Skills shortages and future skills requirements for the labour force

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Abstract
The Victorian Office of Training and Tertiary Education (OTTE) funds research annually to inform their planning and determination of priorities for training. In 2007 a consortium of four Victorian Institutes - RMIT, Kangan Batman, Box Hill and Chisholm, was formed to undertake research for the OTTE into the skills shortages and skills requirements of the manufacturing, retail, finance services and transport, distribution and logistics industries.

The action research project used current debate and research findings to inform a qualitative framework aimed at gathering data from industry stakeholders about the kind of skills needed by the labour force in the selected industries.

A framework for individual work progression and work cycle patterns was developed and variables considered critical in the analysis of skills shortages and skills requirements included cohort trends, regional issues, contemporary challenges such as technology and mobility and career structures and trends.

The following four dimensions were considered within this framework for each of the targeted industries:

- What skills shortages are there due to insufficient workers being trained?
- What skills shortages are there as a result of people choosing to work in occupations other than that for which they have been trained/
- What are the current skills gaps?
- What are the future skills requirements?

One of the key aspects of the research was the recognition of the supply chain link between these industries and exploration of the areas of commonality between them.

Key findings of the project highlight the importance of well-developed common key generic employability skills with variations based on specialisation according to each industry, as well as the need for on-going renewal of individual skills

Introduction
This paper presents the key findings of a research project undertaken in 2007 by a consortium of four Victorian TAFE institutes into the skills shortages and future skill requirements over the short and medium term (1-3 and 5–10 years respectively) of the labour force, focusing specifically on the Manufacturing, Transport, distribution and logistics, Finance Services and Retail industries.

The aim of the project was to identify the skill shortages specific to these industries, both individually and collectively, identified both in the current literature and by industry stakeholders.

From the various issues raised by the literature review, the following challenges for the project were posed:
- What do we mean by skill shortage?
- What does skill shortage mean to each of the targeted industries?
- What are the areas of commonality between the industries?

In this paper we also outline the methodology and framework used in this research.

The findings presented are based on the feedback we received from a range of stakeholders and, from industry consultation we undertook as part of this research project. The key finding of this research emphasise the importance of having a set of well-developed key generic skills across all sectors. The extent to what extent that is correct is the debate we seek to further pursue.

Literature Review
There is a significant amount of research around the topic of skills shortages and skills gaps and it was necessary to be focused in out drawing elements that would assist in undertaking this research. A review of the literature finds that although an agreed definition of the term 'skills shortage' has achieved general acceptance, this definition describes such diverse situations that the term 'skills shortage' has no single, clear meaning.

Labour market policy identifies two key areas of concern in industry sectors experiencing skills shortages:
- The need to expand the size of the labour market.
- The need to enhance the broad skill base and competencies of the labour force.

These two could generally be identified as "skills shortage" and "skills gap", respectively, though both are considered to reside under the umbrella term "skills shortage". Skills shortage, in this context, is commonly defined as arising where the supply of workers is not sufficient to meet the demand, at currents rates of pay. Some of the literature refers to "recruitment difficulties" as a related term, which arises when employers have some difficulty in filling vacancies for an occupation.

The following skills shortage typology, identified by Sue Richardson, recognizes the inadequacy of the term 'skill shortage'. Her typology is useful for breaking down the ambiguities of the concept (Richardson, 2006, 2):

Level 1 shortage   There are few people who have the essential technical skills and who are not already using them, and there is long training time to develop the skills.

Level 2 shortage   There are few people have the essential technical skills and who are not already using them, but there is a short training time to develop the skills

Skills mismatch   There are sufficient people who have the essential technical skills and who are not already using them, but they are not willing to apply for the vacancies under current conditions.

Quality gap   There are sufficient people with the essential technical skills, not already using them, who are willing to apply for the vacancies, but who lack some qualities the employers think are important

An area missing in the literature review was the recognition of labour shortage. This is often identified as a shortage of skills in the immediate time due to the inability to recruit people to work in specific environments. This could be picked up between Levels 1 and 2 as outlined above but needs to be identified separately as a critical issue as it could lead to the development/redevelopment of a strategy to deal with the re -engagement of currently disengaged groups.

In addition to the immediate labour market concerns relating to skills shortages and skills gaps is the identification of future skills requirements anticipated over the short to medium term. Shortages of workers trained in specific skills can be identified and predicted with some accuracy for several years into the future. However, the research into the general skill level of the workforce is more generalised and less industry specific in nature.

Literature on this topic suggests that current and future training needs to equip workers with broader generic skills and attitudes. The NCVER report *Generic skills for the new economy: Review of research* identifies two broad positions on essential generic skills in Australia, Britain and the US. A pragmatic view that the current identified key skills/key competencies have served well enough and are valued by employers, so that the focus of future development should be on strengthening implementation of these generic skills rather than searching for a new set of key skills. An alternative view is based on the notion that shifts in the context of VET and the emergence of the knowledge-based new economy require a more holistic approach that links more closely to the imperatives arising from those shifts, including the pressures for lifelong learning, maintaining employability, adaptability, enterprise and creativity"

The Department of Education Science and Training (DEST) report, Employability Skills for the Future (2002), provides an example of this second approach. DEST's goals

included the identification of a 'set of employability skills that employers seek in their employees' and to update the Mayer Key Competencies in the light of new requirements for generic employability. An outcome of this research was the development of an Employability Skills Framework which combined key skills with a range of identified personal attributes and includes:

- Communication skills that contribute to productive and harmonious relations between employees and customers;
- Team work skills that contribute to productive working relationships and outcomes;
- Problem-solving skills that contribute to productive outcomes;
- Initiative and enterprise skills that contribute to innovative outcomes;
- Planning and organising skills that contribute to long-term and short-term strategic planning;
- Self-management skills that contribute to employee satisfaction and growth;
- Learning skills that contribute to ongoing improvement and expansion in employee and company operations and outcomes; and
- Technology skills that contribute to effective execution of tasks.

This research adopted the following trilateral definition of 'skills shortage', allowing for the three distinct labour market situations which can result in intervention:

- A shortage of specific skills;
- A situation where the quality or general skill level of the workforce restricts productivity growth; and
- Inadequate labour-market participation.

We made use of this trilateral definition in our skills matrix.

Research method

In brief, the following research principles underpinned the project:

- Action based research.
- Qualitative in scope and nature.
- Use of current debate and research findings to inform the process but the research was primarily about gathering qualitative data.
- Consultation with people in industry and experts in the field.
- Consolidation and validation of findings.

The methodological steps involved:

- The literature review, from which the key themes and issues were identified.
- Development of a framework to be used to address the research questions. This was tested with those in TAFE Institute Planning and Research roles and the OTTE and was subsequently refined during industry consultation.
- Data gathering from industry. This was a two pronged approach
  - forums and interviews and
  - population of a skills matrix by stakeholders in each of the four industries, providing information relating to skills needed, covering the four 'defined' skills areas
- Validation of the information gathered

These steps are represented visually in the Research Method flowchart, Figure 1. It is important to highlight the in-built validation process amongst participants and other stakeholders as the research took place.

Figure 1: Research Method Flowchart
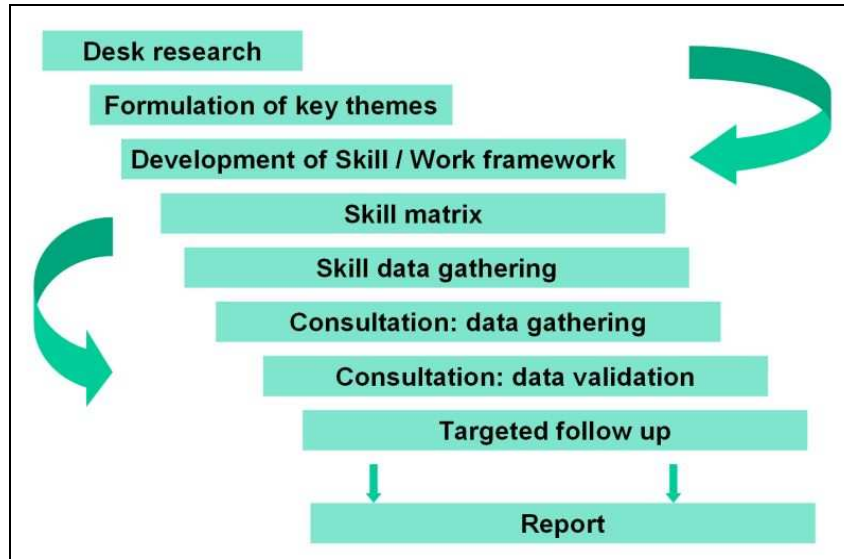
Findings and discussion

Four key variations of *skills needs* were identified and defined, covering the various nuances inherent in the term "skills shortage": These formed the focus of the research for each of the industries under consideration:

- Skills shortages due to insufficient workers being trained.
- Skills shortages as a result of people choosing to work in occupations other than that for which they have been trained.
- Skills gaps, defined as the difference between the skill level of existing workers and the skill level required by industry
- Future skills requirements.

Skills Framework

It is acknowledged that in identifying the general skills requirements of a given industry sector, it is necessary to not only understand the skill needs identified by industry, but also to contextualise these identified needs onto the topography of the individual's career. A framework was developed which acknowledges the fact that an individual's career changes for many and varied reasons, some general or societal, and some specific to the individual.

In developing, testing and validating the framework, the goals were:

- To conceptually encompass all aspects of an individual work life.
- To avoid over-simplification that would create a sense of time or restriction in its application.
- To identify a model that considered work evolution from an individual perspective.

Such a framework, recognizing the impact of **Individual Work Evolution** as conceptualized in Figure 2, challenges the established direct link between skills requirements and industries, complicating the context in which skills needs and shortages are apprehended. In the process of testing and validating the framework it was identified that some people thought of skills in terms of occupations, rather than in terms of the structure of the economy, industry or functions.

Figure 2: Individual Work Evolution
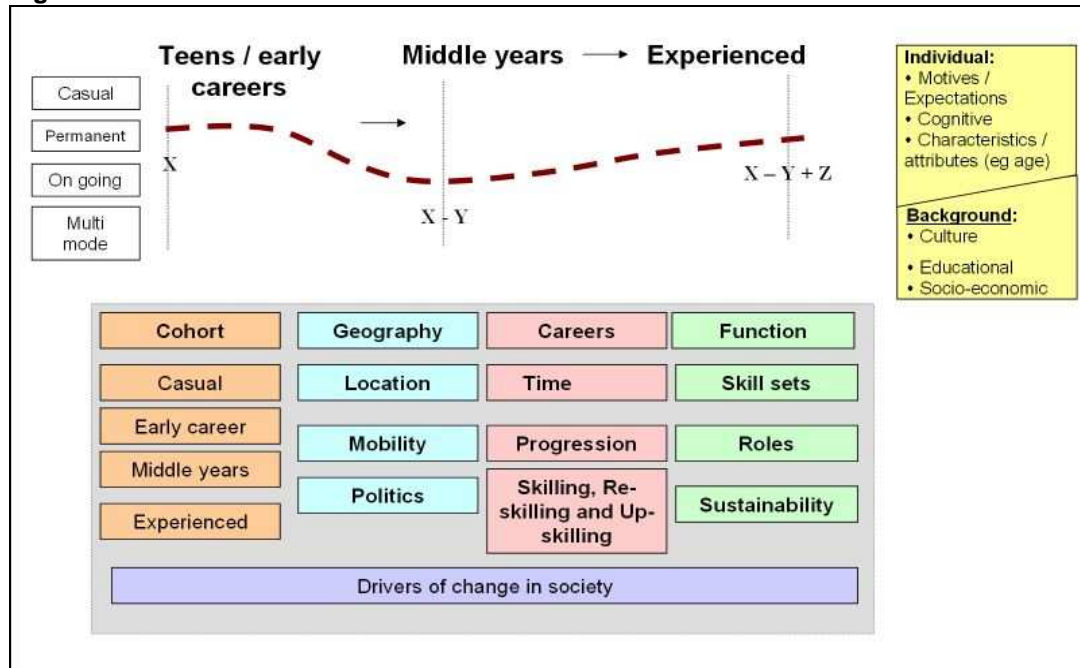
Three elements were identified as the most crucial individual change drivers impacting on skills, with each element defined to a limited number of variables:

- **Cohort**
  - Early career
  - Established
  - Mature
- **Geography**
  - Metropolitan
  - Regional
- **Occupation level / function**
  - Elementary
  - Intermediate
  - Technicians / trades
  - Managers / professionals.

Skills Matrix
From this framework, a **Skills Matrix** (Table 1) was developed which was used for data gathering and validation with stakeholders. The Skills Matrix mapped the above

individual dimensions and was applied to the four key variations of skills needs identified for each of the individual industries. The responses received varied in scope and in detail. Some were generic enough as to suggest that people found it difficult to think in terms of skills and provided commentary on a range of issues and training matters. Others provided a clear differentiation of skills between and within industries, between and within different cohorts and the impact of geography.

Table 1: Skills Matrix Proforma:

Categories / Dimensions		Industry skills
Cohort	**Early career**	
	Established	
	Mature	
Geography	**Metro**	
	Regional	
Occupational / Functional Level	**Managers / professionals**	
	Technicians, trades & related	
	Intermediate	
	Elementary and others	

For each dimension and industry the following four questions were asked:
- What are the skills shortages due to insufficient workers being trained?
- What are the skills shortages as a result of people choosing to work in occupations other than that for which they have been trained?
- What are the skills gaps, defined as the difference between the skill level of existing workers and the skill level required by industry?
- What are the future skills requirements?

Key research findings

Table 2 summarises the research findings – mapped to matrices:

Table 2: Key findings (mapped to matrices)

Dimension	Emphasis of broad skill requirement
Skills shortages: insufficient workers being trained	•Generic skills for those about to enter the workforce •Issue: Engaging those not currently engaged
Skill shortages: people choosing to work in other occupations	•Generic skills and areas of specialisation / differentiation applied in the workplace •Issue: cater in planning for churn? Focus on IR issues / work attractiveness issues/

Current skills gaps in the labour force	•Generic skills across industries •Issue: Build focus on supply chain/ value chain focus at introductory levels. Plan for flexibility of a skilled workforce through generic skills and focus on specialisation within the workplace
Future skills requirements of the labour force	• Generic skills; specialised skills, specific skills •Issue: Concentrate on generic sustainability skills and specialist skills in project management, working in global context.

Overall findings from the industry consultations highlighted the following key concerns:

- The importance of having a set of well developed key generic skills across all sectors.
- The ability to further tune skill sets and acquire new skills as individuals' progress throughout their working careers.
- An emphasis on the portability of skills within an industry and across industries.
- The difficulty in identifying emerging skills: progressing from uniqueness, differentiation to specialization.
- Implicit agreement across the four industries that employability skills of the future are drawn from the generic skill list, with variations based on specialization, differentiation and recognition of being part of a local, yet globalised, labour market.
- Global awareness and Sustainability were two notable elements consistently mentioned for inclusion as generic skills. Whether these are skills (or enablers, or drivers of change), these two elements are influential in the development of individual's skills. Global awareness is meant to be the understanding of the interconnections between the local, national and world interconnectedness in all different aspects of our lives as individuals and as a collective. What is critical in this dimension is the recognition of the relationship and role (whether active or passive) we all play in the world today and our ability to act in a globalised world. Sustainability refers to the ecologically ability to strive in a changing environment in a timely and lasting manner whereby we preserve and guarantee the quality of life in a community, nation or a region.

Mapping of Employability Skills

Drawing from the skills required for employability obtained through our industry consultation and participants' feedback, we mapped those skills against the generic skill sets. Our research findings concur with the generic skills set.

Table 3: Mapping of Employability Skills

Skills demand		Generic Skills (NCVER)
Broad category	**Skills demand (AQF Level)**	

Communication skills	Communication skills (all levels) Foreign language skills (I, H) Customer handling / relations (all levels)	Communication skills that contribute to productive and harmonious relations between employees and customers
Team work	Team working (all levels) Relationship management (I,H)	Team work skills that contribute to productive working relationships and outcomes
Problem-solving	Employability competency (L) Problem solving (all levels) Mechanical awareness (L, I) Technical and practical skills (L, I) Numeracy skills (L) Literacy skills (L)	Problem-solving skills that contribute to productive (enterprise) outcomes
Ability to innovate	Ability to innovate (I,H) Ability to adapt to change (all levels)	Initiative and enterprise skills that contribute to innovative outcomes and business success
Planning and organisation	Strategic thinking / business planning(I,H) Leadership skills (I,H) Management skills Project management(I,H)	Planning and organisation skills that contribute to long-term/ short-term strategic planning and business success
Self management		Self-management skills that contribute to employee satisfaction and growth
Learning skills	Capacity to think / to learn Problem solving (all levels)	Learning skills that contribute to ongoing improvement and expansion in employee and company operations and outcomes
Technology	IT skills (all levels) Technical and practical skills (all levels) Mechanical awareness (all levels)	Technology skills that contribute to the effective execution of tasks.
Global awareness	Global awareness (I,H) Sustainability (all levels) To position business effectively in a competitive global economy	
Small Business Skills	Ability to run /manage a small / medium enterprise SME's (I, H)	
Levels: L- low; I -Intermediate; H High.		

Conclusions

One of the most notable issues faced during the course of this project, particularly during the consultation phase of the project, was ambiguity in usage of the term "skill". Skill was often confused with qualifications, occupations or competences. Linked to this was the question, to what extent a perceived skill shortage is:

- A skill deficiency
- Recruitment difficulty
- A reflection of the state of an industry.

Identification of skill gaps and needs is a complex, ambiguous and challenging process, and taking it further and ascertaining future skill requirements is equally convoluted, particularly given the rapid changes in industry activity.

It is important to recognise the extent to which skill needs are influenced by differences in industrial structures within industries (that is, industries are not uniform), as well as geographical variances in employment and industry activity, such as differences in skill requirements in urban and regional conglomerates and variations in the composition of 'local' communities.

This research provides support for the premise that equipping the Victorian labour force with a set of employability skills that mirror the generic skills is pivotal in meeting the labour skill shortage and skill challenges facing industry in Victoria.

The research also provided confirmation of a growing demand for the on-going renewal of individual set of skills, in particular at the higher levels as people progress through their working lives / careers, in order to remain competitive and current in the labour market and highlighted the need for individuals to develop the agility to adapt rapidly to change and embrace the use of new technologies.

As a result of this project, the following questions have been posed:
- What strategies should flow out of each of the identified four key variations of skills needs?
- What are the policy implications arising out of this research?
- Is the issue of skill shortage an issue of capacity, funding, infrastructure, or a combination?
- How is it possible to successfully skill those who are at the start of their working lives i.e. the youth?
- Is it possible to skill those people at the periphery or socially disadvantaged and not involved in the labour market?

References
An extensive literature review was undertaken as part of the project. Only those specific references referred to within this paper have been included here.
Department of Education Science and Training, (2002). Employability Skills for the Future
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