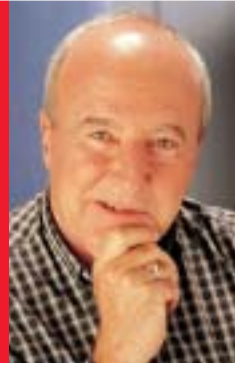


[SA] – centre of innovation



After discovering the outstanding fact that South Australia leads the country and the developed world with our prolific rate of innovation, Prof Dick Blandy has developed an innovation profile to learn why we do it.

Earlier this month, the Australian Bureau of Statistics agreed to an “analytical collaboration” with me and my University of South Australia colleague, Zeljka Sporer, on the causes of business innovation.

The formal title of this collaboration is: Understanding the causes of business innovation in Australia, South Australia and Europe using ABS surveys and other sources, including European surveys. As this title suggests, a significant program of work is envisaged, including comparative research involving a number of European countries that have collected similar data to the ABS.

The main body of ABS data that is the subject of this collaboration is the ABS's 2003 Business Innovation Survey of 8500 businesses from every State in Australia. The ABS's main report on its findings from these data was published in ABS, Innovation in Australian Business, cat no. 8158.0, 17 February, 2005, some results from which were included in my Economic Outlook article in the April/May issue of South Australia *in-business*.

The purpose of the work that Zeljka Sporer and I are now doing is to assist the Australian Statistician inform the Australian people of outcomes of the ABS's data collection work in the area of business innovation. We will be writing articles for publication by the ABS as well as for publication and presentation elsewhere.

This present article for South Australia *in-business* is intended to inform readers of some preliminary results from very early analysis of these remarkable data.

The results take in Australia as a whole, but with a special focus on South Australia. Some earlier, experimental, Australian, results were presented in May to an international conference on innovation in Dubrovnik.

To recap some figures from the ABS's February report:

Nearly 46 per cent of South Australian businesses innovated in the period 2001-2003, a number 10 percentage points greater than the State with the next most innovative business sector (New South Wales);

After adjusting the data to make them comparable with European survey data, Australian businesses ranked seventh in a comparison with businesses in various countries of the European Union. If one were to make the same adjustment to

South Australia's score as to Australia's, South Australian businesses would rank in equal first position (with Germany).

What explains South Australia's strong innovative performance?

Increasing business innovation is nowadays the Holy Grail of economic growth strategy. International competitiveness depends crucially on a location's innovativeness. Understanding South Australia's innovative performance is very important for the economic future of the State.

Coming to an understanding of South Australia's innovative performance via a thorough and comprehensive analysis of the ABS's data will take time. The present article makes a start to this comprehensive inquiry by examining some possibilities based on early explorations of the data.

South Australia's Innovators

The measures of innovation used in the ABS's survey are

- the introduction of new goods or services,
- the implementation of new operational processes, and
- the implementation of new organisational/managerial processes.

These measures have been combined for purposes of analysis into an omnibus measure of innovation that counts an enterprise as an innovator that has introduced any of the above changes. It is interesting to note, incidentally, that 73 per cent of innovations occurred in firms undertaking two or more forms of innovation. Only 23 per cent of firms introducing new goods and services, for example, only introduced new goods and services. The vast majority of firms introducing new goods and services (77.3 per cent) also implemented new operational processes and/or new organisational/managerial processes.

Hence, innovation appears to be predominantly a broad ranging activity within enterprises rather than an isolated act of product or process creation. Directly supporting the creation of new goods and services may not be as successful an innovation strategy (even in the creation of new goods and

services) as supporting a general willingness and capability of firms to experiment, learn, interact and collaborate across a broad front. This is also the broad conclusion of an important study for the Business Council of Australia by Sir Roderick Carnegie, Matthew Butlin, Paul Barratt, Andrew Turnbull and Ian Webber, *Managing the Innovating Enterprise: Australian companies competing with the world's best*, The Business Library in association with Business Council of Australia, Melbourne, 1993.

South Australia's innovative firms are more successful than South Australian firms in general. The innovators

- have survived slightly longer (5.8 years compared with 5.4 years overall),
- are slightly larger (average employment size is 10 persons compared with 9 persons overall; average turnover is \$2.6 million compared with \$1.4 million overall),
- are more profitable (mean operating profit is \$653,000 compared with \$237,000 overall; median operating profit is \$96,000 compared with \$70,000 overall).

South Australia's innovative firms are over represented in:

- manufacturing (17.9% of SA's innovative firms are found in manufacturing compared with 15.9% of SA's firms overall),
- business services (19.6% of SA's innovative firms compared with 17.2% of SA's firms overall), and
- accommodation, cafes and restaurants (12.3% of SA's innovative firms compared with 11.3% of SA's firms overall), but under represented in:
- construction (5.3% of SA's innovative firms compared with 9.0% of SA's firms overall).

The industries in South Australia with the highest proportions of innovative firms are:

- manufacturing (53% of SA's manufacturing firms are classed as innovative, compared with 46%, nationally. Firms in the printing, publishing and recording media sector are the ►

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- most innovative manufacturing firms in SA.),
- business services (52% of SA's business services firms are classed as innovative, compared with 32%, nationally),
- accommodation, cafes and restaurants (51% of SA's firms are classed as innovative, compared with 27%, nationally).

Confirming the most widely accepted understanding of the sources of innovative capability, more of South Australia's innovative firms are classed as collaborative than of South Australian firms in general (21% of SA's innovators are classed as collaborators compared with 10% of SA's firms generally).

Confirming the South Australian picture, Australia's innovative firms are more successful than Australian firms in general. Australian innovators

- have survived slightly longer (5.2 years compared with 5.0 years overall),
- are slightly larger (average employment size is 10 persons compared with 8 persons overall; average turnover is \$3.6 million compared with \$1.6 million overall),
- are more profitable (mean operating profit is \$1.6 million compared with \$0.8 million overall; median operating profit is \$89,000 compared with \$56,000 overall).

Australia's innovative firms are also over represented in

- manufacturing (18.2% of Australia's innovative firms are in manufacturing compared with 13.9% of Australian firms overall),
- as well as in wholesale trade (12.0% of Australian innovative firms are in wholesale trade compared with 9.7% of Australian firms overall), while being under represented in
- retail trade (20.0% of Australian innovative firms are in retail trade compared with 22.2% of Australian firms, overall).
- business services (18.2% of Australian innovative firms are in business services compared with 20.2% of Australian firms, overall), and
- accommodation, cafes and restaurants (6.7% of Australian innovative firms are in this sector compared with 8.8% of Australian firms, overall).

The industries in Australia as a whole with the highest proportions of innovative firms are:

- communication services (50% of Australian communications services firms are classed as innovative. There are too few communications firms in the SA sample to enable a comparison with this figure.),
- manufacturing (46% of Australian manufacturing firms are classed as innovative, of which the most innovative sector is petroleum),

- finance and insurance (44% of Australian finance and insurance firms are classed as innovative, compared with 50% in South Australia).

Again confirming general understanding of the sources of innovative capability, Australia's innovative firms are more collaborative than Australian firms in the broad (27% of Australia's innovators are classed as collaborators compared with 12% of Australian firms generally).

Comparing South Australian innovative firms with Australian innovative firms, in general,

South Australian innovators have survived (slightly) longer, on average,

- are approximately the same size in employment terms, but smaller in terms of average turnover,
- are less profitable in terms of mean average profit, but more profitable in terms of median average profit,
- are similarly distributed across industries,
- are more innovative in manufacturing, business services, finance and insurance, retail trade, and accommodation, cafes and restaurants, but
- are less collaborative, on average.

This last finding is a surprise, given that South Australian firms are more innovative, on average, than Australian firms, generally, and that one of Adelaide's competitive advantages is undoubtedly its community networks that enable things to be done more fluidly than in Sydney, Melbourne or Brisbane.

Innovation sources

To examine the sources of South Australian firms' innovative performance, I have used a statistical technique known as "logistic regression". Firms were classified (by the ABS) into two groups: innovators and non-innovators. This classification can be related to the characteristics of each firm, contained in about 400 answers to questions in the ABS's 2003 Business Innovation Survey, as well as to other factors (the firm's industry, the State where the firm's HQ is located, etc.). Whether a firm is an innovator or not can be related to the characteristics of each firm through the "logistic regression" statistical process.

This process sets up a "best statistical fit" based on successively selecting firm characteristics that predict better and better whether a firm is likely to be an innovator (or not). The process includes both "explanatory characteristic" selection rules, and rules to stop choosing further "explanatory" characteristics. The process has rules to judge whether the collection of characteristics selected is statistically a good collection ("model"), or not. The process is not mechanical, however, but requires judgements at various points. Hence, the explanation of innovative behaviour derived from this statistical process is by no means unchallengeable, even though it has statistical backing.

I used this powerful statistical technique to analyse the ABS's data on 401 South Australian firms. The results show that a South Australian firm is more likely to be an innovator if it:

- has developed new corporate strategies (very important),
- uses secrecy to protect its intellectual property (very important),
- looks for skills and capabilities in IT to support its new processes (important),
- faces price competition for the goods or services it produces (important),
- spends on innovative activities within SA,
- has a higher turnover from non-innovative goods or services, and
- spends on innovative activities using borrowed funds.

(For those who need to know, the Hosmer and Lemeshow test for this model is met, Nagelkerke's pseudo R² = 0.88, while 92% of innovators (and 98% of non-innovators) are correctly forecast by this model.)

What this model of innovation by firms in South Australia suggests is that the things that matter most for innovation in South Australia are

- an understanding by a firm that change is needed,
- having intellectual property to protect (by secrecy),
- introducing new processes that (usually) require extra IT capability,
- trying to cope with price competition by product differentiation,
- spending in South Australia on innovative activities,
- being able to rely on a strong cash flow based on well-established goods and services, and
- being able to reduce the firm's own risk by using outside funds.

An equivalent "model" of innovation in Australian firms can be statistically estimated from the ABS's data on 6195 Australian firms across all States and Territories. The results show that an Australian firm is more likely to be an innovator if it:

- uses the research facilities of Australian (non higher education) research institutes to acquire knowledge (very important),
- has developed new corporate strategies (important),
- is classed as collaborative (important),
- acquires new equipment and technology, from any source, including overseas (important),
- seeks skilled people of all kinds (important),
- is driven by a desire to be more responsive to customer needs (important),
- spends on innovative activities using its own funds,
- spends on innovative activities using borrowed funds.

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Some of these factors are the same as in the South Australian results. Others are different. The Australian results also differ from the previous logistic regression analysis of the Australian data presented at the conference in Dubrovnik (mentioned earlier) that used a more restricted set of explanatory variables.

(For those who need to know, the Hosmer and Lemeshow test for the Australian model is nearly but not quite met, Nagelkerke's pseudo $R^2 = 0.75$, while 76% of innovators (and 99% of non-innovators) are correctly forecast by this model.)

The sort of South Australian Government policy that would appropriately flow from considering the results of the Australian, as well as the South Australian, analyses is one that

- a) targets well-established firms with messages about the need to respond to a rapidly changing, and highly competitive, world, by being responsive to customer needs, particularly through process innovation and product differentiation, using new equipment and technology and a highly skilled work force; and that
- b) supports innovators by
 - encouraging research institutes to meet the needs of innovating firms,
 - by facilitating the protection of intellectual property,
 - by ensuring an adequate supply of IT skills for the support of new production processes,
 - by encouraging local spending by firms on their innovative activities,
 - by supporting collaboration between firms and
 - by creating a financial climate where innovative firms have access to more funds (both loans and equity).

Fortunately, these messages do not look like rocket science. They form a rather sensible and plausible program of support for increasing innovation among South Australian firms.

Because South Australian firms are already Australian leaders in innovation, it can reasonably be inferred that South Australia's "regional innovation system", described in preceding paragraphs, must already be working reasonably well. Clearly, the system could be improved by considering some of the activities that characterise Australian innovators and that are not strongly found in South Australia.

The challenges to South Australia's economic prosperity are great, and are likely to become much greater during the 21st Century, as China and India become world economic powerhouses. Our response to these challenges will require even greater attention in the future to the capacity of our enterprises to innovate.