between those participating economies. It is anticipated that engineers entered on the APEC Engineer Register will be granted a high degree of mutual exemption from further assessment when practising in any of the participating economies: Australia, Canada, Chinese Taipei, Hong Kong SAR, Indonesia, Japan, Korea, Malaysia, New Zealand, Singapore, Thailand, the Philippines and the US.

An APEC Engineer is defined as a person who is recognised as a professional engineer within an APEC economy, and has satisfied an authorised body in that economy operating in accordance with the criteria and procedures approved by the APEC Engineer Coordinating Committee, that they have completed an accredited or recognised engineering program; been assessed within their own economy as eligible for independent practice; gained a minimum of seven years practical experience since graduation; spent at least two years in responsible charge of significant engineering work; and maintained their continuing professional development at a satisfactory level.

APEC Engineers must agree to be held individually accountable for their actions, both through requirements imposed by the licensing or registering body in the jurisdictions in which they work and through legal processes. Engineers Australia recognises that engineers registered on the APEC Engineer Register in participating countries are competent to practice in Australia and are therefore eligible to be listed on the National Professional Engineers Register (NPER).

Washington Accord

The Washington Accord was signed in 1989. It is an agreement between the bodies responsible for accrediting professional engineering degree programs in each of the signatory countries. It recognises the substantial equivalence of programs accredited by those bodies, and recommends that graduates of accredited programs in any of the signatory countries be recognised by the other countries as having met the academic requirements for entry to the practice of engineering.

The Washington Accord covers professional engineering undergraduate degrees. Engineering technology and postgraduate-level programs are not covered by the Accord. The signatory countries of the Washington Accord are: Australia, Canada, Hong Kong SAR, Ireland, Japan, New Zealand, Singapore, South Africa, United Kingdom and the United States. Germany, Korea, Malaysia and Chinese Taipei are provisional members of the Accord. Engineers Australia uses the Washington Accord to assess overseas engineering qualifications for the purposes of skilled migration to Australia, for meeting the educational requirements of the National Professional Engineers Register (NPER) and membership of Engineers Australia.

Sydney Accord

This agreement was signed on 23 June 2001 and is in its early stages of implementation. The Sydney Accord is an agreement between the engineering accreditation bodies to recognise as substantially equivalent the Engineering Technologist/Incorporated Engineer course of study that are accredited and delivered in those countries. The Sydney Accord applies only to accreditations conducted by the signatories within their respective national or territorial boundaries.

The following accreditation bodies are signatories to the Sydney Accord: Engineers Australia, Canadian Council of Technicians & Technologists, The Hong Kong Institute of Engineers; Institution of Engineers of Ireland; Institution of Professions Engineers, New Zealand; The Engineering Council of South Africa; The Engineering Board of the UK. Engineers Australia uses the Sydney Accord to assess overseas engineering qualifications for the purposes of skilled migration to Australia, for meeting the educational requirements of the National Engineers Technologist Register (NETR) and membership of Engineers Australia.

International Register of Professional Engineers

The Register is governed by the Engineers' Mobility Forum, a grouping of international professional associations who enter into various types of mutual recognition agreements for membership. The following professional associations participate: Engineers Australia, Canadian Council of Technicians and Technologists, The Hong Kong Institute of Engineers, Institution of Engineers of Ireland, Korean Professional Engineers Association, Board of Engineers, Malaysia, Institution of Professions Engineers, New Zealand, Engineering Council of South Africa, The Engineering Registration Board of the United Kingdom and the US Council for International Engineering Practice.

Through this Agreement, the signatories aim to facilitate cross border practice by experienced engineers. The signatories have agreed to use their best endeavours to ensure that the bodies responsible for licensing engineers to practice in their own economies simplify as much as possible the requirements for those on the International Register. As with the APEC Engineer Register, Engineers Australia recognises the competence of engineers on the International Register to practice engineering in Australia.

Endnotes

[1] Department of Foreign Affairs and Trade, *Trade in Services Australia 2005,* http://www.dfat.gov.au/publications/stats-pubs/tradein_services.html
[2] Organisation for Economic Cooperation and Development, *Open Services Markets Matter*, Working Party of the Trade Committee, 11 December 2001.
[3] Organisation for Economic Cooperation and Development, *Open Services Markets Matter*, Working Party of the Trade Committee, 11 December 2001, p27.
[4] Dee, Philippa and Kevin Hanslow. 1999. "Multilateral Liberalisation of Services Trade," for presentation at *World Services Congress*, Atlanta, GA, November 1-3, 1999.
[5] Information draws heavily from Organisation for Economic Cooperation and Development, *Open Services Markets Matter*, Working Party of the Trade Committee,11 December 2001, p53
[6]Department of Foreign Affairs and Trade, *Australia and the WTO: Services 2005* http://www.dfat.gov.au/publications/brochures/trade_0506/wto_services.pdf
[7]Department of Foreign Affairs and Trade, *Why Trade maters; 10 reasons why trade is important for Australia*, Fact Sheet Series, http://www.dfat.gov.au/trade/why_trade_matters.html
[8] Department of Foreign Affairs and Trade, *Australia and the WTO: Services 2005* http://www.dfat.gov.au/publications/brochures/trade_0506/wto_services.pdf
[9] Miroudot, S. "The Linkages between Open Services Markets and Technology Transfer", *OECD Working Paper No.29,* 2006
[10] World Trade Organisation, *Annual Report – International Trade Statistics 2001*, WTO, Geneva, 2001.
[11] Department of Foreign Affairs and Trade, *Trade in Services Australia 2005,* http://www.dfat.gov.au/publications/stats-pubs/tradein_services.html
[12] Hardin, A. and Holmes, L.*, Services Trade and Foreign Direct Investment*, Industry Commission Staff Research Paper. AGPS, Canberra, 1997.
[13] Department of Foreign Affairs and Trade, *Trade in Services Australia 2005,* http://www.dfat.gov.au/publications/stats-pubs/tradein_services.html
[14] Department of Foreign Affairs and Trade, *Fact Sheet: The General Agreement on Trade in Services, www.dfat.gov.au/publications/brochures/trade_0506/wto_services.pdf*
[15] Department of Foreign Affairs and Trade, *Trade in Services Australia 2005,* http://www.dfat.gov.au/publications/stats-pubs/tradein_services.html
[16] World Bank, *Global Economic Prospects and the Developing Countries 1995*, www.wto.org page 43.
[17] Just over 1000 individuals and 150 companies participated in the surveys.
[18] Each company has more than one overseas office. As a result the figures do not add to 100%
[19] UNCTAD and World Bank, *Liberalising International Transactions in Services: A Handbook 1994*, New York: United Nations.
[20] Organisation for Economic Cooperation and Development, *The OECD Report on Regulatory Reform: Synthesis*, 1997
[21] Mumford, Peter, *What Constitutes Good Regulation of Services?,* Ministry of Economic Development, Wellington, New Zealand, prepared for the meeting of the Asia-Pacific Economic Cooperation Group on Services, Mexico 19-20 February 2002.
[22] Organisation for Economic Cooperation and Development, *Service Providers on the Move: mutual recognition agreements*, Working Party of the Trade Committee, 2002, p21
[23] Department of Foreign Affairs and Trade, *Submission to the Senate Foreign Affairs, Defence and Trade Committee Inquiry into the General Agreement on Trade in Services and the Australia-United States Free Trade Agreement*, 2003 page 8.
[24] Beviglia Zampetti, Americo, "Market Access Through Mutual Recognition: the promise and Limits of GATS article VII" in Sauve and Stern (eds), *GATS 2000: New Directions in Services Trade Liberalisation*, Harvard University: Brookings Institution Press, Washington DC, 2000.
[25] Hamilton, *The Engineering Profession*, UK Engineering Council, 2000