

Making the grade?

Globalisation and the training market in **Australia** Volume **2**

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Introduction

This volume has two purposes. First, it is intended to identify and clarify the key concepts to be investigated in the research. Second, it summarises the key empirical industry and employment data for the relevant industries and their labour markets at the aggregate level.

The core of the project is an investigation of the emerging industry training market in Australia. Policy development around the training market is arguably the major priority of VET in Australia. Despite its importance, there has been limited considered detailed analysis of how the market is actually working in the context of globalisation. The project is therefore necessarily concerned with the interaction of the nationally based and historically generated existing VET institutional arrangements with externally generated forces associated with 'globalisation'.

Posing the overall research aim in this way raises three immediate conceptual questions:

- ❖ What is a 'training market'?
- ❖ What is 'globalisation'?
- ❖ What are 'VET institutional arrangements'?

The answers to these questions are neither self-evident nor unambiguous. They have analytical, empirical and policy implications. For the purpose of this research project it is also important to clarify the concepts and areas of social and economic practice to inform subsequent research stages. With this in mind the paper has been structured as follows:

Technical note 1 discusses conceptual issues and debates associated with the terms, 'training markets' and 'VET institutional arrangements'. Globalisation was considered in the synthesis report.

Technical notes 2–4 summarise data describing recent changes to the overall structure of the Australian economy and the targeted metals and engineering, and information technology industries.

Technical Note 1

Debates Associated with the Terms 'Training Markets' and 'VET Institutional Arrangements'

Introduction

Vocational Education and Training (VET) involves between one and three billion dollars per year of public, private and individual expenditure, depending on how individual expenditure and opportunity costs are calculated. Access to and participation in education and training dramatically affects life chances and hence has major social equity implications of importance to public policy.

It has become commonplace within almost all areas of public policy to implicitly, or more usually explicitly, frame discussion within assumptions about the inevitable impact of 'globalisation' on domestic policy and to formulate policy responses as more or less inevitable results of the pressures associated with 'globalisation'. VET, with its necessary connection to the labour market through its role in developing skills and knowledge (the 'human capital' of a society), is no exception. The identification of 'human resources' as a critical 'factor of production' which can contribute to 'national competitive advantage' (e.g. Porter 1990; Reich 1992) underlines this linkage.

ANTA (1998b; p.i) in *Bridge to the Future: Australia's National Strategy for Vocational Education and Training 1998-2003*, states the relationship clearly in its Mission Statement:

To ensure that the skills of the Australian labour force are sufficient to support internationally competitive commerce and industry and to provide individuals with the opportunities to optimise their potential.

The major forces for change identified by ANTA clearly indicate an appreciation of the inter-relationships and differential impacts of global, national and regional-level forces on both productivity and employment. The key forces identified include:

- ❖ the growth in global markets and intensified competition combined with lower Australian tariffs;
- ❖ the emergence of service and knowledge-based industries as significant for employment;
- ❖ changes in geographical and regional distribution of employment opportunities;
- ❖ the impact of new information/communication technologies on the community—and enterprises in particular;
- ❖ growth of small business and the increased use of 'non-standard' employment relationships such as casualisation, part-time, contract, labour-hire companies and the outsourcing of business functions;
- ❖ changes in work organisation involving 'flatter management', 'teamwork' and 'multi-skilling';
- ❖ demographic changes in the population;
- ❖ changes to social and family structures;
- ❖ the need to reduce the level of unemployment; and
- ❖ changes in the roles of government from direct service provision to the purchasing of services, with an increased focus on competitive processes and purchasing options. (ANTA, 1996; pp.1-2)

Although structural change is self-evident, there has been considerable debate over the causes and meaning of such changes. Many of the key concepts such as 'globalisation', the 'training

market' and the role of 'institutions' are not unambiguous. How these concepts are applied may affect how changes are interpreted and, hence, what choices are made to respond to them.

In the synthesis report we considered the background and contemporary literature surrounding the notion of globalisation. While this concept is perhaps the most important and contested, it is also necessary to consider the meaning and emergence of the idea of the training market and the concept and delineation of VET institutions.

The Emerging 'Training Market'

The emergence of the training market (NCVER 1997) represents a shift from a training system based on non-market principles of education administration. This shift has been promoted, in part, to help improve efficiency in the provision of skills in Australia. The need for such an improvement is intense owing to heightened international economic integration and competition—commonly referred to as *globalisation*.

Markets are a means to allocate scarce resources, and the model is usually that of a market for a tangible good on the basis of price. The market for *training* can be described as a set of institutional arrangements involved with the allocation of skills (especially credentialled skills) on the basis of price. These are *supplied* by training providers. They are *demand*ed by workers and firms. In theory credentials/skills are allocated by price signals. Demand is determined by the returns available to those investing in training and supply by the relative cost of production.

Origins of the Contemporary 'Training Market' Model in the United Kingdom

Although the concept of skills and knowledge as a 'good' in which public and private investments could be made—and hence about which market-based decisions on the return to that investment could be rationally formed—is familiar in Human Capital Theory (Becker 1975), the concept and the promulgation of a 'training market' is a relatively new phenomenon. It first emerged as a major policy objective in VET in conjunction with the 'enterprise culture' promoted as a key element of the social and economic policies of the Thatcher period of the former conservative government in the UK (Evans 1992).

As numerous commentators have noted (Gospel 1993, 1994, Evans 1992; Green, 1995; Sheldrake and Vickerstaff 1987) training in the UK had historically been typically decentralised, 'voluntarist in nature' and chronically underdeveloped, particularly in comparison with continental systems. However, by the beginning of the 1980s the tripartite arrangements under the Manpower Services Commission and the Industry Training Boards had seen an increase in the quantity of training of around 15 per cent, at least for manufacturing (Sheldrake and Vickerstaff 1987; Green 1991). While the Manpower Services Commission (MSC) and Industry Training Boards (ITBs) period has been extensively criticised as having had little impact outside traditional trades 'it was as near a national system as the country had come to in its history' (Green 1991). From the late 1980s there was a dramatic shift of focus in training policy. Tripartite boards were abolished and employer-dominated Industry Training Organisations (ITOs) and local employer dominated Training and Enterprise Councils (TECs), based heavily on models derived from the Private Industry Council (PICs) in the United States, were established (see Evans 1992). This new system, while nominally based on a national qualifications framework, is essentially administered and monitored at local levels. The purpose of the accumulated changes from the mid-1980s from national system to local level arrangements was made quite clear in the *1988 Employment for the 1990s* White Paper. It was to 'give leadership of the training system to employers where it belongs' and, particularly in the context of entry level training, to give further encouragement

to young people to see themselves as consumers in a demand-led training market through a system of educational credits (see Friedman 1962) in order to:

put buying power into the hands of young people so that they can choose the training and training provider which best suits their needs (Employment Department 1992, cited in Green 1995, pp.100–102).

The 1994 White Paper *Competitiveness: Helping Business to Win* also proposed extending the system to all VET sectors. These changes to VET should be seen as only part of a series of other changes designed to make the labour market more efficient, and included the deregulation of industrial relations and the control of youth wages through mandated Youth Training Scheme (YTS) allowances. One of the most commented on changes in the composition of VET participation over the proceeding decade has been the collapse of traditional ‘apprenticeship’ and other NVQ level 3 participation. Critics have described the associated policies as ‘the triumph of ideology over experience’ (Coffield 1992), although it should be noted that the ‘market model’ in the UK—and the use of ‘training credits’ is really a ‘special market’ and that the employer-led TECs are really only quasi-private—they are essentially private business-led mechanisms for distributing government funding. Although the details of the direction to be taken by the new government is not yet clear, it would appear that apart from additional targeted expenditure on literacy/numeracy and additional support for trainees, new Labour in the UK will not introduce a radical break with previous policies.

Implications of Market Models for Training Policy

As Moore (1992) in *The Private Government of Public Money* (building on Hecló & Wildavsky’s (1981)) notes, there are three relatively distinct choices about the ways in which training policy may be organised. Each has implications for the role of the State in the regulation and governance of the system. The first is through a State-controlled bureaucracy, the second is a ‘corporatist public-private mix’ and the third through (relatively ‘pure’) ‘market-based provision’. Moore rejects the first as inappropriate in a mixed economy, but notes that decisions about the second two organisational forms have significant implications for the role of the State.

Using standard liberal/pluralist political theory he argues that in the ‘corporatist public-private mix’ model (e.g. the continental ‘social partnership model typical of Germany, tripartite arrangements in Australia and those which were emerging pre-Thatcher in the UK) the State is a partner and arbiter. In the (pure) market-based model the State has merely a regulatory role and training provision is a private responsibility conducted through company programs and market mechanisms such as recruitment (1992).

The Australian Context

In Australia, the promotion of ‘market-based’ approaches to VET provision was strongly signalled in the (1990) Deveson Report, although the issue had been previously flagged in the context of award and industry restructuring as a means to increase the national investment—both public and private—in Australia’s training system. The ‘Deveson approach’ was endorsed by a Special Ministers’ Conference in 1990 which, in setting out the framework of the National Training Reform Agenda, agreed in principle to:

- ❖ establish a national training market;
- ❖ implement a system of competency-based training;
- ❖ establish a national framework for accreditation; and
- ❖ establish a unified entry level training system.

These strategic objectives have remained essentially unchanged through successive governments, even though the specific details of particular policies and the responsibilities assigned to individual agencies have changed over time.

Marginson (1997:29) following Auerbach (1988) argues that there are difficulties delineating the boundaries of specific markets and notes that 'a market is not a "thing" but a behavioural relation and that 'market behaviour cannot be read off market structure'. In addition, he notes the difficulties in training markets where places in education (and VET) may be described as positional goods; that is, where they provide students with advantages in access to scarce education and training resources. Because positional goods are hierarchical in nature they confer places in a (status) hierarchy and some are more valuable than others. Although education and training institutions can 'increase production', the number of places in education and training that confer distinct *relative advantage* cannot be expanded. The advantages are realised in the rewards offered in the labour market and are finite. For example, by definition and in fact there are a limited number of 'top positions' in any hierarchical society. With a fixed number of places at each level of advantage one individual may gain advantage—but only at the expense of another. Institutions at the elite level—i.e. those with a high positional advantage—have an incentive *not* to expand student/trainee numbers because it decreases the scarcity and hence value of the credential. The higher the demand for the elite credential the less elite institutions are subject to market pressure. In fact, individually they may benefit by being able to charge higher prices for services/credentials; that is, under positional competition, market forces may redistribute *individual* advantage—often at the cost of increased individual investment in education/training reflected in credentials—without increasing the *aggregate* level of skills in the community. Marginson locates much of contemporary debate about 'credentialism' and 'quality' in education and training in this context and argues that in reality 'much of education is a mix of market and non-market production, with tensions between the two' (1997: 28).

Other commentators have also argued that the development in Australia of a 'national training market'—at least one based on pure competition—has not been unproblematic. Anderson (1997) notes that Deveson 'distinguished between the government-funded TAFE sector which operates largely on non-market principles and the "industry-funded training market" in which there is direct competition for resources and clients', and describes the developing training market in terms of 'a developing market for training outputs' (i.e. competencies) and a further developed "series of training inputs" (i.e. training staff, fee-for-service activities)' (1997; 17). Anderson further notes that the 'utility of this conceptual framework is limited in the absence of clear definitions of, and comprehensive data on, VET inputs and outputs' and that overall, 'the conceptual framework for analysing the size, structure and composition of the training market is generally underdeveloped'. As such information is essential to both effective policy formulation and market operation the work funded by ANTA on VET inputs and outputs and issues such as professional development may be seen as attempts to rectify this situation.

It is arguable that, in practical terms, the emerging training market in Australia may be considered to be a form of shorthand for 'marketisation' whereby market mechanisms and accountability systems based on defined outputs have been introduced to stimulate efficiency. The main processes may be summarised as a deliberate shift in emphasis from the 'supply' to 'demand' sides of a simplified market 'model'.

From 'Supply' to 'Demand'

While Marginson (1997), Anderson (1997), Burke (1992) amongst many have addressed theoretical issues associated with market theory as applied to education and training, the most important shift from a policy perspective has been the shift in the allocation of public resources from the 'supply' to the 'demand' side in VET, argued most consistently by Fitzgerald (1994).

In the report to ANTA, *Successful Reform* subtitled *competitive skills for Australians and Australian Enterprises*, Fitzgerald (1994) criticised the then existing approach to skill formation arguing that:

the reforms have been constructed from a supply-side perspective and driven by a top-down policy approach. Efforts directed at demand-side issues appear centralist in approach...

and that a better way—and central recommendation—to achieve the objectives of training reform (that is, the ‘development of a deep, diverse and dynamic labour pool’) would be that:

implementation of reforms should be refocussed on the demand-side. This is conceived as developing a training market around direct client relationships between training providers on the one hand and enterprises and individuals on the other, and in which skills held by individuals are publicly recognised and portable to the maximum extent possible.

Framework of the Training Market and Points of Regulation

As Lundberg (1994) and Ryan (1995) have argued, it is ‘not just a policy objective’ but ‘a (structural) reality’ that a competitive market exists in education and training with public providers such as TAFE, private providers, skill centres, schools, and Adult and Community Education all offering services and that, in practical terms, the important question is whether or not VET would become more or less efficient and effective—and the quantity and quality of training increase—if the existing ‘market’ became more competitive and education and training providers more ‘market-responsive’.

The regulatory framework that has developed over the last decade and in which the emerging training market is expected to more efficiently and effectively operate can be summarised as having a number of key points. These are:

- ❖ A system of National Qualifications (the AQF) and recognised competency standards;
- ❖ A quality control system which regulates providers (Registered Training Providers/Registered Training Organisations);
- ❖ Competitive tendering arrangements for Commonwealth funding;
- ❖ User choice for contracts of training whereby funds follow students;
- ❖ An increased emphasis on structured Entry Level Training under New Apprenticeships; and
- ❖ The availability to public and private providers of standardised Training Packages for contracts of training, including assessment criteria.

Implications for the Project

At the macro level there is an integrated system which regulates standards, delivery, assessment and funding as they apply to formal VET. What is not known, however, is how these mechanisms operate at the micro level, and the effect the new arrangements may have on the choices made in the market.

VET Institutions

One of the most significant developments in VET in Australia over the past decade has been the development of a *national* system of standards, qualifications and advisory structures which provide an overarching framework—and a common quasi-legal regulatory environment—within which VET institutions now operate in all States and Territories. This is despite the constitutional provisions which, with limited exceptions involving training arrangements specified in federal awards under the industrial powers, defines education (and

training) as a State responsibility. However, institutions, including VET institutions, develop over time and the development and form of VET institutions in Australia has been necessarily related to industry and occupational distributions and past investments in training infrastructure.

Although much of the occupational structure in Australia, such as professional, para-professional and craft-based occupations, was inherited from the UK, their relationship with education and training institutions has been different. Unlike VET in the UK, which has been extensively criticised as uncoordinated and ‘voluntarist’ until at least the 1960s, education and training institutions in Australia developed with strong State support from an early period.

Secular State-funded education was well established in colonial times and the ‘sandstone’ universities were progressively established from the mid-19th century. By the late-19th century, secular schools, universities, technical and agricultural colleges and schools of mines were well established, and by federation institutional support, in the form of associations for professions and unions supported by the emerging award and arbitration system for the craft-based trades provided both criteria for entry to, and a framework for, the production and reproduction of occupationally defined skills. Historians have long identified strong State involvement in the development of transport and other infrastructure in colonial Australia (e.g. Connell & Irving 1980), but the small size of most firms and their orientation to import substitution meant that traditionally the State has also been the major investor in education and training as a *substitute* for either the unwillingness or inability of the private sector to fund training.

By at least the end of WW1, for example, Sydney Technical College and the Museum of Technology were involved in research and development partnerships with local chemical, electrical and manufacturing industries and by WW2 the technical staff and the equipment of the major NSW technical colleges and the Victorian RMIT provided both a substantial production capacity and specialist tooling supplies to the war effort (Cobb 1984; Neill, 1991). Although mostly neglected by historians of education, who have concentrated on the school system, the involvement of the State-funded technical education sector in post-war reconstruction provided a framework on which later Commonwealth involvement following Kangan (1974) was able to be built.

The constitutional arrangements by which education is a State responsibility certainly affected the trajectories of technical education in the different States, particularly as technical education became technical and further education in the 1970s (Goozee 1992). For example, Victorian TAFE largely grew out of the technical school system, whereas in NSW the Technical Education Branch of the Department of Public Instruction was largely autonomous from the first decades of the century. By 1947–48 it had become a separate Department following extensive criticism of the inefficiencies, administrative duplication, lack of accountability and costs to the Treasury of the former decentralised college-based system (Cobb 1984)¹. These different historical experiences explain, to some extent, the cultural differences retained within contemporary individual State TAFE systems, even though they share a common acronym.

Notwithstanding the differences amongst States and Territories—and periodic complaints from employer representatives—the post-Kangan developments supported by increased Commonwealth funding produced a system which was arguably amongst the most developed and accessible in any country, and superior to others in the English-speaking world (Goozee 1992). It is on the basis of this history, and the long-standing investments by both State and Commonwealth Governments, that the TAFE system remains the major provider of VET in Australia and deeply embedded in local communities as the ‘provider of choice’.

¹ From an historical perspective, it is somewhat ironic that the absorption in 1998 of technical education in NSW under, in practice, the school system has reversed almost a century of contrary industrial experience.

Of significance for this project is the fact that these long-standing investments in VET infrastructure by State and Commonwealth Governments provide major barriers to entry into the training market by other potential providers, particularly where significant capital investment may be required. For example, the cost of setting up a metals skills centre in competition with a TAFE engineering workshop is substantial, and probably impossible to recover without government or other subsidy given the static nature of employment in the industry². Similar situations apply in other areas. Cost constraints and concerns that uncontrolled competition may increase the potential for the duplication of capital and human resources has led to the development of the concept of 'thin markets' in NSW, QLD and WA and suggests State level reservations about the limitations of 'user choice' notwithstanding formal ministerial agreements.

Barriers to entry and constraints resulting from the existence of a strong publicly funded TAFE sector suggest that an understanding of 'VET institutions' on at least two levels is required. The first is the common one of a VET provider as an 'institution' and the second is the relationship of that institution to the 'institutional framework' which supports formal and informal skill formation processes.

While TAFE on the basis of diversity of courses, geographical dispersal and student enrolments is the largest 'VET institution', a broad understanding of VET means that the category of VET provider should also include schools, universities, adult and community education, as well as professional, industrial and trade associations and the range of private providers—such as business colleges—which have long been part of VET provision. For any market to function, a flow of information between providers and consumers is required. Information flow between employers and TAFE colleges and administrations has customarily been identified as a critical weak point. The shift to a demand-side emphasis in the development of the contemporary training market has attempted to rectify that weakness by giving employers and those seeking training more choice. The extent to which the emerging training market has succeeded in improving information flow is considered in the appendix to volume 1.

VET providers, as 'institutions', do not exist independently of a range of other institutional arrangements which support their continued existence. These include the government and industry bodies involved in training needs identification, administration and regulation but would also include industrial and social arrangements which support and reward skill formation in terms of monetary or other rewards. For example, the recognition of occupational classifications in industrial awards, the definition of the competencies to be achieved to achieve such classifications and the status attributed both within a workplace and in the wider community may affect decisions by individuals and groups alike to make particular choices about either participation in various forms of VET or between different providers. It is unlikely that all such choices will be simply based on price differences.

Implications for the project

In the regional-industry case studies that follow we indicate the range of training providers available and utilised in each of the regions. However, it is unlikely that the simple existence of a number of providers in itself will provide the basis of market choice. This is why it is also necessary to analyse the decision-making processes that appear to be at work at enterprise and individual levels. Such choices are likely to be constrained by the institutional framework within which they are made. As noted above, the operation of the emerging training market is intended to become increasingly dependent on 'demand side' signals. This requires consumer knowledge. The ability to make an *informed* choice will therefore depend to a great extent on the existence and operation of information channels at the individual, workplace,

² Depending on the area and number of occupations covered it could be more than \$1,000,000. For example, DEETYA is about to invest approximately \$450,000–\$500,000 in the CCI WA Skills Centre in Kwinana. On the basis of field research, this is still unlikely to provide a level of equipment equivalent to that of a TAFE college. (Source: Field notes; *Quality Arrangements in Group Training*, draft, ACIRRT, August, 1998)

organisational and regional level *in addition to those* which may operate at peak government and industry level. What is investigated is the way information flows (or fails to flow) between consumers and institutions and how this may facilitate or constrain informed choice in the market. This is likely to depend on the institutional frameworks within which different industries operate as well as the particular arrangements which may characterise the operations of any single VET institution.

Technical Note 2

Summary of Empirical Data Associated with Changes to the Structure of Australian Industry

Over the past decade Australia's economy has undergone fundamental changes. These changes have largely been driven by a need to make the Australian economy more internationally competitive through the deregulation of Australia's financial system, the privatisation of key government activities and the systematic reduction in tariff protection for the Australian manufacturing industry for instance. In response to, and in many cases a result of, the pressures of globalisation the structure of the Australian labour market has been altered substantially. Three of the most significant of these changes are:

- ❖ changes in the composition of Australian industry
- ❖ increased casualisation of work
- ❖ increase in self-employment and subcontracting

Changes in the Composition of Australian Industry

One of the most significant changes to the labour market has been the change in its composition which has seen a decline in the manufacturing industries and a growth in service sector employment as shown in table 1.

Table 1: Job Losses and Gains by Industry, Australia 1988 to 1998

Industry	Change in employment - number persons
Largest number of new jobs	
Property and business services	+ 391,400
Retail trade	+ 201,400
Health and community services	+ 199,400
Accommodation, cafes and restaurants	+ 144,600
Education	+ 120,900
Construction	+ 92,300
Personal and other services	+ 79,300
Cultural and recreational services	+ 61,800
Wholesale trade	+ 58,900
Largest number of lost jobs	
Manufacturing	— 70,000
Textile, clothing, footwear & leather	— 31,500
Machinery & equipment	— 41,400
Metal product	— 19,500
Electricity, gas and water	— 52,200
Rail transport	— 40,100
Insurance	— 20,600
Government administration and defence	— 17,400
Finance	— 16,200

Source: ABS Labour Force Surveys

Note: New job industries are all at highest level of the Australia and New Zealand Standard Industry Classification (ANZSIC) aggregation. Different levels of aggregation are used in the lost job industries for purposes of clarity.

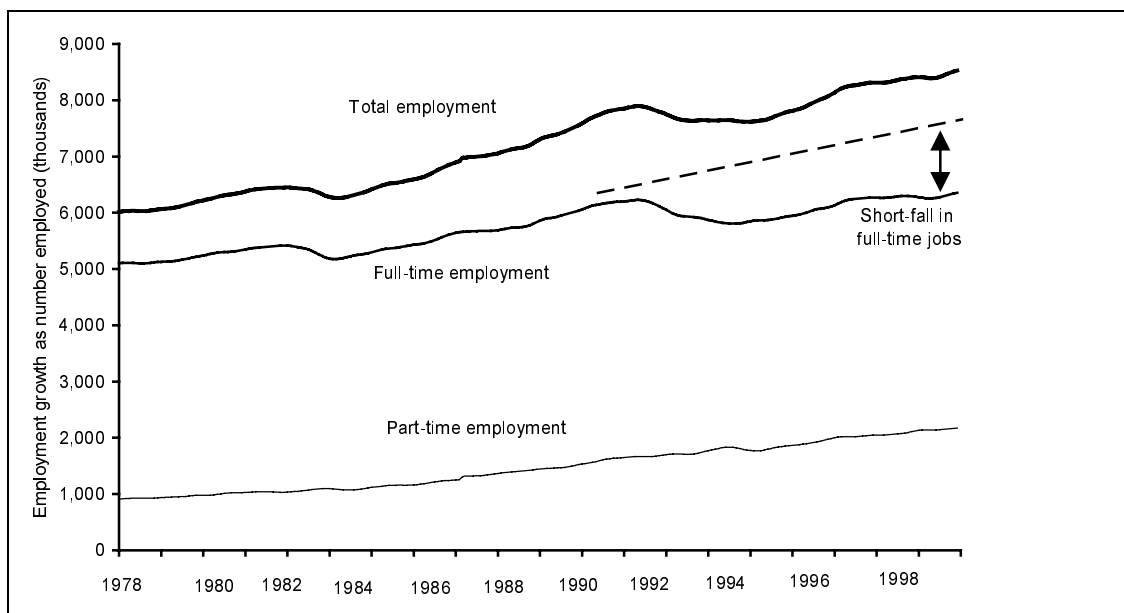
Over the ten-year period to 1998 employment in metal manufacturing alone has fallen by almost 20,000 persons compared to property and business services which has seen

phenomenal growth, increasing by over 390,000. As discussed previously, defining the IT industry is both problematic and contentious; however, a large proportion of the industry is situated in the service sector and has contributed to an increase in service sector employment overall.

Increased Casualisation of Work

At the same time as the structure of the Australian labour market was undergoing radical change so, too, were the types of jobs on offer. Figure 1 details the employment growth in Australia over the period 1978–1998. It shows that while total employment has steadily increased over the period, a large proportion of this can be attributed to the increase in part-time employment. Part-time employment is generally associated with lower levels of training and opportunities for skill development and increasingly less job security where part-time work is by those employed as casuals.

Figure 1: Employment Growth in Australia 1978 to 1998

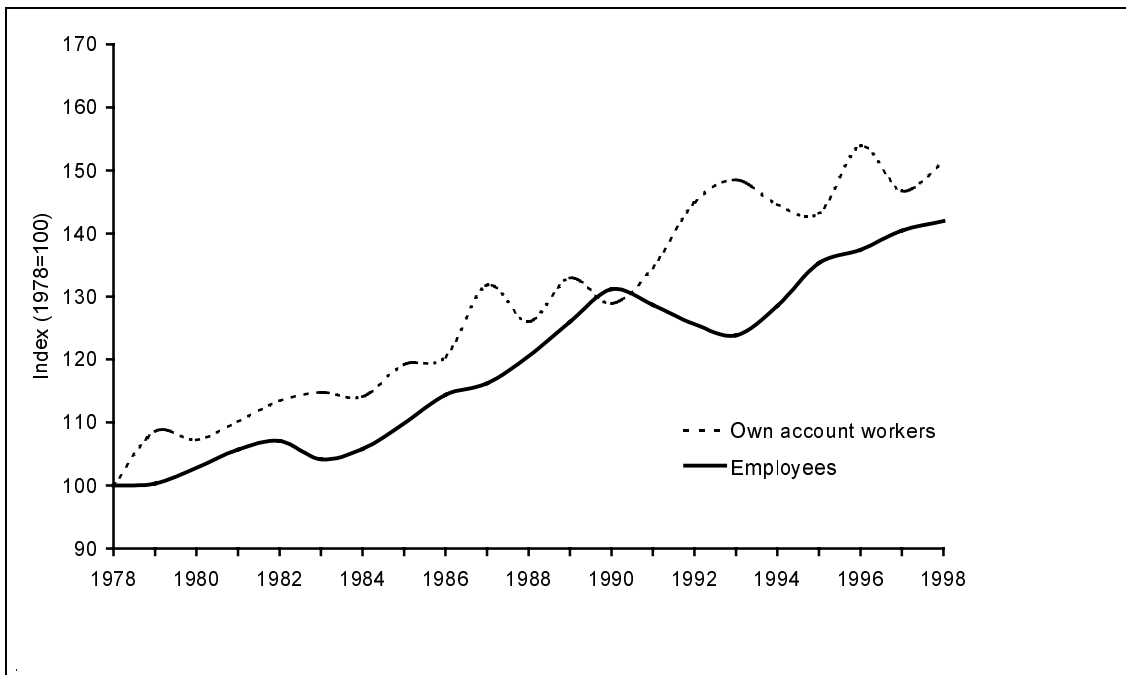


Source: ABS, Labour Force Surveys

Increase in Self-employment

The third major change in the labour market of relevance to this project is the increase in self-employed workers relative to wage and salary earners. This group is made up of sub-contractors, those operating their own businesses and workers employed by labour hire firms as contractors who often are employed at the expense of full-time workers. This trend has been observed in both the manufacturing and information technology industries. It has also been associated with an increase in outsourcing in both the private and public sectors. Unlike manufacturing, the information technology industry appears to have benefitted from this outsourcing. Sections of the industry have developed specialising in providing on-call service to firms rather than being directly employed by them.

Figure 2: Growth in Self-employment and Wage and Salary Earners 1978-1993



Source: Derived from ABS, *The Labour Force Australia*, Cat no. 6204.0

Technical Note 3

The Australian Metals and Engineering Industry: Size, Structure and Trends

How big is the industry overall and what is the relative numerical significance of each of the elements which make it up? Table 2 summarises the most comprehensive information available on the subject.

Table 2 Employment in the Metals and Engineering Labour Market, Australia, August, 1996

	Metals and engineering labour market			
	Manufacturing		Non-Manufacturing	All Industries
	Metal Manufacturing	Non-Metal Manufacturing		
Number Employed	327,994	69,738	114,825	512,557
(% of metals and engineering workforce)	(64.0)	(13.6)	(22.4)	(100)

Source: Unpublished information from the 1996 Census of Population and Households.

Notes: Full details on how this is defined using ABS material and how these estimates were derived are the same as those outlined in Metal and Engineering Training Board, Vocational Training Plan, May 1994.

As the table reveals, in August of 1996 about half a million people were employed in the metal and engineering labour market. Of these workers the largest group (64.0%) is employed in metals manufacturing. The table also highlights that the metals industry extends beyond metal manufacturing and even into non-manufacturing activities. Indeed, 22.4 per cent of metal employees work in industries as diverse as mining, construction and wholesale—especially wholesalers of machine tools. Confirmation of this extensive spread of the industry is provided in Australian Bureau of Statistics (ABS) material concerning the coverage of the metal industry awards.³

The Metal Manufacturing Segment of the Industry: Structure and Recent Developments

While two and three workers in the metal industry are involved in metal manufacturing it is important to appreciate that a wide range of activities are undertaken in this segment of the industry. Sub-sectors predominantly involved in project or jobbing work like structural steel products have distinctive characteristics and experiences of change compared to workplaces

³ Comprehensive details of the wide spread coverage of the Federal, Victorian, Queensland and Western Australian metal industry, engineering and/or trade awards is provided in David H Plowman and Malcom Rimmer, *Bargaining Structure, Award Respondency and Employer Associations*, UNSW Studies in Australian Industrial Relations, UNSW, 1992 pp.148-149, 163, 191-192, 195. It should be noted that some of the State awards are very expansive in coverage, extending to motor vehicle repair and allied services. This broader coverage under the State awards appears to reflect the customary links within a large family of jobs encompassing 'engineering' type tasks.

involved in producing more generic, bulk goods such as those involved in casting or steel tube production. Both in turn differ from producers of consumer durables and more specialised standard goods such as industrial machinery and planes, boats and trains. And each sub-component within metal manufacturing has experienced a different range of economic and structural changes over the 1980s and 1990s.

To help summarise its current structure and report on recent developments material on metal manufacturing has been broken down into four categories. These categories and the particular sub-segments that make them up are summarised in table 3.

Table 3: Different Components of Metal Manufacturing

Element of Metal Manufacturing	Corresponding ABS Category & % of its value-added falling within metal and engineering	Key specialised industries making up this category (& industries included in the ABS category that should be excluded)
Machinery, Electrical and Electronic Equipment and Appliances	Other machinery and equipment (100%)	Photographic, professional and scientific equipment Appliances and electrical equipment (e.g. radios, TVs, refrigerators) Industrial machinery and equipment (e.g. agricultural machinery, machine tools, pumps and compressors)
Transport Equipment	Transport Equipment (55.7%)	Motor vehicle components Ships and Boats Railway rolling stock Aircraft Note: this category should exclude Motor Vehicle Assembly
Fabricated Metal Products	Fabricated Metal Products (100%)	Fabricated steel products (e.g. coal loaders) Architectural metal products Metal containers and furniture Cutlery, springs, nuts and bolts
Casting, Forging, Steel Pipes and Tubes	Basic Metal Products (15%)	Iron and Steel Casting and Forging, Production of steel pipes and tubes. Note: this category should exclude Iron and Steel Products, Basic Non-ferrous metals and non-ferrous metal basic products.

Wherever possible data will be presented in a way that is consistent with these definitions. Sometimes the statistical material is not released in a form that allows for the removal of non-metal and engineering parts of metal manufacturing. Where this occurs it will be noted and taken into account when interpreting the data. The data also reports on the period from the early 1980s to the early 1990s. Ideally the following analysis should be based on more up-to-date information. Unfortunately, conventions in data collection have limited the capacity to do this. Where more information is available it is mentioned in the text. All tables report over a common period to allow for direct comparability across the variables examined.

Key Developments: 1981–82—1991–92

It is well known that the metals and engineering sector faces significant and growing competition from overseas manufacturers. Indicators of the significance of the industry's involvement in international trade are summarised in Table 4.

Table 4: Indicators of International Competitive Pressures in Select Metal Manufacturing Industries, Australia: 1981–82 and 1991–92

Industry	Indicator	1981–82	1991–92
Machinery, Electrical, Electronic Equipment and Appliances	% of domestic market	49.4	34.8
	% of output exported	8.5	12.5
	Effective rate of assistance	21	15
Transport Equipment	% of domestic market	60.0	55.2
	% of output exported	4.9	12.2
	Effective rate of assistance	71	31
Fabricated metal products	% of domestic market	88.1	85.0
	% of output exported	2.8	7.7
	Effective rate of assistance	31	16
Basic iron and steel	% of domestic market	88.2	88.5
	% of output exported	8.2	14.0
	Effective rate of assistance	15	17
Manufacturing	% of domestic market	74.2	69.0
	% of output exported	13.3	21.4
	Effective rate of assistance	25	17
Other Factors			
. Trade Weighted index		(80)	(50)
. US\$/A\$			
. Japanese¥/A\$			

Source: Industry Commission, *Australian Manufacturing Industry and International Trade Data 1968-69 to 1992-93*, Industry Commission, Canberra, 1995

One of the most striking features of this table is the profound variation in levels of import penetration in the Australian market for the different sub-sectors at the beginning of the 1990s. At one extreme is the Machinery, Electrical and Electronic Industries segment where local suppliers account for just over a third of domestic sales (34.8%), down from just under half (49.4%) in the early 1980s. At the other extreme are the basic Iron and Steel producers whose share of the domestic market has remained stable at over 88 per cent.⁴ The experiences of Transport Equipment and Fabricated Metal Products in maintaining domestic market share fell between these extreme cases.⁵

Table 4 also reveals significant increases in exports for all elements of metal manufacturing. This development has been broadly in line with that occurring across manufacturing more generally. The table also reveals that effective rates of assistance remained stable or fell in the ten years to 1991–92. Against this it should be noted that the real value of the Australian dollar also fell. This latter development probably reduced the impact of reduction in assistance during this period.

⁴ The situation for casting, forging, steel pipe and tube production was hard to identify precisely from available data. What data was available indicated it was basically the same as that for the larger basic iron and steel industry grouping, hence the use of the more aggregated category is appropriate in this case.

⁵ Also note the importance of differences at the three and four-digit level. Computer imports knocked around part of general machinery and consumer appliance at the same time as other parts of this ASIC code did well in terms of market share and exports. Hence while overall trend was decline this was not uniform across all the elements making up this group of industries.

The net result of these changes appears to have been a decline in domestic market share for sectors producing more elaborately transformed goods, with fabricators and those involved in casting and forging holding their own. All have increased the extent of their exporting activities. This, however, has occurred from a very low base. Table 5 summarises movements in output levels of these industries.

Table 5: Changes in Output Levels, Select Metal Manufacturing Industries, Australia, 1982–83 and 1991–92 (Reference base year 1989-90 =100)

Industry	1982–83	1991–92
Machinery, Electrical and Electronic Equipment and Appliances	82.0	99.0
Transport Equipment (includes cars)	82.7	84.5
Fabricated metal products	81.6	85.6
Basic metal products	74.4	103.9
Manufacturing	84.2	96.4

Source: ABS, *Yearbook Australia 1995*, Categories reported at the two-digit Australian Standard Industry Classification level

What is particularly interesting is that while levels of international competition have obviously increased, sometimes resulting in the lost of domestic market share, this has not resulted in reduced levels of production. Instead output, instead, appears to be have been more sensitive to fluctuations in the domestic business cycle. Consequently, it seems that in terms of output international competition has restrained possible growth rather than reduced levels of production as such. It is particularly interesting to note that even during the recession some parts of metals manufacturing continued to grow or suffered only minor setbacks in the levels of production. This was especially the case in Machinery, Electrical and Electronic Equipment and Appliance Manufacturing and Basic Metal Products, both of which grew dramatically over the decade to 1991–92: the former by over 20 per cent, the latter by just under 40 per cent. These sub-industries were amongst the strongest performing sectors of Australian manufacturing during this period.

Unlike output of levels, there were dramatic falls in employment levels in the ten years to 1991–92. These developments are summarised in table 6.

In absolute terms the greatest falls were in two sub-industries: Machinery, Electrical and Electronic Equipment and Appliances (down 49,000); and Transport Equipment (down 40,000). Even in relative terms the decline in transport equipment was significant at 41.7 percent. A fall of similar proportions afflicted those involved in Casting, Forging, Steel Tube and Pipe Production. Given that output remained relatively stable during this period most of these falls must have resulted from significant increases in productivity. The inability to extend output to meet growing domestic demand and export opportunities also appears to have contributed to this outcome. While there have been modest employment gains in some parts of Metal Manufacturing in the first half of the 1990s, these have been marginal compared to the losses in the 1980s. Moreover, they have occurred against a background of rising output growth implying further labour productivity growth. Further details on more recent developments in the machinery, electrical and electronic industries are provided in table 7.

Table 6: Changes in Employment Levels, Select Metal Manufacturing Industries, Australia, 1981–82 and 1991–92 ('000)

Industry	1981–82	1991–92	Difference (% change)
Machinery, Electrical and Electronic Equipment and Appliances	163	114	49 (30.1%)
Transport Equipment	96	56	40 (41.7%)
Fabricated Metal Products	113	86	27 (23.9%)
Casting, Forging, Steel Pipe and Tubes	17	10	7 (41.2%)
Manufacturing	1155	907	248 (21.5%)

Source: Industry Commission, *Australian Manufacturing Industry and International Trade Data 1968-69 to 1992-93*, Industry Commission, Canberra, 1995

Table 7: Employment Levels in the Machinery, Electrical and Electronic Industries, Australia 1981–82, 1986–87, 1991–92 and 1995–96

	1981–82	1986–87	1991–92	1995–96
Photographic & Scientific Equipment	9,536	9,700	11,007	11,199
Electronic Equipment	20,970	19,900	18,509	19,833
Electrical Equipment and Appliances	58,404	46,100	38,761	37,323
Industrial Machinery and Equipment	74,020	52,500	45,884	51,826
Total MEE Industries	162,930	128,200	114,161	120,181
Total Manufacturing	1,154,659	1,024,700	906,938	907,694

Source: Industry Commission, *Australian Manufacturing Industry and International Trade Data 1968-69 to 1992-93* and ABS, *Manufacturing Industry Australia, 1995-96*, Cat no 8221.0

As is evident in this table the big shakeout in the Machinery, Electrical and Electronic (MEE) industries occurred in the early 1980s, with smaller employment losses associated with the most recent recession of the early 1990s. White goods and industrial machinery and equipment appear to be particularly cyclically sensitive. In the first half of this decade employment levels have stabilised and, if anything, increased slightly.

Given these developments in output and employment it is not surprising that labour's share of turnover and value-added declined over this period. These developments are summarised in table 8.

Table 8: Wages Share Ratios, Select Metal Industries, Australia, 1981–82, 1989–90 and 1995–96

Industry	Wages to Turnover ratio (%)			Wages to value-added ratio (%)	
	1981–82	1991–92	1995–96	1981–82	1989–90
Machinery, Electrical and Electronic Equipment and Appliances	25.7	21.6	19.1	58.0	47.7
Transport Equipment (includes cars?)	*	26.0	23.0	*	48.6
Fabricated Metal Products	23.9	20.8	21.0	56.7	48.1
Casting, Forging, Steel Pipe and Tubes	*	*	17.8	*	47.5
Manufacturing	20.8	16.9	15.0	54.2	40.0

Source: Industry Commission Data

Note: * signifies data either unavailable or unreliable

The first three columns report on wages share as a proportion of turnover. As is well known labour costs are only a relatively limited proportion of total costs in the manufacturing process.⁶ Generally speaking for metal manufacturing they declined from about a quarter to a fifth of input costs in the decade to 1991–92. This shift was of a similar order to that occurring elsewhere in Australian manufacturing at the same time.

Of greater interest, however, is labour share of value-added. While wages may be a relatively small proportion of input costs, they are a major claim on industry value-added. Developments here are summarised in the last two columns. It is particularly interesting to note that this too declined between 1981–82 and 1989–90—the latest year for which data are available.⁷ It is almost uncanny how the level of labour share of value-added is almost identical for the four sub-components of metal manufacturing. The uniformity of the decline also indicates that there was a major shift in factor shares at the sub-sector/industry level. The policies surrounding this development receive close attention in the following chapters. The uniformity of factor shares also highlights the importance of separating out the non-metal and engineering components of metal manufacturing. If the more capital-intensive sub-sectors are not netted out this level of uniformity disappears. It seems that many metal and engineering employers face a relatively uniform factor share situation.

In recent times a major structural change at work-site level appears to have been a decline in the average size of establishments in these sectors. Care should be exercised when interpreting this data given the cautions issued by the ABS. Nonetheless, it appears that at the beginning of the 1980s around two-thirds (65.6%) of employees in metal manufacturing were employed in establishments with 100 or more workers. By the beginning of the 1990s this had fallen to a little over half (55.7%).

⁶ Skinner, W. (1986) 'The Productivity Paradox', *Havard Business Review*, 1987 vol.64, no. 4, pp.55-59.

⁷ Data on 'industry gross product' is available for 1995–95. But this is not directly comparable with value-added as defined in earlier years. Hence the analysis must be confined to shifts in factor shares from the early 1980s to the early 1990s.

This development was particularly pronounced in those sub-industries already having the largest proportion of workers employed in smaller establishments. In the Machinery, Electrical and Electronic Sector the proportion fell from 56.8 per cent to 47.9 per cent. The shift was even more dramatic amongst metal fabricators where the proportion fell from a low base of 38.0 per cent to 26.1 per cent.

The distribution of employees by workplace size was also mirrored by business size measured in employment terms. In Machinery, Electrical and Electronic sector and Metal Fabrication less than ten per cent of the workforce was employed by the four largest firms. In Transport Equipment and Basic Metal Products the proportions were 25 and 45 per cent respectively.⁸ Further details are provided in table 9.

While reasonably comprehensive information is available on the key structural variables considered above, only patchy data are collected on economic performance. That which is readily available is summarised in table 10.

These data concern developments in the late 1980s and early 1990s: a period of movement from boom to recession. This shift is clearly evident in the figures. Investment levels during this period fluctuated dramatically. For example, as the 1980s boom neared its peak in 1988–89 investment in general machinery, electrical and electronics equipment and appliance and metal fabrication totalled \$1,089m. By 1991–92 this had nearly halved to \$667m. This was despite the fact that profits in both years were generally constant at over \$1,000m in each year. Trends in transport equipment and basic metals are obviously overwhelmed by material from car assembly, steel and non-ferrous metal producers. The scale of the impact of recession on profits in Transport Equipment was clearly considerable. Profit fell tenfold when the result of 1991–92 is compared with the result for 1988–89—down from \$413m to \$53m.

Details concerning return on assets and operating profit margins for the years 1990–91 and 1991–92 are summarised in the last four columns. Between these two years there was a general deterioration in performance on both indicators, with transport equipment particularly severely hit (for example, negative returns in 1991–92). The changes were more dramatic for the industries including more capital-intensive production; that is, transport equipment and basic steel production. Amongst fabricators and machinery, electrical and electronic equipment and appliance manufacturing levels and movements were pretty close to manufacturing averages. Operating profit margins in 1991–92 were between five and six per cent and return on assets between 7.5 and 8.5 for these latter two groups.

Table 9: Distribution of Workplaces and Business Units in Metal Manufacturing, 1991–92

	Machinery (bar Transport Equipment) and Consumer Appliances	Transport Equipment	Fabricated Metal Products	Basic Metal Products
Concentration of enterprises in employment terms				
. % of employees in largest 4	9	25	7	45
. % of employees in all bar 16 largest enterprises	78	46	80	27

Sources: *ABS Manufacturing Industry, Australia* Cat no. 8221.0, 1991/92 as cited in NMETB Plan April 1994; *ABS Year book, 1995*

⁸ Concentration statistics taken from *ABS Yearbook Australia 1995*

Table 10: Indicators of Economic Performance, Metal Manufacturing Industries, Australia, late 1980s–early 1990s

	Capital Expenditure (\$'000)		Profits (\$'000)		Return on Assets (%)		Operating Profit Margin (%)	
	88–89	91–92	88–89	91–92	90–91	91–92	90–91	91–92
Machinery (bar Transport Equipment) and Consumer Appliances	1,089	667	1,248	1,016	10.6	7.8	7.9	5.9
Fabricated Metal Products					8.0	8.2	5.2	5.1
Transport Equipment (includes car assembly)	822	554	413	58	3.2	-6.0	1.9	-3.8
Basic Metals (includes steel, nonferrous etc.)	881	1643	1,905	140	9.1	5.1	10.3	5.9
Manufacturing	7,666	6858	8,616	5,788	7.7	5.9	6.4	5.2
All Industries					11.2	8.4	8.7	7.3

Source: ABS *Yearbooks* and unpublished data from the ABS Survey of Business and Economic Performance

Summary

Overall the Metals and Engineering industry employs over half a million people across a range of manufacturing and non-manufacturing industries. The single largest segment of the industry, metal manufacturing, has experienced dramatic structural changes over the 1980s and into the 1990s. Levels of international competition have increased, eroding domestic market share for producers of elaborately transformed goods, but having a lesser impact on fabrication and casting/forging workshops. While exports are up, this is from a low base and has not made up for the loss of domestic market share. Despite these developments, overall output levels have not declined, remaining stable around a cycle that is closely linked to domestic economic booms and recessions. Employment levels have, however, fallen dramatically. Although there have been some modest employment gains in the last few years, these have done nothing to offset the falls of between 30 and 40 per cent in key metal-manufacturing industries in the decade to 1991–92.

The maintenance of output levels in the face of declining employment implies significant productivity improvement. The benefits of this appear to have been passed on to consumers in the form of lower prices and to employers/owners in the form of larger profit share of value-added. Not surprisingly labour shares of turnover and value-added have declined over the same period. In parallel with these developments workplace size has fallen, with the declines greatest in those industries with the smallest proportion of workers in factories with 100+ workers—metal fabricators and in the machinery, electrical and electronic industries.

The limited indicators of economic performance reveal highly volatile investment patterns and profit. Levels of volatility are greatest for capital intensive sectors. The heartland of metals and engineering, fabrication and machinery, electrical and electronic manufacturing have performed pretty close to the manufacturing average with less volatile swings.

Technical Note 4

Overview of the Australian Information Technology Industry

The Australian Information Technology Industry: Size, Structure and Trends

The information technology (IT) industry has become one of the fastest growing industries in the developed countries. The industry is characterised by rapid technological change, short product life cycles and a market where prices for both products and services are constantly falling. This technology-driven product market makes it difficult to capture productivity gains. The structure of the industry is also constantly changing as the convergence between communications and the media progresses and business use of IT increases (Houghton et al.1996: XI). It is an important industry not only because of its size and growth rate but also (and perhaps more importantly) because of its potential to enhance the productivity and competitiveness of other businesses in the economy as providers of the national information infrastructure (Information Industries Taskforce 1997). The industry is also of significance because of its capacity to increase Australia's level of economic performance. The Information Industries Taskforce argues that:

it is through their enabling role that the information industries can contribute most significantly to Australia's future economic growth, employment and productivity (1997: 14).

How is the Information Technology Industry Defined?

One of the most problematic features of the IT industry is that it defies standard classification systems such as the Australia and New Zealand Standard Industry Classification (ANZSIC). This is owing to its diverse nature and structure, covering a range of industries extending from manufacturing through to service industries. To date there is no internationally recognised standard on which goods and services should be included in a definition of IT. This is owing in part to the industry's growth which has been faster than the evolution of classification systems. As a result there is no single ANZSIC category for the IT industry.

A range of approaches has been developed to address this problem and to allow for definitions of the industry to be constructed. The most popular approaches used in Australia define the industry on an activity basis, i.e. the IT industry is made up of those businesses which earn a large part of the income from a particular set of IT&T goods and services (ABS 1995).

The ABS in its publications and surveys adopts a narrow definition of IT, i.e. businesses which create goods and services based around computer chip technology (ABS 1995). In the 1995-96 survey the following industries (ANZSIC classes) were included in the IT industry:

- ❖ (2841), computer business and machine manufacturing
- ❖ (2842) telecommunication, broadcasting and transceiving equipment
- ❖ (2849) electronic equipment manufacturing, n.e.c
- ❖ (2852) electric cable and wire manufacturing
- ❖ (4613) computer wholesaling
- ❖ (4614) business machine wholesaling, n.e.c.
- ❖ (4615) electrical and electronic equipment wholesaling n.e.c.
- ❖ (7120) telecommunication services
- ❖ (7831) data processing services
- ❖ (7832) information storage and retrieval services

- ❖ (7833) computer maintenance services
- ❖ (7834) computer consultancy services

This is based on a definition agreed to by policy and industry organisations where the IT industry covers computers and communication equipment and the services which facilitate the use of this equipment. Where industries manufacture or service microprocessors for the setting or control of functions they have been excluded from this definition (ABS 1997c).

In order to overcome these difficulties Houghton et al. (1996) propose a new IT map where the industry is divided into four main industries—communication services, information services, equipment manufacturing and information products (see table 11). This map is an attempt at establishing a new conceptual framework for analysing the industries which make up IT. The IT map allows for the integration of existing classification schemes (e.g. ANZSIC) and data sources to explore the dimensions of the IT industry.

Table 11 summarises the IT map and allocates the appropriate ANZSIC industries. The table shows that IT cuts across a range of ANZSIC classifications from the business services to manufacturing industry sectors. This map also allows some bridge between the occupational and industry dimension of a definition of the IT industry by suggesting the types of occupations you would expect to find in the IT industry (Baxter 1998).

Table 11: Map of the Information Technology Industry

Communication Services	Information Services
(7120) Telecommunication Services	(7832) Information Storage and Retrieval Services (7834) Computer Consultancy Services (7831) Data Processing Services (7833) Computer Maintenance Services
Information and Communication Equipment	Information Products
(2852) Electrical Cable and Wire Manufacturing (2842) Telecommunication broadcasting and Transceiving Equipment Manufacturing (2841) Computer and Business Machine Manufacturing (4613) Computer Wholesaling (7743) Plant Hiring and Leasing (2849) Electronic Equipment Manufacturing (4615) Electrical and Electronic Equipment Wholesaling	(2430) Recorded Media Manufacturing and Publishing

Source: Houghton et al. 1996, p.103.

A definition of the industry is further complicated by the fact that it is also possible to view the industry as a hybrid of both industry and occupational classifications as IT personnel tend to work in all industry groups, and, as such, a definition of the IT industry may need to be sufficiently broad to acknowledge this. Table 12 shows the distribution of IT personnel across industry groups. It suggests

that while there are clusters of IT workers in Manufacturing and Property and Business Services (16.4% and 32.7% of all IT staff respectively) IT occupations are present in every industry. A definition which focusses exclusively on industries which derive a large proportion of their business from the manufacture or service of IT goods and services can not capture the true breadth of the industry.

Table 12: Distribution of IT&T Staff by Industry

Industry	Proportion of All IT&T Staff
Mining	1.3%
Manufacturing	16.4%
Electricity, Gas and Water Supply	1.4%
Construction	3.9%
Wholesale Trade	11.7%
Retail trade	3.8%
Accommodation, Cafes and Restaurants	0.23%
Transport and Storage	4.5%
Communication Services	2.7%
Finance and Insurance	14.6%
Property and Business Services	32.7%
Education, Health and Community Services	3.0%
Cultural and Recreational Services	1.7%
Personal and Other Services	2.0%
All Industries	100.0%

ABS (1997a) *Business Use of Technology, 1993-94*, Cat. no. 8129.0.

As the definitional issues remain unresolved, both within the literature and at the practitioner level, estimates on the value, size and employment in the industry vary widely. As a consequence the IT industry tends to be referred to in two ways, the more specific information technology and telecommunications industry (IT&T) and the broader information services industry which incorporates the range of IT activities performed across all industry groups.

The Structure of the IT&T Market

The structure of the IT industry both locally and overseas has been shaped by both globalisation and a desire of firms to locate in close proximity to major markets. This has produced both a concentration of IT production and service providers geographically and the emergence of a relatively small number of firms which dominate world trade.

As a direct result of globalisation the IT&T industry, specifically the design, engineering and production of electronics and IT&T products, is seeing world production, R&D and trade in these products dominated by less than 50 transnational corporations, with much of this trade being intra-firm (Kuras 1998:2).

There has also been a shift in production to low cost global production centres in South-East Asia and more recently in Ireland and Israel where levels of education are high, governments offer tax incentives and wages are relatively low. These areas have then benefitted from spillovers in the high value design, engineering and manufacturing associated with the production of IT goods and services. The global trend to outsourcing of IT services and the emergence of world specialist centres is

facilitated by the availability of high quality international telecommunication links at ever reducing prices (Kuras 1998: 2).

Manufacturing in the information industries within Australia is also highly geographically concentrated, with 77 per cent of all IT manufacturing located in NSW and Victoria and the majority of these within the Sydney and Melbourne metropolitan areas. This reflects manufacturers' attempts to capture economies of scale, proximity to major suppliers and customers and ready access to skilled labour (Kuras 1998: 5). This geographical concentration is expected to continue, with other States likely to contain local companies and service operations such as data centres and call centres. It is also likely that clusters of centres of excellence could develop in these States around local activities such as defence and mining exploration (Kuras 1998: 6).

The local industry consists of two key user sectors—businesses (major users) and households. In the business sector the take-up of new technology is high with 49 per cent of all non-agricultural businesses having computers and 99 per cent of all businesses with more than 100 employees having computers (ABS 1997c). Of these 60 per cent of computer systems in Australian businesses are less than 5 years old and 15 are less than 1 year old (AIIA 1998). The business sector provides an ever-growing market for new technology and upgrades of hardware, software and IT infrastructure. In 1993-1994 businesses spent \$22.3 billion on IT and telecommunications or 2.9 per cent of total business expenses (ABS 1997c).

The Internet has provided a key source of market growth for the IT industry with Australia's commercial market on the Internet growing at 11 per cent per month with experts predicting that by 1998 Internet traffic will surpass voice traffic (AIIA 1998: 10).

In the household sector of the market it is estimated that around 2.5 million Australians have a PC at home. The growth area in this market is again in Internet access for recreation, entertainment and work. It is estimated that Internet access increased 14 per cent between February and May 1998 and that currently around 34 per cent of all households with a computer have Internet access (AIIA 1998: 3).

It has been argued that Australia is well placed to develop a strong IT&T industry for a range of reasons which include:

- ❖ the highly educated and skilled workforce
- ❖ range of language skills held by the workforce
- ❖ Australia shares a time zone with large fast growing markets in Asia
- ❖ stable government and well-established protections for intellectual property
- ❖ established infrastructure services
- ❖ cost of employing professionals in Australia is lower than in other developed countries (Kuras 1998:7).

Kuras argues that these strengths can be exploited by entering the global market. They may, however, be hampered by the limited export focus of almost all Australian-based IT&T businesses and the fact that Australia has not yet established a global reputation in IT&T because of a small domestic market which has limited local firms establishing their brands in the global market. A strategic export focus for Australian producers is also limited by the cost and availability of capital and the relatively high cost of low-skilled labour in Australia (Kuras 1998: 8).

Table 13 shows that the businesses operating in the information industry are predominantly small, with 95 per cent employing less than 20 employees. The industry is also dominated by small businesses in the information services sector, which account for 88 per cent of all businesses in the industry.

Table 13: Number of Businesses by Information Industry Sector and Employment Size

Sector	Small	Medium	Large
	< 20	20-99	>100
Communication Services	174	12	3
Information Services	4,725	132	29
Information and Communication Equipment	211	52	23
Information Products/content*	30	5	1
Total	5,140	201	56

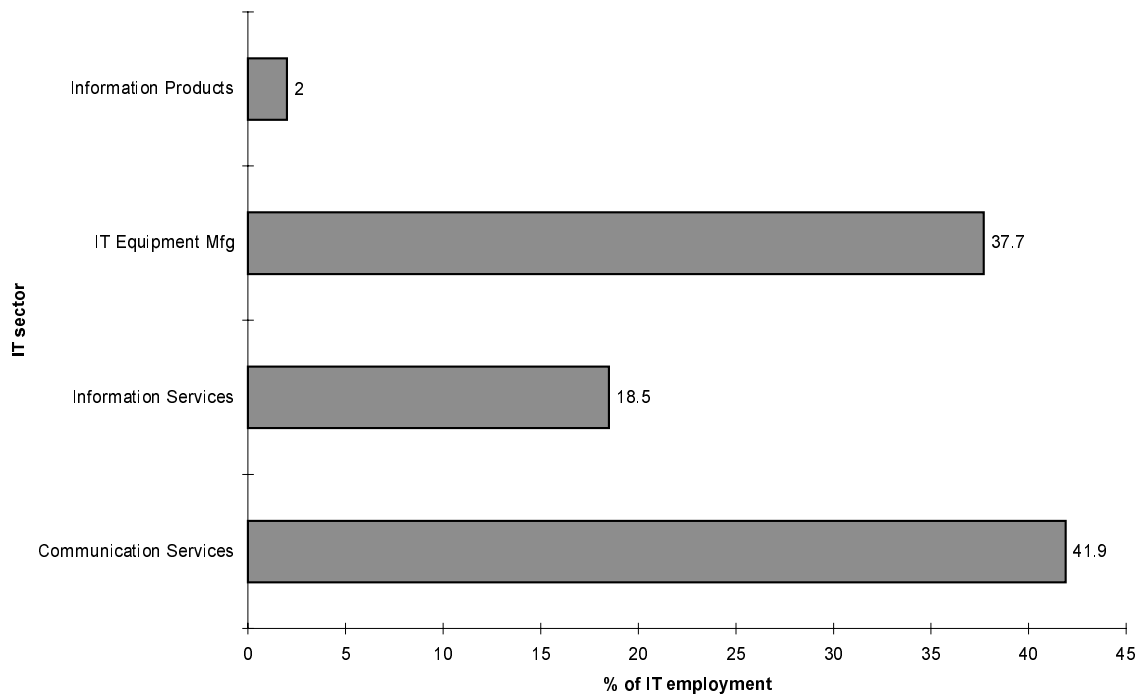
* excludes wholesale and retail activities

Source: Charles et al. (1997) Chapter 2.

Employment in the IT Industry

Estimates of employment in the IT industry vary because of definitional issues discussed earlier, in particular whether employment should be measured by the number of people working in specific IT industries or whether the industry employment should reflect the number of IT professionals who work across a range of industries; that is, those employed in information industry. Using the ABS definition there are around 250,000 employed directly in the IT industry in 1995-96; however, IT&T professionals, programmers, systems analysts, operators and the range of IT management which support business and government account for an additional 250,000 persons, giving a total information industry employment of around half a million employees or ten per cent of the labour force (AIIA 1998a: 3). The number employed in this industry is then comparable to those employed in the tourism, accommodation and restaurant trade, one of the largest and fastest growing industries in Australia (Information Industries Taskforce 1997)

Figure 3: Employment in Australian IT Industries, 1992-3



Source: Houghton et al 1996, p.103

Employment Growth in IT

Table 14 illustrates the difficulties associated with defining the IT industry and those who work in it. It suggests that 121,000 workers were employed in IT occupations in the IT industries in 1994-95 compared to 319,100 employees in IT occupations across all industries. IT occupational growth was greater across IT industries than all industries where IT occupations are employed over the period 1989-90 to 1994-95 (10% compared to 3%). The growth in computing professionals and data processing machine operator occupations was also higher in IT industries than across all industries. Houghton et al. suggest that this could be a result of the trend towards outsourcing IT activities or vertical disintegration as a mode of entry into the computer services industry.

Over the period 1992-93 to 1995-96 the ABS estimates that employment in the industry has grown by 49 per cent from 136,000 to 208,000, with the number of businesses almost doubling from 7,199 to 13,535 (ABS 1997c). Of those employed in 1996 in the IT industry, 93 per cent of jobs were full-time and two-thirds were male (ABS 1997c).

Table 14: Employment and Compound Annual Growth Rates (CAGR) in IT Occupations, 1989-90 to 1994-95

ASCO	Occupation	Selected IT Industries			Total all industries		
		89-90	94-95	CAGR	89-90	94-95	CAGR
1311	Data processing managers	1,750	2,500	7	7,700	8,400	2
2707	Computing professionals	14,875	42,100	23	65,575	89,600	6
2211	Electrical and electronic engineers	11,725	9,400	-4	29,875	26,600	-2
3201	Electrical and electronic engineering associates and technicians	12,325	11,900	-1	30,900	27,900	-2
4311	Communications equipment tradespersons	17,625	25,100	7	34,150	31,800	-1
4315	Office equipment and computer services	6,350	11,800	13	10,275	16,100	39
5201	Data processing machine operators	11,675	18,600	10	101,100	118,700	3
Total	IT Occupations	76,325	121,400	10	279,575	319,100	3
Total	All Occupations	596,175	639,600	1	7,822,300	8,057,900	1

Source: Houghton et al. 1996, p.106.

Key Developments in IT

Major trends affecting the information industries and shaping their development include:

- ❖ globalisation, the increasing interrelation of international trade, capital and technology flows;
- ❖ the changing composition of terms of trade, the increasing importance of manufactures to world trade, and changes in the relative prices of traded manufactures vis-a-vis commodities;
- ❖ the convergence of computing, communications and broadcasting into digital format;
- ❖ stronger regional growth than in the Australian domestic market;
- ❖ a shift in value in information and communication technology products from hardware to software and services (Information Industry Taskforce 1997: 4)

Contribution to the Economy: Growth, Exports and Imports of IT & T Products and Services

In terms of its contribution to the Australian economy the Australian information industry is very important. In 1995-96 the information industry market was estimated to be worth between A\$55 billion and A\$67 billion, depending on the breadth of industry definition. This represents 6.3-7.5% of national GDP (AIIA 1998a: 2). It is expected that this figure will continue to grow. While the demand

for IT products and services has grown dramatically over recent years, it is problematic that this demand has largely been met by imports. As a consequence the information industries account for 20-25 per cent of Australia's Elaborately Transformed Manufactures (ETMs) trade deficit (Information Industries Taskforce 1997). In 1995 the Australian trade deficit in IT&T was estimated at between A\$7 and A\$14 billion (depending on industry definition) and is projected to grow, if conditions remain unchanged, to A\$22-46 billion by 2005. (AIIA 1998a: 3). While domestic demand may not be satisfied from local product, the information industries are amongst Australia's top export earners with exports exceeding \$4 billion in 1995 alone (Information Industries Taskforce 1997).

An increased emphasis on the development of a local IT manufacturing industry would provide the basis on which a greater proportion of domestic demand could be met and exports could be increased. This is desirable not only because of the effect on the current account but also because as major producers of ETMs they are high growth industries which can provide the information infrastructure which increasingly underpins growth in other industries (Information Industries Taskforce 1997).

While the Australian domestic information industries market is growing at around 13 per cent per annum, nearly four times GDP growth, and has good long term growth prospects (Information Industries Taskforce 1997: p12), Australia's manufacturing base in this area is still not sufficient to meet domestic demand. With the world market dominated by a small number of large multinational companies it becomes increasingly difficult for Australian exporters to get a toehold into the industry on a significant scale. At present Australia's share of the international trade in IT&T is very low at 0.3% (AIIA 1998a: 3).

Table 15 shows that the growth in turnover in the information industries has been significantly higher than that experienced in the manufacturing industries over the period 1989-90 to 1995-96, with a compound annual growth rate of 11.6 per cent.

Table 15: Manufacturing Industries' Turnover 1989-90 to 1995-96 and Compound Annual Growth Rates

Industry	Turnover (A\$ bn)		CAGR
	1989-90	1995-96	
Food, beverage and tobacco mfg	33.3	43.1	4.4
Textile, clothing and footwear mfg	9.9	9.8	-0.1
Wood and paper products mfg	9.5	11.4	3.1
Print, publish and record media mfg	10.4	13.7	4.6
Petroleum, coal and chemical mfg	26.2	30.1	2.3
Non-metallic mineral products mfg	8.1	8.6	0.9
Metal products	34.1	36.9	1.3
Information Industries	19.5	33.7	11.6

Source: Information Industries Taskforce 1997, p.24.

Training and Skills Development in IT&T

Industry representatives have consistently claimed that there are perennial skill shortages that plague the IT industry (Information Industries Taskforce 1997: 76). The skills shortage crisis in IT is not unique to Australia. Baxter claims that:

(at) the World Congress on information Technology in Fairfax County Virginia ... a consistent message from both delegates and speakers was that the availability of skilled professionals is one of the greatest threats to the IT & T industry (1998: 2).

The AIIA estimates that the skilled vacancy level in Australia's IT&T industry is likely to be greater than ten per cent of total employment (Baxter 1988: 11). In the ten years to November 1998 the Skilled Vacancy Survey Index for computing professionals rose by 305 per cent compared to a rise of 15 per cent for all professionals (DCITA 1998: 4). A recent survey in Victoria showed that the high priority areas for the industry are:

- ❖ Internet, intranet and extranet specialists
- ❖ networking computing specialist
- ❖ web site development specialists
- ❖ security specialists
- ❖ protocols specialists
- ❖ help desk/client support personnel
- ❖ people who can design business applications
- ❖ people skilled in a variety of programming languages
- ❖ people to work on year 2000 compliance issues

At a lower level of priority, but still in strong demand were:

- ❖ multiskilled support personnel in technical/business sales
- ❖ project managers
- ❖ database managers
- ❖ data warehousing specialists
- ❖ businesses process re-engineering specialists (Baxter 1998: 6).

The areas of skill shortages show a bias towards the service sector. Unlike other service sector employment, however, these positions tend to be well paid, highly skilled and relatively secure (Baxter 1998).

Not all employees in the IT industry are IT professionals. Like other businesses the industry employs a range of support personnel such as human resource managers, trainers, sales staff etc. These areas are likely to suffer skills shortages as well if such a shortage exists more generally.

Yet in Australia there is a lack of information about the specific extent and location of the skills shortages (Baxter 1998: 3). The information that is available, such as the Skilled Vacancy Survey, shows that there has been a 19.4% increase in vacancies for computing professionals over the past 12 months and compared to a total of 13.6 per cent for other professional occupations (DEETYA 1998: 2).

Skill shortages in IT are apparently quite uneven, partly because of the volatility and fragmentation of the labour market, especially for computing professionals. Moreover, at the lower end of the labour market, amongst, for example, word processing and data processing workers, skill shortages are uncommon. A recent survey and discussion paper prepared jointly by four federal departments notes that while there is significant evidence of a shortage of some skills, there are oversupplies of other skills. It also notes that certain classes of workers tend to confront difficulties in gaining employment, in particular 'new graduates' and 'recent immigrants with poor English language skills' (DCITA 1998: 15).

According to that study employers are constantly seeking professionals with experience and expertise in a 'number of database systems and languages' and with strong 'communication and interpersonal skills'. This suggests the need for a greater emphasis in higher education and VET on the development of skills using a variety of applications and environments and on the so-called 'soft skills' as well as technical skills.

The Australian Information Industries Association has claimed that Australia currently confronts a shortage of 30,000 IT workers. The DCITA Discussion Paper cautions, however, that the IT labour market is characterised by particularly high turnover and that specific skill shortages may often be caused by that turnover. Problems in IT skills development are also exacerbated by the pace of product change and the consequential requirement for IT workers to constantly retrain. The propensity for IT employees to change jobs regularly has also been reported to operate as a disincentive to employers investing significantly in the training of their existing staff (DCITA 1998: 18).

While there is a strong industry consensus that the increasing demand for IT professionals, in particular, is bound to continue the volatility of the skills demands of the industry makes predicting the magnitude or areas of future demand especially hazardous. For example, many IT professionals are presently occupied on Y2K projects. It remains to be seen whether the labour market remains as buoyant as the volume of Y2K compliance work declines.

Demand for University Computer Science, Information Systems and Electronic and Computer Engineering courses has increased dramatically over the past decade. For example, enrolments in Computer Science and Information Systems courses have almost doubled from 6,629 in 1989 to 13,128 in 1997 (DCITA 1998: 21).

The dominance of private, vendor-provided or vendor-licensed training in the VET sector has been recognised by government to present difficulties for skills development. 'This can limit recognition and portability of skills across the industry and State boundaries, and can make it difficult for unemployed people, especially young people, to establish career paths in the industry' (DCITA 1998:22). The high cost of many of the courses also points to more general equity and access questions—the system of widespread industry deference to vendor-provided or vendor-licensed training may make required training inaccessible for more than just the young unemployed. While the level of industry recognition associated with the vendor training courses cannot be doubted, the means by which the quality and relevance of the courses can be guaranteed is also unclear.

The growth and present level of vendor training is virtually impossible to assess. There is no requirement (or particular reason) that these training courses necessarily result in nationally recognised Australian Qualification Framework (AQF) qualifications and they are therefore not necessarily included. Figures showing persons enrolled in VET in semi-professional computing courses, based on unpublished NCVER data, demonstrate some increase over the past few years. In 1997, 15,328 persons were enrolled in those advanced certificate, associate diploma and diploma courses (and their AQF equivalents, Certificate IV, Diploma and Advanced Diploma) compared to 12,728 in 1994. This 20 per cent increase in numbers is relatively modest alongside the 44 per cent increase in university enrolments for the same period.

In 1997 the Federal Government commissioned a report to establish an action agenda for the information industry. The Information Industries Taskforce (1997: 75) proposed three key recommendations with respect to enhancing the skills, education and training of those working in the information industries which can be summarised as follows:

1. Enhance tertiary information and communication technology education. In order to achieve the report called for the active involvement of government and industry to pursue the following goals:
 - Encourage partnerships (including staff exchanges) between industry and educational institutions at all levels to help ensure course relevance;
 - Focus TAFE and vocational training;
 - Create centres of excellence;

- Government should fund a redeemable vouchers system to provide 15,000 additional tertiary places in information and communication technology-related courses (including engineering) over the next three to five years;
 - Encourage universities to integrate the various facets of information and communication technology disciplines more effectively;
 - Encourage and provide greater support for the Cooperative Education Program and similar programs;
 - Increase access to the technology. Students must have access to PCs and to the Internet. They are an essential instrument of education. To assist access government should allow students to add reasonable information and communication technology-related expenses to their HECS advance to enable them to 'buy now, pay later'. (Information Industries Taskforce 1997: 79-80).
2. Enhance information and communication technology education in schools. In order to achieve this governments must:
- Ensure that school students have access to PCs and to the Internet from an early age.
 - Establish a national 'learning to use' initiative.
 - Establish a national 'using to learn' initiative.
 - Provide the opportunity to teach the teachers.
 - Implement an Information Management Education Program. (Information Industries Taskforce 1997: 80-81)
3. Enhance education in the workforce.

To enable businesses to develop their skills base a multifaceted approach is required using existing and some new mechanisms to deliver better skilling outcomes for business.

There are a number of things that should be done:

- Enhance industry skills and retraining;
- Enhance certification and professionalisation;
- Give greater support to the Co-operative Multimedia Centre (CMC) initiative (Information Industries Taskforce 1997: 82-83).

The report envisaged a major role for government, especially in the enhancement of tertiary level and school level education, and it called for government-industry cooperation to improve the 'focus' of TAFE and other vocational training. Somewhat curiously, however, the report made no reference to TAFE or other VET institutions in its recommendation to enhance education in the workforce. While it referred to the need to use 'existing and some new mechanisms to deliver better skilling outcomes for business' (1997: 82) the report remained silent as to what mechanisms might be appropriate.

In 1998 the Department of Industry Science and Tourism's Information Industries and Online Taskforce reported on progress with the implementation of the action agenda. None of the initiatives noted there appeared to relate to the enhancement of skills formation, education and training for the sector and none of the key priorities for the future it identified related directly to training (Kuras 1998).

The government's four key departments in this area (the Department of Communications, Information Technology and the Arts, the Department of Education, Training and Youth Affairs, the Department of Employment, Workplace Relations and Small Business and the Department of Immigration and Multicultural Affairs) appear to be placing great stock in the capacity of the new IT Training Package to solve a number of current problems associated with IT VET. In particular the relevant departments have claimed that:

- ❖ Endorsement of the Training Package by Commonwealth, State and Territory Ministers 'ensures that the competencies gained by trainees are portable within the industry...'
- ❖ The introduction of the Training Packages 'is expected to facilitate a further increase in the supply of skilled and formally qualified people for this industry'.

- ❖ Part of the development of the IT Training Package involved working with 'Microsoft, Novell and Lotus to map and align major vendor training programs against the Package's qualifications' (Department of Communications, Information Technology and the Arts 1998: 23).
- ❖ The impact of the Training Package and its likely success in addressing these key issues are critical points of investigation taken up in the fieldwork analyses contained in the appendix to volume 1.

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