

Encouraging high expectation entrepreneurship: The implications of Australian policy practices

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ABSTRACT

Recent studies have shown the important roles that new high growth firms can play in job creation and economic development. This paper reviews the positioning of present Australian government policies and programs that intend to be supportive of the development of more high growth businesses; that is those that employ greater than twenty persons. The research explores the environments of a group of new high growth Australian firms and the roles that the various identified government support initiatives have played in their development. The paper also draws on recent research on survival and growth patterns of spin-off companies generated by publicly funded research agencies to map the government support initiatives with the different stages of the high growth business life cycle. The paper reviews issues in the Australian business environment that may have affected the rate of generation of new high growth firms. Of particular relevance has been the progressive freeing up of the Australian labour market and a greater resource allocation to research commercialisation by publicly funded research providers. The analysis has finally separately considered how to produce and support more founders of such high growth firms, their future chief executive officers, the specialist consultants and other professional support people and issues related to access to finance that such firms will need. The research findings draw attention to the important role of government financial support for industry research, particularly at the point where the first product is in the market and resources are scarce. At this point support is vital both to increase the market penetration of the core product and for R&D for product customisation and increasing the product range.

Keywords: Commercialisation, entrepreneurship, high growth firms, innovation, public policy

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INTRODUCTION

Recent studies find that only 3 to 5 per cent of new small firms account for three-fourths of jobs created in the United States (Birch, 1998; “The Corporate Growth Puzzle,” 1999). Half of America’s growth derives from firms that did not exist a decade ago (“Innovation in Industry”, 1999).

This quote (Buss, 2001: 1) on its own illustrates why importance is placed upon identifying government policy initiatives that are designed to or otherwise likely to lead to the establishment and development of more new high growth companies. Similarly, the OECD Secretariat (1998) in its summary of main policy recommendations found that:

Policy should ensure favourable conditions in which technical progress can contribute to job creation by (inter alia):

- *facilitating the creation and growth of new technology-based firms by fostering managerial and innovation capabilities, reducing regulatory, information and financing barriers and promoting technological entrepreneurship (OECD, Undated :8).*

Autio (2005) prefaced a recent analysis of the Global Entrepreneurship Monitor (GEM) data on the respondents’ expectations for generating or developing new high growth entrepreneurial ventures, with a comprehensive review of the literature that places an emphasis on the importance of new businesses in economic growth, particularly in regional economies. This paper explores the implications of Autio’s finding that a very high proportion of expected new job creation can be attributed to *high expectation companies*. These are firms that expect to generate 20 or more new jobs. Australian commentators, such as principals of successful technology oriented venture capital firms in the Australian IIF program, have drawn attention to Australia’s relatively low historical rate of developing high expectation, high growth (HEHG) new companies, although there have been a number of outstanding successes, such as Cochlear in hearing transplants, Resmed in apnoea treatment, Ambri in medical diagnostics, Look Smart for its search engine...:

We need at least four [*new*] companies with yearly revenues of \$250 million p.a. in the next five to ten years (Michael Panaccio, Investment Principal Starfish Ventures, speaking at the Cooperative Research Centre Association Annual Conference May 2005).

The authors of this paper constituted the Australian contribution to the GEM multinational study of policy settings that encourage the growth and development of HEHG firms. They have surveyed the literature to try to identify key factors and policy settings that may affect the growth and survival of new high growth companies. The GEM study also involved collecting data through interviews from those who are deeply engaged in creating government policies and programs for HEHG firms. Data collected through this study forms the backbone of this paper. To compliment this data set, a literature review has been conducted of relevant Australian Commonwealth and State Government support programs.

In considering government policy and program initiatives, careful consideration has been given to the conclusion of Buss (2001: 183-184) in relation to Federal intervention subsidies in the USA: that no compelling evidence exists to support the contention that wide spread capital gaps plague earliest-stage high-growth firms. Buss makes important points. First, entrepreneurs often try to raise too much money. Second, initial failure to secure new investment illustrates the role of the market in selecting worthwhile proposals and many succeed at their second or subsequent attempt when they have improved their value offering to investors. Third, there is substitutability of human capital for financial capital (Chandler and Hanks, 1998): “unfortunately many entrepreneurs would rather have cash than contribute sweat equity” (Buss, 2001: 60). These conclusions point to the importance of challenging the contributions of the various Australian programs in the specific context of support for the creation and development of high expectation leading to high growth new businesses, not just to the generation of new businesses whatever their expectations and growth potential.

The focus has been on ventures in the earliest stage of their development and on what is needed to reach what Klofsten has called the Business Platform:

By that it is meant that the newly started firm has achieved a state where vulnerability has decreased to the point that the firm has been able to move on to the next phase of its further development (Klofsten, 1998: 7).

The authors’ research has covered both technology based new ventures and those, for example, whose competitive advantage derives from an innovative business model. However the principal focus is on new ventures that derive their competitive advantage from new technology, and people with the technical and managerial skills to manage the exploitation of that technology. Similarly, the focus is on ventures that produce a product or process rather than on technology asset companies that will only licence others (e.g. pharmaceutical providers) to make and distribute products based on the venturer’s technology. Much of the research data derives from a recent doctoral thesis on the role of spin-off companies in the commercialisation of public agency research outcomes (Yencken, 2005) in Australia. The paper follows earlier precedents (such as Buss, 2001) to exclude consideration of ventures where high growth is primarily related to mergers and acquisitions: “these activities combine workforces rather than create new jobs from scratch, and in any case they are not early stage new ventures” (Buss, 2001 :13).

PREVALENCE OF HIGH EXPECTATION ENTREPRENEURSHIP IN AUSTRALIA

A recent study by the Global Entrepreneurship Monitor (GEM) Executive Team (Autio 2005) examined entrepreneurship and the jobs that those in early stages of business formation expect to create. The GEM survey asked business owners and would-be business owners about their expected number of employees in five years from the time of the survey. The categories of business owners were divided into three types although here our primary interest is in only the first two. The first category is that of those who will own at least part of a business that they are actively starting and who have not paid wages for more than three months while the second category includes those business owners who have been paying wages for at least three months but not more than 42 months; that is, none of the businesses in these two categories were more than three and a half years old at the time of the survey. The third category holds businesses beyond our scope of interest that are older than three and a half years.

The GEM Executive team calls the first category *nascent entrepreneurs* and the second *baby-business owners*. The Australian GEM team refers to these categories with slightly different nomenclature that may better describe the types of business activities of these business owners. The first is *start-up* while the second is *young businesses* (Hindle and O'Connor, 2005).

The GEM Executive team's study combined the survey data from the participating nations in the project for the years from 2000 to 2004 inclusive to make allowance for the small sub-set of the overall entrepreneurial phenomenon that was the subject of the investigation. Their primary interest was in gaining a better understanding of two types of business owner (Autio, 2005:14):

- *High-Expectation Nascent Entrepreneur* is an individual who expects to employ at least 20 employees within five years' time through his or her new firm.
- *High-Expectation Baby Business* being a new firm, up to 42 months old, that aims to employ at least 20 employees within five years' time.

While the numbers of entrepreneurs who hold expectations of employment growth of this magnitude were relatively few, their impact on employment and new jobs created was potentially quite substantial (Table 1). Autio (2005:25) found that for the Oceania region (Table 2) – Australia and New Zealand combined—that just under 12% of the nascent (start-up) entrepreneurs expected to create just over 66% of all new jobs of those in this group in five years, while just under 11% of baby-business (young business) owners expected to create around three-quarters of all new jobs from those in this category. From a policy perspective, despite the fact that not all of these expectations are likely to be fulfilled (not accounting for others that may exceed their expectations), it is worthwhile considering the policy framework conditions that encourage and support these entrepreneurs and their ventures as their success may have significant effects on regional economies.

Table1 Job creation aspirations of GEM respondents: Nascent Entrepreneurs

Nascent Entrepreneurs	N	Total Jobs	N (%)	Jobs (%)
0 to 1 employees	18,869	238,833	100.0%	100.0%
2 or more employees	13,230	236,580	70.1%	99.1%
5 or more employees	7,061	220,357	37.4%	92.3%
10 or more employees	3,930	201,071	20.8%	84.2%
20 or more employees	1,820	177,742	9.6%	74.4%
50 or more employees	999	156,371	5.3%	65.5%

Source: Autio, 2005: 20.

Table 1B Job creation aspirations of GEM respondents: Baby Businesses

Baby Businesses	N	Total Jobs	N (%)	Jobs (%)
0 to 1 employees	10,485	149,506	100.0%	100.0%
2 or more employees	9,566	147,278	58.0%	98.6%
5 or more employees	4,529	133,504	27.5%	89.4%
10 or more employees	2,888	124,108	17.5%	83.1%
20 or more employees	1,863	110,002	10.1%	73.6%
50 or more employees	742	86,320	4.5%	57.8%

Source: Autio, 2005:21.

The Australian GEM data was analysed in a similar fashion by one of the present authors—across the same years. (Table 3) Here it emerged that 10.6% of the nascent (start-up) entrepreneurs expected to create 72.3% of all new jobs from those in this group in five years while 10.7% of baby-business (young business) owners expected to create 73.9% of all new jobs from those in this category. Despite the fact that the processing of this data was not identical in procedure to the GEM Executive team's method—the Executive team performed the added task of weighting the data to allow for deviations in sample size and population across the years—the very close proximity of the numbers supports the findings of the GEM Executive team and suggests that policy initiatives designed for HEHG companies as drivers of economic development is a segment of entrepreneurial activity that Australia should not ignore.

The Australian entrepreneurship and innovation policy context for HEHG firms

Table 2 Descriptive statistics Oceania

Nascent Entrepreneurs	N	Total Jobs	N (%)	Total jobs (%)
0 to 1 employees	937	8,663	100.0%	100.0%
2 or more employees	600	8,567	64.1%	98.9%
5 or more employees	363	7,899	38.8%	91.2%
10 or more employees	214	7,031	22.9%	81.2%
20 or more employees	109	5,786	11.7%	66.8%
50 or more employees	39	4,148	4.2%	47.9%
Baby Businesses	N	Total Jobs	N (%)	Total jobs (%)
0 to 1 employees	787	8,840	100.0%	100.0%
2 or more employees	455	8,712	57.8%	98.5%
5 or more employees	269	8,198	34.2%	92.7%
10 or more employees	164	7,567	20.8%	85.6%
20 or more employees	84	6,629	10.7%	75.0%
50 or more employees	35	4,356	4.5%	60.6%

Source: Auto, 2005: 25.

Table 3 GEM Australia analysis of high expectation firms

Start-up (Nascent) Businesses							
		Categories	N	Total Jobs	N%	Tot Jobs %	Tot Jobs per Cat
TOTAL	TOTAL 00-04						
N	Jobs						
545	5933	0 to 1 Jobs	204	5933	100.0%	100.0%	55
		2-4 Jobs	134	5878	62.6%	99.1%	377
		10-19 jobs	57	4964	21.1%	83.7%	672
		20-49 Jobs	36	4292	10.6%	72.3%	867
		50 + Jobs	22	3425	4.0%	57.7%	3425
		TOTAL 00-04	545				
Young (Baby) Businesses							
		Categories	N	Total Jobs	N%	Tot Jobs %	Tot Jobs per Cat
N	Jobs						
441	4565	2-4 Jobs	98	4496	55.3%	98.5%	274
		5-9 Jobs	55	4222	33.1%	92.5%	325
		10-19 jobs	44	3897	20.6%	85.4%	523
		20-49 Jobs	29	3374	10.7%	73.9%	769
		50 + Jobs	18	2605	4.1%	57.1%	2605

Where should entrepreneurship and innovation policy be put?

It is argued that entrepreneurship policy should fall within the context of industry policy. The Industry Commission has identified the following five types of industry policy: tailor-made protection, special industry plans, investment attraction, matching other countries and concentration on fundamentals. (Bill Scales, 'Get the fundamentals right', seminar on Industry Policy reported in CEDA Bulletin, October 1997, p. 1619, quoted in Emmery, 1999).

For much of the twentieth century industry policy in Australia and the world at large focussed upon the erection of trade barriers. They were seen to have a role in generating growth, employment, infant industries, foreign exchange earnings and defence industry capability. Trade barriers over time made it easier for Australian companies to survive without innovating, and prevented business and consumers from shifting resources into areas of higher productivity and yield. In essence ongoing trade barriers were not just anti-competitive, they were anti-entrepreneurial.

As economies progressed throughout the twentieth century, primary and secondary industries lost their domination in both economic importance and political influence, particularly in the past thirty years. The service, information and communication sectors have become increasingly important. The rise of the service, information and communication sectors has dramatically altered the course of industry policy. The demise of protection as an industry policy goal has led to a culture favourable to entrepreneurship. The focus has begun to move towards new industries with "high growth in demand, rapid technological change, new markets, risk of obsolescence, and a strong trade orientation" (Emmery, 1999). The locus of control for productivity growth and wealth creation internationally has shifted to entrepreneurship and innovation.

One feature that is apparent in a review of Australian government innovation programs is that they have tended to concentrate on Drucker's seventh source of innovation knowledge based innovation.

Knowledge-based innovation is the 'super-star' of entrepreneurship. It gets the publicity. It gets the money. It is what people normally mean when they talk of innovation. Of course not all knowledge-based innovations are important. Some are truly trivial...like most 'super-stars' knowledge-based innovation is temperamental, capricious, and hard to manage (Drucker, 1985: 35).

There have been a number of attempts by Australian Governments to foster R&D spending, though notable attempts until recently to apply the discipline of entrepreneurial good practice to the creation of new technology-based small firms (NTSF).

Where is Australia's entrepreneurship policy currently located?

The short answer should be: 'all over the place.' However, in the Australian policy literature, specific emphasis on entrepreneurship (in the sense of commercialising new knowledge through business creation or associated means) is both rare and fragmented.

In *Investing for Growth*, the Howard Government's Plan for Australian Industry (DISR, 1997), the Commonwealth recognised the key role played by the Department of Industry, Science and Resources (DISR). Now renamed and restructured as the Department of Industry, Tourism and Resources (DITR), it has a broad portfolio of responsibilities with the following general aims of:

- improving national prosperity and wellbeing
- improving the competitiveness of Australian business
- fostering excellence in Australian science, technology and sport
- maximising the national benefits of research and innovation
- increasing productivity investment in Australia

These aims were intended to foster economic advantages that might continue to strengthen Australia's international competitiveness. DISR was also aiming to strengthen Australia's national system of innovation, but the Science responsibility (including the CRC Program and CSIRO) has now moved to the Department of Education, Science and Training (DEST). This was followed in 2003 by the Australian Government's Innovation Report, *Backing Australia's Ability*.

The only reference to entrepreneurship in this and other contemporary policy documents is in the National Innovation Awareness Strategy shown in the text box below with the emphasis on encouraging young entrepreneurs. There were no references to entrepreneurship in the DITR Corporate Plan list of programs also shown in a text box below. There are frequent references to innovation, but the general tenor of the references suggests a meaning closer to what Hindle has called 'small-i innovation': mere invention, the *creation* of new knowledge rather than its implementation (Hindle 2002). There was no emphasis in *Backing Australia's Ability* on entrepreneurially-derived 'BIG-I innovation', the wealth that flows from converting new knowledge into sustainable value (Hindle 2002). The DITR research commercialisation programs have been similarly shown in a later text box.

The Department of Industry, Tourism and Resources

Corporate Plan

The Department has a key role in the formulation of innovation policy and in the delivery of initiatives announced in the statement, *Backing Australia's Ability*, by the Prime Minister. The Government's industry policy focuses on innovation as one of the key drivers of economic growth. The Department assists industry to be more innovative through a range of programs such as tax incentives and concessions to assist existing and developing industries; it nurtures emerging knowledge based industries; and increases awareness of the importance of innovation for the future of Australian industry. Some of the policies that the Department has developed, and the programs which we are administering, are set **out in** the Portfolio Fact Sheets under *Innovation*.

Source: <http://backingaus.innovation.gov.au>. Accessed 20 October 2004.

The *Economist's* 1999 Survey on Innovation in Industry (February 18, 1999) noted

Governments still tend to view innovation as a pipeline. If public money is stuffed into basic research in universities and national laboratories at one end, they reckon, new technology and commercial applications should pop out of the other.

Support for industry research

As pointed out earlier by Gregory (1993) and later in the Boston Consulting Group (Pappas et al., 1991) study, and by Hindle (2002), Australia has a reasonable record in public funding of research and development but a very poor record of business investment in R&D. AusIndustry is the Commonwealth industry support agency. AusIndustry specifically does not target or intend to target start-up businesses with its programs. In addition to this, AusIndustry states that "innovation is through research and development". The key agency for the support of business R&D is the Industrial Research and Development Board (See www.ausindustry.gov.au).

AusIndustry's aims as the Commonwealth Government's central point for business assistance and information, in light of the national objectives shown above, are to support innovation, R&D and commercialisation of that R&D through encouragement of a venture capital industry. These programs are:

- targeted at a particular sector
- designed to assist businesses generally
- address market failures
- remove impediments to competitiveness

Backing Australia's Ability Commercialisation Initiatives

PART 4 – Commercial application of research

PROVIDING CAPITAL FOR COMMERCIALISATION

Innovation Investment Fund
Pooled Development Funds
Venture Capital Limited Partnership
Renewable Energy Equity Fund

RESEARCH TO INVESTMENT READY STAGE

Pre-Seed Fund
Commercialising Emerging Technologies
Biotechnology Innovation Fund
Building Information Technology Strengths

BUILDING LINKAGES TO FACILITATE COMMERCIALISATION 74

Cooperative Research Centres
Australian Government Space Forum
Intellectual Property Awareness
Intellectual Property Protection

ENCOURAGING COMPANIES TO INNOVATE

Innovation Access Program
Information Technology Online
Pharmaceutical Industry Investment Program
New Industries Development Program
Shipbuilding Innovation Scheme
Textiles, Clothing and Footwear Strategic Investment Program
Automotive Competitiveness and Investment Scheme
Energy Efficiency Best Practice Program
Renewable Energy Commercialisation Program

Source: <<http://backingaus.innovation.gov.au>>. Accessed 20 October 2004.

The Industrial Research and Development Board (IR&DB) is responsible within AusIndustry for supporting industrial R&D. Its core objectives are that:

- By 2006, Australia will be a highly competitive location for R&D
- By 2006, Australia will have developed a viable capital market for early stage, technology-based small to medium sized enterprises
- By 2006, Australia will have encouraged the development of a wide range of investor-ready companies with strong technology, superior leadership and managerial skills.
- By 2006, Australia will have a strategic set of internationally successful high-technology industries.

The Annual Report of the Industrial Research and Development Board (IBRD, 2005) contains lists of companies that received grants or loans under these programs, together with the Board's assessments of programme relevance and case studies of selected grant and loan recipients.

Its programs are summarized in the following text box.

Industry Research and Development (IR&D) Board

Every year, some very clever, even cutting-edge projects come out of assistance programs funded by the Australian Government. These commercial success stories help to boost Australia's international reputation for innovation and smart ideas which, in many cases, only needed a helping hand to get up over the commercialisation hurdle. Their success also sends a clear message to international investors that Australia is serious about capitalising on its world-class research and development.

The Industry Research and Development Board is one of the main bodies helping Australian firms work towards that ideal. It is an independent statutory body that administers specific Australian Government programs to encourage and support innovation in industry.

The Board was established on 1 July 1986, under the *Industry Research and Development Act 1986*. Its mission is to increase the number of successful technology-based enterprises in Australia by supporting their performance and commercialisation of research and technical development...

These programs aim to increase the level of research and development (R&D) activity undertaken in Australian industry and to improve the commercial success of R&D outcomes.

Through its various committees, the Board administers the Government's R&D support programs. The role of the Board, however, encompasses more than just delivering programs. Rather, it is about promoting innovation as a means to secure tangible outcomes for industry and the economy.

R&D Start and the new Commercial Ready program

R&D Start is a competitive, merit based grants and loans program that supports businesses to undertake research and development and its commercialisation. The Australian Government is providing more than \$1 billion to 30 June 2011 for the new [Commercial Ready](#) program. Commercial Ready forms part of the Backing Australia's Ability - Building our Future through Science and Innovation \$5.3 billion package to follow on from the \$3 billion Backing Australia's Ability strategy announced in 2001.

R&D Tax Concession is a broad-based, market driven tax concession which allows companies to deduct up to 125% of qualifying expenditure incurred on R&D activities when lodging their corporate tax return. A 175% Premium (Incremental) Tax Concession and R&D Tax Offset are also available in certain circumstances. This program forms part of the Backing Australia's Ability - Building our Future through Science and Innovation \$5.3 billion package to follow on from the \$3 billion Backing Australia's Ability strategy announced in 2001.

Source: <www.industry.gov.au. Accessed November 2004.

THE PROGRAMS SELECTED FOR CASE ANALYSIS

In selecting the programs for assessment we looked at two factors. The first was that all the programs should come from only one or two government departments. In this way we can eliminate any potential overlap due to political considerations. The second factor was to target programs that have been described by the Commonwealth agencies themselves as promoting innovation or building entrepreneurial ventures. Using these criteria we have selected a number of programs from within AusIndustry, a division of the Department of Industry Tourism and Resources (DITR). AusIndustry funds a number of programs designed to foster innovation and entrepreneurship in Australia, which are generally relevant as factors affecting generation and development of HEHG firms. The programs we have selected for analysis come from AusIndustry's "Venture Capital" and "Innovation Products" streams. The programs are the following:

- Innovation Investment Fund (IIF)
- Pre-seed fund
- Commercial Ready (formerly START) program
- Commercialising Emerging Technologies (COMET)
- Pooled Development Funds (PDF)
- Tax Concession

Brief descriptions of each program and its objectives are shown in the text box below headed *Grow your small business*. We have also included the Co-operative Research Centres (CRC) Program which used to be administered by DITR. Though the administrative arrangements of the CRC programme have changed, it is desirable to consider it as part of a structured portfolio as intended by its AusIndustry progenitors. Importantly, about six hundred SMEs are or have been involved with CRCs.

The CRC Programme was established in 1990 to improve the effectiveness of Australia's research and development effort. It links researchers with industry to focus R&D efforts on progress towards utilisation and commercialisation. The close interaction between researchers and the users of research is a key feature of the programme. Another feature is industry contribution to CRC education programmes to produce industry-ready graduates.

Grow your small business

AusIndustry provides a range of products designed to assist small businesses to become innovative and internationally competitive.

[Commercial Ready](#)

Commercial Ready is a competitive merit-based grant program supporting innovation and its commercialisation. It aims to stimulate greater innovation and productivity growth in the private sector by providing around \$200 million per year in competitive grants to small and medium-sized businesses (SMEs) between 2004-05 and 2010-11. It offers industry a single entry point to competitive grants for early-stage commercialisation activities, research and development (R&D) with a high commercial potential, and proof-of-concept activities.

[Commercialising Emerging Technologies \(COMET\) from 13 September 2004](#)

COMET is a competitive, merit based program that supports early-growth stage and spin off companies to successfully commercialise their innovations. This webpage is for customers who are applying for the COMET program from 13 September 2004 onwards.

[Pre-seed fund](#)

The Pre-Seed Fund program has established four early-stage venture capital funds to invest in projects or companies spinning out from universities or government agencies. The funds are managed by venture capitalists experienced in research commercialisation and the development of sustainable businesses. These managers will acquire an equity interest in the companies or projects, and will provide management and technical advice to develop the commercial potential of the technology. The maximum investment in any project or company is \$1 million. It is expected that the managers will eventually divest their interest in successful projects and companies to later-stage investors.

[Innovation Investment Fund \(IIF\)](#)

Innovation Investment Fund is a Venture capital program that invests in nine private sector venture capital funds to assist small companies in the early stages of development to commercialise the outcomes of Australia's strong research and development capability.

[Pooled Development Funds \(PDF\) Program](#)

The PDF Program is designed to increase the supply of equity capital for growing Australian small and medium-sized enterprises (SMEs). PDFs are private sector investment companies established under the PDF Act which raise capital from investors and use it to invest in Australian companies.

[R&D Tax Concession](#)

R&D Tax Concession is a broad-based, market driven tax concession which allows companies to deduct up to 125% of qualifying expenditure incurred on R&D activities when lodging their corporate tax return. A 175% Premium (Incremental) Tax Concession and R&D Tax Offset are also available in certain circumstances. This program forms part of the Backing Australia's Ability - Building our Future through Science and Innovation \$5.3 billion package to follow on from the \$3 billion Backing Australia's Ability strategy announced in 2001.

Source: www.ausindustry.gov.au. Accessed 20 October 2004

When all CRCs from the 2002 selection round are established, there will be 69 CRCs operating in 6 sectors: environment, agriculture, information and communications technology, mining, medical science and technology and manufacturing. For more information on each CRC, visit the [CRC information page](#).

Over the past 12 years, participants have committed more than \$7 billion (cash and in-kind) to CRCs. This includes \$1.8 billion by the Australian Government, \$1.8 billion by universities, \$1.3 billion by industry and almost \$1 billion by CSIRO.

(Source: www.crc.gov.au. Accessed 16 November 2004.)

DEVELOPING AN ASSESSMENT FRAMEWORK: THE FACTORS AFFECTING NEW HEHG FIRM DEVELOPMENT

There is a very large literature on new venture development and on the importance of small firms for job creation and economic regional growth. Autio (2005: 15) also has pointed to the relatively small proportion of all new firms that end up generating the bulk of new jobs.

In the United Kingdom, Storey (1994) found that only 4% of new firms born in any given year accounted for 50% of all the jobs created by the surviving firms within that cohort after 10 years had elapsed. Kirchoff (1994) found that the 10% fastest growing firms contributed three quarters of new jobs during an eight year observation period within a cohort of firms started in the US in 1978.

At the same time he drew attention to the lack of studies focused on the factors specifically affecting new HEHG rather than just generic factors affecting all new firm development irrespective of entrepreneurial orientation, high expectations and high growth aspirations.

...The most interesting aspect of national-level entrepreneurial activity is also the most elusive one. Because only a small fraction of all new companies aim for rapid growth and because entrepreneurial activity, in general, can be typically observed only in a small subset of adult-age population, observing this phenomenon empirically

can be prohibitively difficult...There is very little empirical research on ex-ante growth aspirations: who aspires for and expects rapid growth and what factors are associated with such expectations (Autio, 2005: 16).

Autio (2005) also drew attention to the variation of small firm contribution over the economic life cycle and in different economic contexts. HEHG firm development is affected by the social and legal environments in which they operate. Particularly important influences are: labour market flexibility, taxation and intellectual property and the effects of legislation upon different phases of the firm's development.

The phases of new venture development

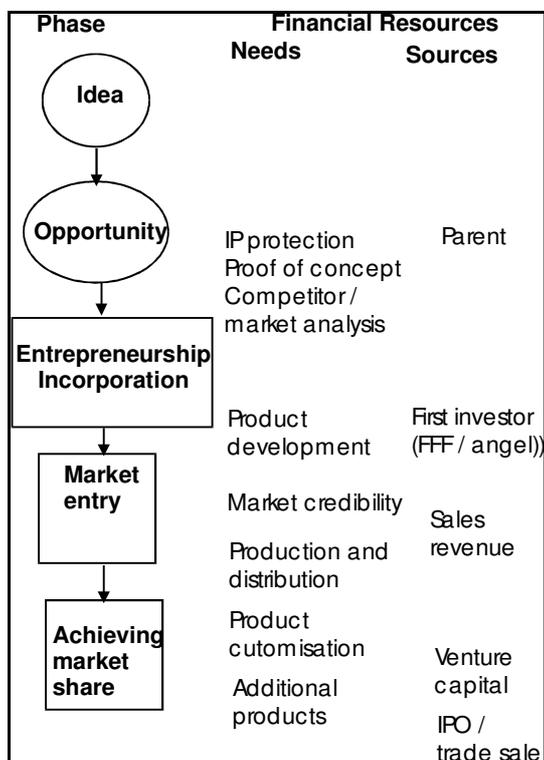
Vohora et al. (2002) have proposed five phases in the development of a new venture: *Research, Opportunity, Pre-organisation, Re-orientation* and *Substantial high growth*. They have also drawn attention to the *critical junctures* between these phases: *Entrepreneurial commitment, Threshold of credibility* and *Threshold of sustainability*. Yencken in his thesis (2005: 109) developed a decision tree framework covering the first two of the Vohora et al. phases up to the point where an opportunity has been identified, a decision taken to protect the intellectual property involved, the venturer has established proof of concept or a working prototype, ie has technology that works, and a commercialisation channel selected (eg licence, strategic alliance, spin-off company). Chakravorti (2003) has drawn attention to two important hurdles in introducing a new product or process to market. The first hurdle involves product development and customer credibility to allow the first sale; that is market entry. The second hurdle, having got a product or process into the market, is achieving market share.

For the purposes of this paper in reviewing policy settings and government program initiatives, support and external resources directed at three critical phases will be used for assessment. These phases are:

1. *the entrepreneurial phase*, from idea to opportunity to incorporated new venture
2. *the market entry phase*, when the emphasis has moved from research to product development and establishing market credibility
3. *achieving market share*, including product customisation and development of Mark II and Mark III products, marketing and distribution channel development.

Figure 1 shows the resource needs predominating in different phases and likely sources of finance for obtaining these resources. Phase one embodies the first three steps (idea to entrepreneurship incorporation) and phases two and three represent the last two steps respectively.

Figure 1 New venture development phases



McKaskill (2006) has produced a set of 14 'principles' that he believes commonly guide new businesses aiming for high growth rates.

- | | |
|--------------------------------------|--------------------------------------|
| 1. <i>Right place, right time</i> | 2. <i>A clear vision</i> |
| 3. <i>Innovation as the driver</i> | 4. <i>The compelling need to buy</i> |
| 5. <i>The right customer</i> | 6. <i>A competitive advantage</i> |
| 7. <i>Sustainability</i> | 8. <i>Channels to market</i> |
| 9. <i>Robust margins</i> | 10. <i>Scalability</i> |
| 11. <i>A capable management team</i> | 12. <i>Profitability</i> |
| 13. <i>Management of risk</i> | 14. <i>A long term strategy.</i> |

Of course, government programs and other initiatives cannot effectively assist in the areas covered by all of these principles. The list is potentially helpful precisely because it articulates the areas and issues where government policy is and is not a relevant potential contributor.

A framework of multiple perspectives

The selected Australian government programs were assessed independently and against each other with respect to their contribution to the various phases of development of new technology-based firms. The assessment maintained a specific focus upon whether the program would assist in the growth and development of HEHG firms drawing from three perspectives: Financial; Management; and Environment and focused on relevant principles (selected from McKaskill's 2005 list) deemed to be important to HEHG businesses.

The financial perspective assessment criteria

Most government programs provide financial assistance and therefore, a financial framework is used to define where businesses are in the growth cycle. The stages in this framework are illustrated in simplified form in Figure 1.

For a few companies, the ability to generate sales revenue almost immediately will avoid the need to dilute equity to obtain the resources needed. For technology asset companies, as opposed to product or process marketing companies (Stankiewicz, 1994), the marketable outcome is usually a licence rather than the actual supply of a product, process or service. The pattern of finance resource application may differ. Typically these are new ventures developing new drugs. Their mezzanine finance needs relate to the conduct of clinical trials rather than to defining and refining manufacturing and distribution activities. These will in time be undertaken by the licensee.

For more typical HEHG firms the *Financial* perspective is important for assessing whether the firm can achieve some of the McKaskill principles. For instance funding can be critical for achieving *Innovation as the driver*, *Sustainability* and *Scalability*, where the use of funds could be directed toward the second and third new products or product customisation and for developing channels to market so necessary to overcome Chakravorti's second hurdle.

The management perspective assessment criteria

The five phases illustrated in Figure 1 have progressively increasing demands for market understanding, management and people with specific skills and experience in order to advance across the three phases of growth. From this perspective, available Australian government initiatives have been assessed on their ability to provide assistance from a management and human capital perspective. An aspect of marketing and distribution development is the need to go global (IBRD, 2005: 23). Assistance with export market entry will be needed by almost all HEHG companies.

Consideration was given to assistance that might assist in developing *A clear vision*, *Channels to market* and – particularly in export market entry – *Management of risk*. The most critical principle, confirmed by responses during interviews for the GEM research described earlier, will be *A capable management team*, in ensuring that the trained and experienced people are available for both the initial entrepreneurship and subsequent product and market development phases and to have available all the specialist skills and services that new high growth ventures need to deploy, whether as employees or outsourced.

The environment perspective assessment criteria

The environment in which new HEHG ventures operate has important implications for their development. Important factors are:

- labour market flexibility: new ventures need to be able offer varying levels of employment conditions (full time, part time, casual) to suit their particular stage of development without penalties such as redundancy payments
- taxation: there are in Australia specific problems about the taxation issues involved with the licensing of intellectual property and valuation of a new business and with the granting of share purchase options to inventors and others
- intellectual property
- availability of experienced HEHG managers and specialist advisers, as discussed under the previous perspective.

All of these environmental factors are heavily influenced by government and related regulatory activities. In its turn, regulation affects the ability to achieve *a clear vision, robust margins, profitability and management of risk.*

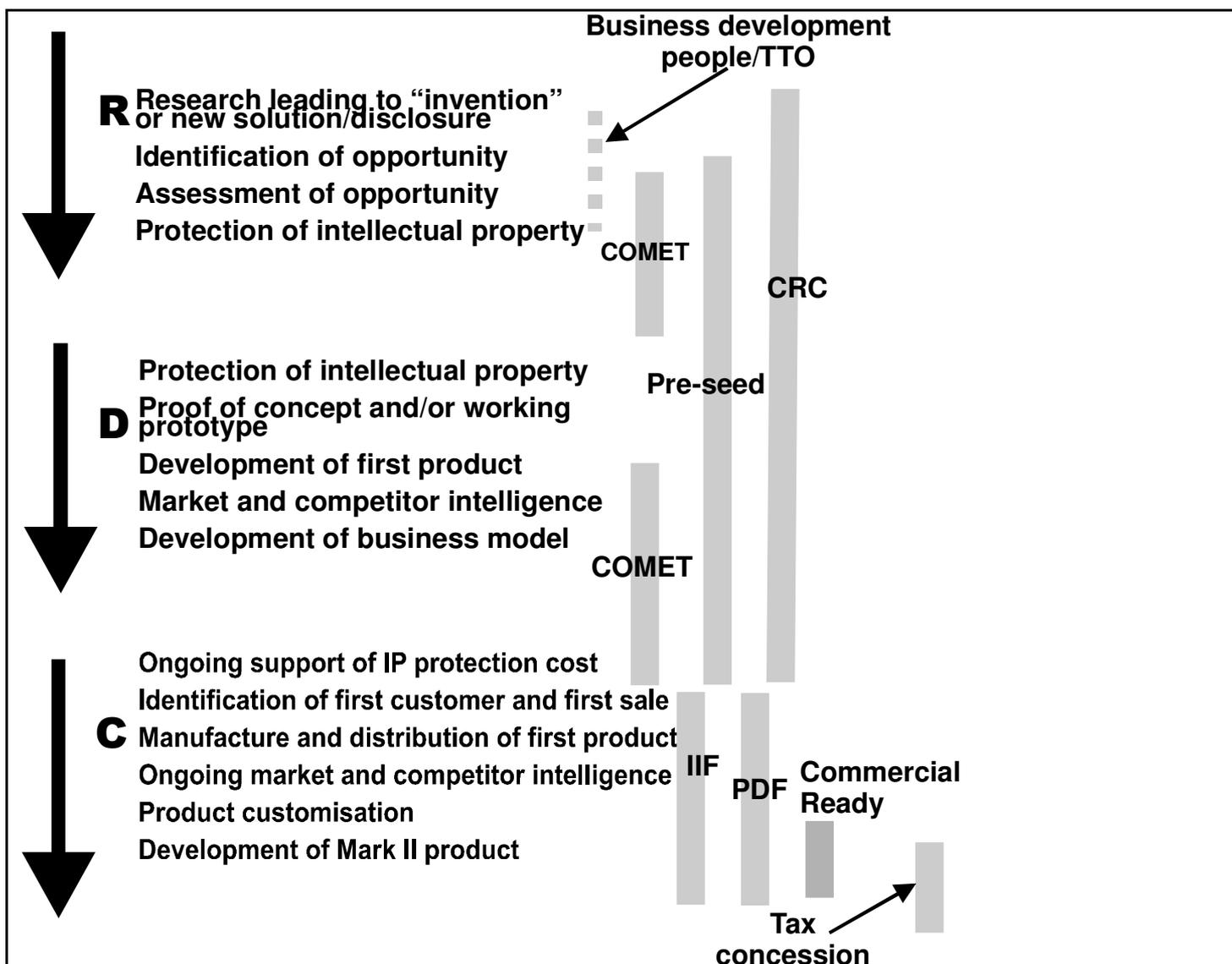
THE FRAMEWORK CRITIQUE OF POLICY AND PROGRAMMES

This assessment compares various Commonwealth programs using the framework of perspectives described in the previous section.

Financial Perspective

Superficially, the financial framework perspective seems to indicate reasonably comprehensive policy coverage of the field. Figure 2 indicates the support that the selected programs supply assessed against this framework. In the framework, nearly all the selected programs provide support. The CRC program is directed at cooperation in research, but as such it generates spin-off ventures and provides pre-seed and other initial support before the new venture is parted from its parent (Yencken, 2005). The tax deduction (125 per cent plus) provides support at all levels as does R&D Start with the exception of the founder stage. However, in practice the tax concession is most effective for companies that have sufficient earnings to pay company tax, although other companies can have access to tax credits. We consider that R&D Start benefits companies from the Product Development phase onwards, as a new venture is unlikely to have adequate initial capitalisation to be able to support a Start or Commercial Ready grant or loan. The resources needed to apply for the scheme are beyond most new technology-based Small Firms (NTSF). The IBRD has recently carried out its own review of the impact of the tax concession programme, involving a survey of 120 businesses. (IBRD, 2005:8).

Figure 2 The innovation framework.



The Pre-seed, IIF and PDF programs fit very well onto this model, but all involve significant dilution of equity. These venture capital related programs assist in the resource side of a developing business. They would be helpful in providing capital and assisting with the formation of the management team, for example.

The Pre-Seed Fund program has established four early-stage venture capital funds to invest in projects or companies spinning out from universities or government agencies. The funds are managed by venture capitalists experienced in research commercialisation and the development of sustainable businesses.

Pre-seed finance is essentially needed to reduce risk, whether it be technology, IP or market risk. Most start-up NTSFs are reluctant to give away equity at the pre-seed stage, because of the high level of risks that lead to low valuations. Recent Australian case studies of university spin-offs have shown that the larger research profile Australian universities have established their own, usually small, internal pre-seed funds, often drawing on past commercialisation earnings as the source of finance (Yencken and Ralston, 2005).

The IBRD in its 2005 venture capital study (IBRD, 2005: 5) concluded:

The venture capital study found that the programs play a major role in providing venture capital finance for early stage technology based firms.

The findings of a recent Australian Institute of Commercialisation survey for DITR are relevant here (AIC, 2004).

From the results of this survey the existence of a gap in funding at the very early stage is verified by 87% of investors and 88% of clients. Respondents believe there is a demand for finance below \$2.0M that is unmet by the current financial market. From comments provided by respondents, this is not necessarily only the result of a lack of available funding for specific equity investment, but also a combination of several other issues.

IIF and PDF are clearly focused on the later market development stages. For biotechnology and other companies developing new drugs, this source of funding is needed to finance Phase 1 clinical trials. Commercial Ready (the successor to START) supports both applied research in new ventures and applied research leading to innovations by established companies.

CRCs with commercially experienced Chairs and Board members—and now more focussed on generating economic benefit—can and do cover both the “R” and the “D” stages and even the start of the commercialisation (“C”) stage, including the technology development, opportunity identification and assessment activities, and IP protection. For new ventures that are not generated out of CRCs, *Commercial Ready* and the Pre-seed Fund are the only selected program that help to fund the technology development stage of “D”, that includes proof of concept and working prototype development. *Commercial Ready* however requires matching funds commitment from the recipient company. Other research has shown that CRC spin-off companies generally are not set loose without considerable planning and initial resource commitment (Yencken and Gillin, 2004).

Except for CRCs, the programs selected show a big gap in support for the initial phases of opportunity identification and assessment and for initial IP protection—essentially the entrepreneurship or act of new entry phase (Figure 2 and Lumpkin and Dess, 1996). The high cost of initial IP protection can be a heavy burden on universities and a deterrent to commercialisation of research outcomes (Larkins, 2002).

Management perspective

Figure 2 indicates where the selected programs provide support in this framework. The solid vertical bars show the coverage of the selected Commonwealth programs. The broken vertical bar indicates where cover is provided by research provider business development people or other, mainly Australian Institute of Commercialisation or State government, programs. These are however primarily focused on training and consultancy type support and do not contribute to early stage finance needs.

From a market understanding point of view, the program that clearly shines here is COMET. This is a relatively new program introduced by AusIndustry in November 1999. It has been directed at very early stage ventures and is the only program to evaluate the potential of the applicant with regard to their perceived entrepreneurial abilities. This analysis is confirmed by the recent review of the COMET program.

COMET was substantially expanded under *Backing Australia's Ability* and again under *Backing Australia's Ability – Building Our Future through Science and Innovation*.

A 2002 survey of firms assisted by COMET showed that the program was very successful in encouraging entrepreneurs and enabling firms to achieve their business goals. The network of business advisers is a unique and valuable feature of COMET, and leads to long-term and beneficial changes to firm behaviour. The

Australian Government is providing a further \$100 million over the next seven years to continue and expand the highly successful Commercialising Emerging Technologies (COMET) program.

(Source: <http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=5483ACCB-97CA-1838-61B239AE0868E468>>. Accessed November 2004).

For new ventures which have been started by individual entrepreneur(s) or spin-offs by staff or students with no parent research provider IP or equity, the available sources of financial support, which often link to management development or support, again lie outside the ambit of the DITR programs considered in this paper. Some of them have access to incubator programs such as the Commonwealth Government *Building on IT strengths* (BITS) Incubator Centres program. They also have access to State government initiatives such as the Victorian Government Technology Commercialisation Program (TCP)—now succeeded by the *Building Innovative Businesses Program*—under which selected consultants were subsidised as TCP Partners “to provide intensive management assistance, internationally focused market support and access to private sector equity” (Scitech, 2002: 247). However, history has shown the lack of success in Australia of external consultants finding IP based opportunities in universities, which in turn renders any intended transference of management skills ineffective.

Few TCP Partners set out to specifically address the commercialisation of public sector research and their limited attempts were relatively unsuccessful in generating technology opportunities from public sector R&D (DIIRD, 2004: 10).

Interviews with venture capitalists and people in government agencies have stressed the importance of human capital and access to specialist skills and experience. One experienced venture capitalist pointed to the shortage of people in Australia (outside the minerals exploration industry) who had experience and were competent to manage young technology based HEHG firms and suggested that was need for more people with science PhDs followed by product development experience in an established company and training in entrepreneurship and small company management. He also drew attention to the lack of people in Australia with the specialist skills that a venture capitalist needs at various stages in a new HEHG firm's development. However, the Australian Institute of Commercialisation in its boot camps for academic researchers and related programs has started to make a contribution here (see www.ausicom.com.au).

Environment framework perspective

Governments in recent years in Australia have initiated significant increases in labour market flexibility. Labour market regulation is no longer a significant obstacle to new HEHG development.

Australian taxation policies and regulations still contain problem issues for inventors and venture capitalist and other investors (Rider et al. 2006):

- (a) Contribution of intellectual property assets...to a spin-off company may trigger an immediate large tax liability for the intellectual property contributors...
- (b) ...grant of options may trigger immediate taxation on the value of shares and options granted...
- (c) Start-up losses are trapped in the spin-off company and cannot be made to flow through to the investors.
- (d) commercialisation profits in a spin-off company are taxed at the 30% company tax rate, so exempt investors cannot benefit fully from their exempt status (Rider et al., 2006:103).

Rider's working paper indicates a case for tax reform in the area of the contribution of IP assets and labour to a spin-off company (Rider et al, 2006: 105).

Intellectual property protection, usually involving patents, is expensive, particularly as Australian HEHGs will need to protect global markets.

FINDINGS AND CONCLUSIONS

The conclusions from the previous analysis of Australian government policy initiatives with impacts on new business growth rates are discussed here against the three phases of new venture development shown in Figure 1 as; *Idea to Entrepreneurship Incorporation, Market Entry and Achieving market share*. This analysis was undertaken from three different perspectives: *Financial, Management and Environment*.

Entrepreneurship and incorporation phase

Except for CRCs, the programs selected show a big gap (Figure 2) in support for the initial phases of opportunity identification and assessment and for initial IP protection—essentially the entrepreneurship or act of new entry phase (Figure 2 and Lumpkin and Dess, 1996). As discussed, the high cost of initial IP protection can be a heavy burden on universities and a deterrent to commercialisation of research outcomes (Larkins, 2002). For universities and other public

research agencies, support in this entrepreneurial phase is usually provided by business development staff in technology transfer offices or deployed close to groups of researchers, usually funded out of other research provider funds. In some States there have been a few instances of such business development people being funded by State governments for limited periods—for example, in Victoria at RMIT and Deakin Universities.

For new ventures which have been started by individual entrepreneur(s) or spin-offs by staff or students with no parent research provider IP or equity, the available sources of financial support again lie outside the ambit of the DITR programs considered in this paper. Some of them have access to incubator programs such as the Commonwealth Government *Building on IT strengths* (BITS) Incubator Centres program. They also have access to State government initiatives such as the Victorian Government Technology Commercialisation Program (TCP)—now succeeded by the *Building Innovative Businesses Program*—under which “selected consultants were subsidised as TCP Partners to provide intensive management assistance, internationally focused market support and access to private sector equity” (Scitech, 2002: 247). However history has shown the lack of success in Australia of external consultants finding commercialisable opportunities in universities.

There are however some important new initiatives in providing support in this phase. The Australian Institute of Commercialisation has been implementing a series of boot camps to help researchers in the identification of commercial opportunities. Several of the Pre-seed Fund accredited venture capitalists are experimenting with providing pre-seed finance prior to incorporation in exchange for an exclusive first option to licence and commercialise the new technology involved. State governments such as Victoria are also involved in the provision of grants to finance infrastructure. Examples included the funding of an automated wood bending equipment for a CRC spin-off Wood Shapes Pty. Ltd. and a micro fabrication facility, the Small technologies Cluster in which Swinburne University of Technology is involved.

The market entry phase

A number of the government initiatives discussed are clearly supportive of new high growth ventures in this phase (Figure 3), particularly COMET, CRCs. Pre-seed funds and Commercial Ready for companies with adequate financial resources such as spin-offs from well established companies. It is in this phase that issues raised in the earlier discussion of the Management Perspective start to become more important. The transition from R&D to first product development is never easy and entrepreneurs and managers with good product development experience are often hard to find. Similarly, the need for access to a variety of skills arises. These are in short supply in Australia. Opportunities for postgraduate training in technology development as at Macquarie University (well used by the CRC that led to the formation of diagnostic product company Ambri Ltd.) and the Swinburne University Master of Entrepreneurship and Innovation start to become significant. Several respondents to the GEM study stressed education and training in all aspects of new high growth venture development and management as the most critical need, above financial subsidies and grants.

In this phase also some of the Environment perspective issues start to be significant: labour market flexibility, taxation issues relating to intellectual property, availability of specialist resources such as accountants and patent attorneys.

Achieving market share

Achieving market share is essential to survival and starts to require much increased financial resources to finance market expansion, manufacturing and distribution and ongoing product development, both customization and Mark II and Mark III products. A number of surveys including one by *The Economist* some years ago have suggested that multi-product companies have better chances of survival than single product companies because they deal better with issues such as competitive advantage, sustainability, scalability and innovation. By this time the venture will usually have obtained additional equity usually as second and third tranches from venture capitalists (possibly involved in an Innovation Investment Fund or a Pooled Development Fund). This allows access to Commercial Ready and other Industrial Research and Development Board (IDRB) programs where various levels of matching contributions by the grant or concessional loan recipient may be required. Available information on recent high growth ventures strongly indicated that IRDB-type finance is most valuable. It is also more used for research related to achieving market share that needs product customisation and second or later product development. This kind of activity is otherwise hard to fund because often all resources have been consumed during the initial product entry phase.

The human capital needs generated by the Management perspective will have become much more critical, both for employees and outsourced specialist people. Similarly the Environment perspective issues will continue to be of concern if appropriate actions in the development of financial and organisational structures have not been resolved.

From our analysis it is clear that AusIndustry's programs *seem* to be working well and meeting genuinely entrepreneurial objectives *if they are considered solely within the context of the financial and innovation frameworks*. However, the program suite can be seen to be working poorly from the perspective of management for the start-up and entrepreneurial phases, where the latter becomes increasingly critical to foster HEHG firms. The question remains whether the present focus of these programs is still optimal. GEM interview respondents suggested that more emphasis was needed on the adequacy of human capital resources and on environmental issues such as intellectual property

taxation. One suggestion was that more people with track records in entrepreneurial minerals exploration should come across into other areas of innovation.

The future: is a new and broader focus needed for innovation policy?

The dominant conceptual problem for innovation policy in Australia is: 'technology push versus market pull'. This single phrase succinctly summarises the generic problem with Government policy in fostering entrepreneurship. In legend, anecdote and even in fact, Australia is the land of inventors: the ingenious Aussie battlers who are able to solve most problems using some combination of fencing wire and hay bind. We also have a long tradition of world class research, especially in medicine. Australia is also a land rich in natural resources and as such we have been able to provide ourselves with a comfortable standard of living. These factors have generated a society that prides itself on its ingenuity, but is not always able to capture the potential commercial gains that may flow from these endeavours.

This history colours the way in which we tackle national policy relating to entrepreneurship and innovation and fostering new ventures. We are strong exponents of 'Technology Push'. The programs we have studied all operate on this premise. Something has been invented, whether through the endeavours of a lone maverick or a multi-institution coordinated research project. Then money is found to move this to the development stage, and then finally capital is sought to commercialise the whole thing and take it to the market. Too often too little attention is paid to actually finding out if anybody is actually interested to purchase it.

What Australia lacks is the ability to systematically identify opportunities related to the market and harness our inventive power to develop businesses capitalising on these opportunities. We are so focused on products that we ignore the other real drivers of new venture development, people and the market. The only programs that have addressed this problem have been COMET and more recently CRCs. COMET takes a more holistic approach to dealing with new venture opportunities than most technology push Australian support programs, and it does not provide help with screening for opportunities. Again, the implicit assumption is that someone will come along with a product that they are looking to move to market.

The need for a broader focus for innovation policy is well stated in the Executive Summary to a recent Business Council of Australia survey report (Howard Partners, 2006).

New research conducted for the Business Council of Australia demonstrates that what innovation is, and how it is achieved, is different to how it has been understood by many parts of Government and by policy-making bodies. Some areas of Government and other institutions have often equated innovation with research and development (R&D). This reflects a traditional view of innovation in which, throughout the 19th century and much of the 20th century, Australia's innovation capacity was defined around the technological capabilities of its primary and manufacturing sectors. Such a view fails to recognise the increasing importance of a wide range of business activities that deliver innovation benefits to the modern Australian economy. Factors such as rising global competition; the changing industrial structure of the Australian economy towards a greater focus on high-value-added services; and the growing convergence of many technological fields, such as information and communication technology (ICT), have broadened the scope of approaches that businesses use to achieve innovative outcomes. In an open and highly competitive services-oriented market economy, technology-driven research is unlikely to be the only, or even the primary method of achieving the business innovation imperative to provide maximum value for money for goods and services to attract and maintain discerning customers.

The analysis conducted in this paper provides a strong argument for a shift in policy philosophy as a necessary predicate for more effective creation and implementation of high expectation / high growth entrepreneurship policy in Australia. In particular, there is a great need to assist the Australian population to acquire the difficult skills associated with opportunity evaluation, generally and new venture evaluation, specifically. If more Australians possessed the skills to answer two questions: "Is this a genuine commercial opportunity?" and "Is the proposed venture adequately designed to exploit the opportunity?" then our poor record of commercialising new knowledge might improve significantly.

REFERENCES

- Australian Institute for Commercialisation (2004) Investigating the existence of anecdotally reported innovation funding gapFINAL REPORT: Survey commissioned by the Commonwealth Department of Industry, Tourism and Resources. Canberra : Department of Industry, Tourism and Resources.
- Autio, 2005.. GLOBAL ENTREPRENEURSHIP MONITOR. 2005 Report on High Expectation Entrepreneurship. London, GEM Entrepreneurship Research Association.
- Buss, 2001. Capital, Emerging High-Growth Firms and Public Policy. Westport CT, USA: Greenwood Publishing Group.
- Chakravorti, 2003. *The slow pace of fast change: bringing innovation to market in a connected world*, edn. Harvard Business Press.
- Chandler and Hanks, 1998. .An Examination of the Substitutability of Founders' Human and Financial Capital in Emerging Business Ventures. *Journal of Business Venturing*. 13:353-369.
- Department of Innovation, Industry and Regional Development (2004). Technology Commercialisation in Victoria: Information Paper . Melbourne: Department of Innovation, Industry and Regional Development.

- DISR (1997). Investing for Growth. The Howard Government's Plan for Australian Industry. Canberra: Commonwealth of Australia.
- Drucker, P.F. (1985). Innovation and Entrepreneurship: practices and principles. Pan McMillan.
- Emmery, M. (1999) Industry Policy in Australia. Canberra: Economics, Commerce and Industrial Relations Group. 1999.
- Gregory, R.C. (1993). The Australian Innovation System. In: Nelson, R.R., (Ed.) *National innovation Systems: A Comparative Analysis*, Oxford: Oxford University Press]
- Hindle, K. 2002. small-i or BIG-I? How entrepreneurial capacity transforms 'small-i' into 'Big-I' innovation: some implications for national policy. *Telecommunications Journal of Australia*, 52(3): 51-63.
- Hindle, K. and O'Connor, A., (2005), Westpac GEM Australia, 2004, Melbourne. Swinburne University of Technology.
- Howard Partners. 2006. New Concepts in Innovation: The Keys to a Growing Australia. Canberra.: Business Council of Australia;
- IBRD, 2005. Annual Report 2004-5. Canberra. Commonwealth of Australia. Industry Research and Development Board.
- Kirchhoff, 1994. Entrepreneurship and dynamic capitalism: the economics of business firm formation and growth. Westport, Connecticut: Greenwood Publishing Group;
- Klofsten, M. (1998) *The Business Platform: Entrepreneurship and management in the early stages of a firm's development.*, edn. Luxembourg: TII - European Association for the Transfer of Technologies, Innovation and Industrial Information.
- Larkins, F. (2002) Research and research training in Australian universities. *Chemistry Australia* **69**, 13-16.
- Lumpkin, G.T. and Dess, G.G. (1996) Clarifying the Entrepreneurial Orientation Construct and Linking to Performance. *Academy of Management Review* **21**, 135-172.
- McKaskill,, (Forthcoming).. Winning Ventures: 14 principles of high growth businesses. Wilkinson Publishing. Melbourne:
- OECD Secretariat (1998) Technology, Productivity and Job Creation: Best Policy Practices - Highlights. Paris: OECD.
- Pappas, et al., (1991) Innovation in Australia. Report for the IR&D Board. Canberra:
- Rider, C., et al., (2006) Taxation Problems in the Commercialisation of Intellectual Property (IPRIA Report No.1/06). Melbourne: The University of Melbourne Intellectual Property Research Institute of Australia.
- Stankiewicz, R. (1994) University firms: spin-off companies from universities. *Science and Public Policy* **21**, 99-107.
- Storey, D. (1994) Understanding the Small Business Sector. London: Routledge;..
- Vohora, A., Lockett, A. and Wright, M. (2002) Critical Junctures in the Growth in University High-Tech Spinout Companies. Nottingham. Presented at Babson Kauffman 2002 Entrepreneurship Research Conference, Boulder, Colorado: Nottingham University Business School Jubilee Campus.
- Yencken, J. (2005) An Australian Model for Spin-off Companies in the Commercialisation of University and Other Public Sector Research: Thesis for PhD Degree. Melbourne: Swinburne University of Technology.
- Yencken, J. and Ralston, L. (2005) Evaluation of Incentives for Commercialisation of Research in Australian Universities: A survey of selected Australian universities. Canberra Department of Education, Science and Training.