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Title:

The Klofsten Business Platform as a self-diagnostic tool for new technology-based small firms.

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Abstract

This paper first reviews available instruments that might be used by new technology-based small firms (NTSFs) as self-diagnostic tools to plan their future development strategies. It makes a clear distinction between tools that are for self-diagnostic internal use by such ventures and the more established tools, such as Timmons “fatal flaw analysis” and Bell-Mason, designed to assist venture capital investors in decisions whether to invest or not in a new company. The paper then analyses the application of the Klofsten Business Platform with its eight Cornerstones as a comparative diagnostic tool in over twenty case studies to the understanding of the early stages of development of new technology-based spin-off ventures from Australian and Scottish universities. The analysis is longitudinal over a period of up to six years for surviving companies. Survival rates for the sample have been compared with overall survival rates of spin-off and other new ventures in Australia.

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Introduction

The literature on new venture creation and development describes a number of models that might be used for the assessment of new business ventures. Most of these have as their focus helping potential equity investors (friends, family and fools, business angels and venture capitalists) in their decisions whether to invest or not in that particular venture (Bell and Mason, 1991; Mainprize et al., 2003; Mason and Stark, 2002; Timmons, 1994). Klofsten (1998) has developed a Business Platform concept that was designed as a self administered diagnostic to assist small and medium sized knowledge based companies to assess for themselves their status in relation to what Klofsten identified as the Business Platform:

To survive and develop, a firm must reach *a business platform early on*. Therewith, the firm has achieved a condition where the initial vulnerabilities have been overcome, although this is not any guarantee that the firm will survive...A business platform is not a goal in itself, but the first very important step towards a stable growing firm (Klofsten, 1998: 13).

From this concept, Davidsson and Klofsten (2003) developed a questionnaire instrument that a firm might complete to evaluate its status in relation to this Business Platform objective. This questionnaire was evaluated by a survey of Swedish knowledge based businesses. Responses were received from 114 firms with a 36 per cent response rate. Of these firms, 58 per cent were providers of services and 35 per cent providers of products. Their average age was 6-7 years and median age 7.0 years (Davidsson and Klofsten, 2003:7). In this earlier research the focus was on helping existing knowledge based companies.

The research reported here involved case studies of newly established companies spun out by universities and other publicly funded research providers, twenty in Australia and two in Scotland. The case studies were based on well established principles (Yin, 1994; Miles and Huberman, 1994; Eisenhardt, 1989). One of the research objectives was to test the validity of The Klofsten Business Platform concept as the basis of a self-diagnostic tool and to explore its relevance for newly established New Technology-Based Firms (NTSF), not just for knowledge based companies with six or seven years' history.

The authors finally reviewed the survival rates for spin-off companies against other new ventures in Australia and elsewhere to provide benchmarks to assess the survival rates of the case study sample.

Reaching the *Business Platform*

The sample of companies

The research involved case studies over the period FY1999 to 2002 of twenty two spin-off companies established in Australia and Scotland, most of which were incorporated in the period FY 1995-2000. The parent research provider organisations included both large (research expenditure greater than A\$100million per annum) and small/medium research profile universities, CSIRO (the Australian national public research agency), and Cooperative Research Centres (CRCs). CRCs are an Australian Commonwealth Government initiative to bring together in the one organisational structure universities and other research providers with industry and other users of research (See www.crc.gov.au). The unit of analysis was the spin-off company. The population was theoretically sampled to ensure inclusion of a wide range of technologies and parent research providers, with wherever possible two spin-off companies from each research provider (Yencken, 2005).

The individual case studies involved both quantitative data collection using a developed survey instrument (Yencken, 2005:340) and qualitative research based on interviews with researcher inventors, managers, technology transfer staff and first investors.

The survey instrument

At the time when the research reported here was started, only a Swedish version of the survey instrument was available. This was translated into English in Australia by a fluent Swedish speaker. Inevitably there are small differences in translation between this earlier translation of the original Swedish instrument used here and the later translation of the survey instrument included in Davidsson and Klofsten (2003). However to avoid any incompatibilities, the same *translated-in-Australia* version was used both for the initial surveys in 1999-2001 and the re-interviews in 2005. The changes made to the original Swedish questionnaire included deletion of one statement that did not appear relevant in the Australian environment and expansion of the Likert response value scale from one to five to one to seven. This latter change was well validated in the responses. Respondents regularly used all scores from one to seven. The Likert seven-value opposing statements used to explore the case study company's status in relation to the eight Cornerstones have been included as Appendix A. The complete version of the questionnaire is available in one of the present authors' thesis (Yencken, 2005: 340). The analysis of the data in the comparative data questionnaire, based on the Davidsson/Klofsten Cornerstones and Business Platform (Davidsson and Klofsten, 2003), had a similar objective. It measured how close a business was to reaching its Business Platform.

Klofsten (1998: 7) defined the Business Platform as meaning 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":

The likelihood that a company would generate sustainable growth was determined by its ability to satisfy the eight pillars of Klofsten's Business Platform (Klofsten and Davidsson, 2001) and how this ability varied over time. A key output or dependent variable in each individual case study was how it scored (on a scale 1 to 7) on each of these pillars and against some average of these scores. The eight pillars included:

The firm's development process:

- IDEA The formulation and clarification of the idea behind the firm
- PRODUCT The development of finished products accepted by customers
- MARKET *The definition of the market, .eg niche large enough to be profitable*
- ORGANISATIONAL DEVELOPMENT

Actors close to the firm, such as the founders, the CEO and board members:

- CORE GROUP EXPERTISE. Market knowledge, marketing and sales expertise, technical expertise
- PRIME MOVER & COMMITMENT The actors' driving force and commitment.

External supply of resources in supplementary areas necessary to the firm:

- CUSTOMER RELATIONS These relations are important for all firms since they are the source of revenue
- OTHER FIRM RELATIONS A variety of different relationships; particularly important are suppliers of financial backing and supplementary knowledge

The mean scores in for the Swedish sample of 119 established knowledge based companies have been shown as Figure1. A Likert five-value scale was used for this survey.

For the Australian sample, data on the eight Cornerstones identified by Klofsten were obtained using Likert seven-value opposed statements in the comparative data questionnaire (Appendix A). Mean values of these scores for the set of statements relating to each Cornerstone have been shown in Table 1 and Figure 2. The table has only shown scores at the time of questionnaire completion. The individual case study reports also included scores *Two years ago* (Yencken, 2005).

Comparison between the mean Cornerstone scores achieved by the sample of established Swedish companies (median age seven years) based on a five-value scale (Figure 1) and those for the Australian companies based on a seven-value scale (Figure 2) are very similar except for the two Cornerstones that related to established relationships The low scores for Customer relations in the Australian data arose because many of the companies had not yet made their first sale. The low scores for *Other relationships* generally related to problems with finance availability. By comparison, for a well established publicly listed Australian pharmaceutical company (Company X in Table 1), the mean Cornerstone score was 6.54 (Figure 3). Only one case came close to this score, Case Number One with a mean Cornerstone score of 6.24 (Figure 4).

Interview data were collected from fifteen such companies in Australia and from two in Scotland. Three other companies were included in the qualitative research sample, Case Number Three for reference as a typical NTSF entrepreneurial start-up that had had no direct relationships with a university or other public research agency parent, and two others, Numbers Four and Eight, which turned out not be spin-off companies but rather companies that had used in one case a university and in the other a CRC as their contracted technology source. The key details of this sample of companies segmented as indicated earlier have been summarised in Table 2-4.

For the whole sample, only one company (no. 11 average score 5.39) that had an average Cornerstone score of over five failed, while there was only one company that had an average score less than 5.0 (no.14 with average score 4.32) and was still active. However this last

company was the oldest company in the sample and it had still not at the time of interview made its first sale. The data therefore suggests that companies with an average Cornerstone score of less than 5.0 after two to three years of existence are vulnerable. Based on these data and having regard to the small sample involved, it is a reasonable but tentative conclusion that the Klofsten Business Platform approach can be used as an effective self-diagnostic tool for New Technology-based Small Firms, not just well established knowledge-based firms as originally tested by Davidsson and Klofsten (2003).

Validation of the questionnaire responses

Only one individual in each company completed the questionnaire. The interview response data were used to check and validate the relevance and accuracy of these responses. The interview transcripts showed no significant divergences from those suggested by the Business Platform questionnaire. A possible explanation for the high score for Case No. 11, which was later taken over as having a need for new management, may have been related to a change in management immediately after the interview.

Segmentation of cases

The unit of analysis has been new technology based ventures, particularly those that are spin-off companies arising from universities or other public research providers where there is an ongoing intellectual property link back to the parent research provider. Bhavé (1994: 225) drew attention to the importance of selecting samples of cases on taxonomic dimensions rather than by the usual more convenient dimensions of industry, size, technology or region. The sample here was theoretically selected on taxonomic dimensions, with NTSF class, technology and type of spin-off parent as the primary dimensions. It included seventeen cases where there were adequate qualitative interview derived data for effective triangulation. The sample included four different classes of NTSFs:

A. Opportunity driven entrepreneurs, the classical domain of entrepreneurship research.

B. Direct Research Spin-off companies where there had been an ongoing intellectual property link with and often staff transferred across from the parent research provider (Upstill and Symington, 1999; Stankiewicz, 1994; Thorburn, 1997; Hindle and Yencken, 2004).

1. *Product oriented mode (PO) companies*, organised around a well developed product (or process) concept and focussed on the advanced development, production and marketing of that product (or process).
2. *Service-oriented mode companies*, similar to product oriented mode companies but developed around a well-developed service concept.
3. *Technology asset oriented mode (TA companies)*, concerned with the development of technologies which are subsequently commercialised through spinning-out new firms, licensing, joint ventures or other types of alliance rather than by manufacturing products or delivering services

There were four classes of spin-off parent research suppliers: universities with large, universities with medium to small research profiles, Cooperative Research Centres and CSIRO as a public research agency.

The segmentation of the companies as shown in Tables 2-4, was based on Bhidé's three types of new ventures: opportunity driven entrepreneurs, venture capital driven and corporates. The classification was based on the increased level of planning and resourcing by the parent

before the company was cut loose from this parent that was most typical for the corporates (Table 4).

Survival of the fittest

In this section of the paper, available data on the survival rate of spin-offs from universities and other publicly funded research agencies has reviewed to allow comparisons with the survival rates of the spin-off companies involved in the case studies reported earlier.

The Australian Bureau of Statistics has only once previously, for FY 1995/96, published data on cumulative business exit rates and survival rates (*Business Exits Australia*, ABS Cat. No. 8144.0). The 1995/96 data showed a survival rate after five years of 65 per cent both overall and for small companies and after ten years 52 per cent overall. New data (ABS Cat. No. 8160.0) were released on 23 June 2005 for FY 2000/001, 2001/02 and 2002/03. These data only included survival rates over periods of one and two years from 2001-02. Over the two year period from 2001-02 to 2003-04 the survival rate for private companies was 94.8 per cent and for public companies 72.3 per cent. By sector, survival rates for Manufacturing were 87.9 per cent and for Communication Services 82.6 per cent. Unfortunately no more up-to-date data for longer term survival rates in Australia have been produced.

Overseas data

The only overseas data on survival rates for *academic spin-off companies* has been given by Mustar (1997: 41) for France. His data showed a survival rate for such spin-offs after five years of 75 per cent by comparison with the survival rate for all new companies in France of 50 per cent over five years.

It can be seen therefore that the survival rate [*after five years*] is very high: continued trading for five out of every six firms and the same legal structure for three out of four firms.

He also drew attention to the importance of networking. For the group of firms that had very close links with R&D and which had entered into cooperation agreements with other French or foreign firms, ten had between 50 and 100 employees and two had staffs of 150 and 260 respectively. 'In the group of firms without a network, half the enterprises had disappeared' (p.41).

Australian data

An earlier Australian survey of university spin-offs (Yencken and Gillin, 2001:16) suggested a survival rate of 57 per cent over three to five years and 87 per cent over two to three years (Table 5). These data on survival rates were not complete as not all companies could be contacted.

More recently for this paper the current status of all new spin-off companies established in FY 2000, as listed in the Australian National Survey of Research Commercialisation Year 2000 (ARC/NEMIC/CSIRO, 2002) was reviewed by direct contacts with the companies and/or their research provider parents. For the first time the data in this report allowed a more systematic exploration of survival rates of spin-offs that originated in universities and CSIRO, the Australian Government funded research agency. It has been possible to establish the present status of all these companies five years after their establishment. Two companies were excluded as being technology transfer vehicles rather than direct research spin-offs. The findings have been summarised in Table 6.

The survival rates for the Australian university spin-off companies established in 2000 over five years to 2005 have been 68 per cent for the university spin-offs with three (10 per cent)

under new ownership following trade sales as liquidity events. Seven companies (22 per cent) have been liquidated and three companies (10 per cent) are not actively trading. The survival rate has been lower than that suggested by the earlier survey of Australian university spin-offs shown in Table 6 for a shorter period of three years (Yencken and Gillin, 2001). All the CSIRO spin-offs established in the year 2000 were still trading with six (50 per cent) under new ownership. The survival rate for the university spin-offs is thus comparable with that for all new ventures established in 1995/96 in the ABS data (ABS Cat. No. 8144.0 *Business Exits Australia*), while that of the CSIRO spin-offs established in 2000 is higher.

Conclusions

Based on the data from the case studies and having regard to the small sample involved, it is a reasonable but tentative conclusion that the Klofsten Business Platform approach can be used as an effective self-diagnostic tool for New Technology-based Small Firms, not just well established knowledge-based firms as originally tested by Davidsson and Klofsten (2003).

It remains to compare the survival rates of the companies involved in the case studies reported earlier, with a reminder that this sample was theoretically sampled for a wide range of technologies and parents and is not a statistically valid random sample. The survival rates for the three groups as shown in Tables 2-4 have been:

Group A: Opportunity driven entrepreneurial ventures

Four out of seven companies (57 per cent) in this group aged 24 to 72 months had survived and were active.

Group B: Venture capital driven companies

Neither of the two companies in this group had survived but the intellectual property from one of them was still being developed after the sale of the original company. In both cases there was evidence of a lack of an effective champion. In one case the company was formed when a deal with a major pharmaceutical company fell through when it withdrew from that field of medication.

Group C: Corporate style spin-offs

Nine of the twelve companies in this group, ranging from 13 to 180 months in age, had survived and were active. One of these had been the subject a profitable liquidity event, a trade sale.

While the numbers are small, these survival rates—57 per cent for Group A and 75 per cent for Group C—support the findings from the qualitative research interviews that a higher survival rate might be expected from spin-offs that been effectively planned and well nourished with resources before being cut loose from the parent, that is the spin-offs in Group C that met Bhidé's (2000) description of corporate style spin-off ventures. The Group C survival rate was also noticeably higher than the underlying survival rate indicated by ABS Business Exits 1995-96 data. The qualitative interview data for the two Group B companies also showed the importance of a commercially oriented champion and the likely outcomes where this does not occur.

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Appendix A

Statements in Business Platform Questionnaire

A number of statements follow which deal with the company and its internal and external relations. These statements are placed in opposite pairs. The statements are formulated in the present, but are always concerned with two timelines: *how things are right now*, and *how they were two years ago*.

Please read the two statements. Score the company on the scale between the two according to which statement fits best. Choose 1 if the left-hand statement **fits completely**, or 7 if the right-hand statement **fits completely**. If the situation of the company was/is right in the middle, choose 4. If it doesn't fit completely, but leans more towards one or the other statement, choose 3 or 5.

Please circle one number in each row.

Ideas

Ideas

Ideas and opportunities on which the company's activities should be based are not well specified.	There is a clear understanding on which ideas and opportunities the company's activities should be based.
Q.1. Now: 1 2 3 4 5 6 7	
Q.2. Two years ago: 1 2 3 4 5 6 7	
There is uncertainty about which ideas and opportunities should have priority for development and investment.	Everybody in the company is completely clear about which ideas and have priority for development and investment
Q.3. Now: 1 2 3 4 5 6 7	
Q.4. Two years ago: 1 2 3 4 5 6 7	
It is unclear which needs of which type of customer the company's new ventures can satisfy.	It is completely clear which needs of which type of customer the company's new ventures can satisfy.
Q.5. Now: 1 2 3 4 5 6 7	
Q.6. Two years ago: 1 2 3 4 5 6 7	
It is rather difficult to say what is special and unique about the company's development ideas.	It is completely clear what is special and unique about the company's development ideas.
Q.7. Now: 1 2 3 4 5 6 7	
Q.8. Two years ago: 1 2 3 4 5 6 7	

Products

There is no developed, market-ready product.	There is a well-developed product that is completely ready to sell.
Q.9. Now: 1 2 3 4 5 6 7	
Q.10. Two years ago: 1 2 3 4 5 6 7	
No user has tested the product.	The product has been tested with various possible users.

Q.11. Now:	1	2	3	4	5	6	7
Q.12. Two years ago:	1	2	3	4	5	6	7

No identified customer can confirm the product's usefulness.					Various identified customers can confirm the product's usefulness.		
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Q.13. Now:	1	2	3	4	5	6	7
Q.14. Two years ago:	1	2	3	4	5	6	7

The Market

The company has no limitations on the customer categories to which it should sell.					The company sells to a very specific customer category.		
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Q.15. Now:	1	2	3	4	5	6	7
Q.16. Two years ago:	1	2	3	4	5	6	7

It is difficult to say what characterises the company's customers who have the greatest likelihood of purchasing from the company..					There are a number of criteria that define exactly the potential customers who have the greatest likelihood of purchasing from the company.		
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Q.17. Now:	1	2	3	4	5	6	7
Q.18. Two years ago:	1	2	3	4	5	6	7

The usefulness that the company's products can give to customers is built on assumption from within the company.					Usefulness of the product to the customer is fully specified after contact with the customer.		
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Q.19. Now:	1	2	3	4	5	6	7
Q.20. Two years ago:	1	2	3	4	5	6	7

The market is cultivated primarily through random contacts.					The company works with a structured strategy for market cultivation.		
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Q.21. Now:	1	2	3	4	5	6	7
Q.22. Two years ago:	1	2	3	4	5	6	7

The company cultivates a large number of customer categories.					The company makes a clear prioritisation of certain customer categories over others		
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Q.23. Now:	1	2	3	4	5	6	7
Q.24. Two years ago:	1	2	3	4	5	6	7

Organisation

All staff do most types of tasks.					All staff have clearly demarcated tasks.		
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Q.25. Now:	1	2	3	4	5	6	7
Q.26. Two years ago:	1	2	3	4	5	6	7

There are no specific organisational units.					The company can clearly be described in an organisational chart.		
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Q.27. Now:	1	2	3	4	5	6	7
Q.28. Two years ago:	1	2	3	4	5	6	7

The staff were recruited from the founder's personal network of contacts					Staff in the company were deliberately recruited for their special skills.		
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Q.29. Now:	1	2	3	4	5	6	7
Q.30. Two years ago:	1	2	3	4	5	6	7
The company's activities derive from reactions to situations and events.				There is disciplined and goal-oriented work to develop the company.			
Q.31. Now:	1	2	3	4	5	6	7
Q.32. Two years ago:	1	2	3	4	5	6	7
Everybody in the company has responsibility for most of the activities involved.				There is a clear division of authority and responsibility in the company.			
Q.33. Now:	1	2	3	4	5	6	7
Q.34. Two years ago:	1	2	3	4	5	6	7
Expertise and competencies							
The company lacks knowledge about the markets for its products.				The company is very well supplied with knowledge about the markets for its products			
Q.35. Now:	1	2	3	4	5	6	7
Q.36. Two years ago:	1	2	3	4	5	6	7
The company lacks expertise in marketing and sales				The company is very well supplied with expertise in marketing and sales			
Q.37. Now:	1	2	3	4	5	6	7
Q.38. Two years ago:	1	2	3	4	5	6	7
The company lacks the specific competencies needed in its field.				The company is very well supplied with Peak expertise in its field.			
Q.39. Now:	1	2	3	4	5	6	7
Q.40. Two years ago:	1	2	3	4	5	6	7
There is a lack of leadership experience and expertise in the company.				The company is very well supplied with leadership experience and expertise.			
Q.41. Now:	1	2	3	4	5	6	7
Q.42. Two years ago:	1	2	3	4	5	6	7
The technical expertise that exists in the company doesn't cover its needs for the future.				The technical expertise that exists in the completely covers its needs for the future.			
Q.43. Now:	1	2	3	4	5	6	7
Q.44. Two years ago:	1	2	3	4	5	6	7
Every staff member is responsible for the development of his own expertise and competencies.				There is a planned and systematic development of expertise and competencies for each individual staff member.			
Q.45. Now:	1	2	3	4	5	6	7
Q.46. Two years ago:	1	2	3	4	5	6	7

Driving Forces

<p>The founder's foremost aim with the company is to create employment for himself and possibly some friends</p>	<p>The founder's foremost aim with the company is to "surprise the world" and build a growing company.</p>
Q.47. Now: 1 2 3 4	5 6 7
Q.48. Two years ago: 1 2 3 4	5 6 7
<p>The founder sees the company as one of several income creating opportunities.</p>	<p>The founder is fully focused on a future as a business person within the company.</p>
Q.49. Now: 1 2 3 4	5 6 7
Q.50. Two years ago: 1 2 3 4	5 6 7
<p>Commitment by people involved to the company could be characterised as modest.</p>	<p>Everyone involved has a very strong commitment to the company.</p>
Q.51. Now: 1 2 3 4	5 6 7
Q.52. Two years ago: 1 2 3 4	5 6 7

Customer Relations

<p>The company has not yet sold any products or services to any customers.</p>	<p>The company has a large number of customers who have bought its products or services.</p>
Q.53. Now: 1 2 3 4	5 6 7
Q.54. Two years ago: 1 2 3 4	5 6 7
<p>It is not likely that any customers will make repeat purchases.</p>	<p>The company's customers regularly make repeat purchases.</p>
Q.55. Now: 1 2 3 4	5 6 7
Q.56. Two years ago: 1 2 3 4	5 6 7
<p>It is difficult to make sales to new customers</p>	<p>The company regularly brings in lots of new customers</p>
Q.57. Now: 1 2 3 4	5 6 7
Q.58. Two years ago: 1 2 3 4	5 6 7
<p>Customers are rarely satisfied.</p>	<p>Customers are always very satisfied.</p>
Q.59. Now: 1 2 3 4	5 6 7
Q.60. Two years ago: 1 2 3 4	5 6 7
<p>One person directs all of the customer contacts.</p>	<p>Customer contacts are spread among all of the staff.</p>
Q.61. Now: 1 2 3 4	5 6 7
Q.62. Two years ago: 1 2 3 4	5 6 7

Other Relationships

<p>There are no relationships with banks and investors.</p>	<p>There are good and firm relationships with banks and investors.</p>
Q.63. Now: 1 2 3 4	5 6 7
Q.64. Two years ago: 1 2 3 4	5 6 7

The company is lacking in capital.				The company has access to all the capital that it needs for the company's present and likely future activities.			
Q.65. Now:	1	2	3	4	5	6	7
Q.66. Two years ago:	1	2	3	4	5	6	7
There are no external contacts which can add to the company's "credibility" in the eyes of the market,				The company has good contacts with government, which strengthen its "credibility" in the market.			
Q.67. Now:	1	2	3	4	5	6	7
Q.68. Two years ago:	1	2	3	4	5	6	7
The company has no external contacts or sources who can bring to the company extra management expertise				The company has good external contacts and sources that bring to it extra.management expertise.			
Q.69. Now:	1	2	3	4	5	6	7
Q.70. Two years ago:	1	2	3	4	5	6	7

Table 1 Australian case study sample: Cornerstone mean scores Now (at the time of questionnaire completion)

No.	Idea	Product	The Market	Organisation	Expertise	Driving forces	Customer relations	Other relations	Mean score
1	6.00	7.00	6.00	6.80	5.83	6.33	5.20	6.75	6.24
2	5.00	5.33	5.00	5.00	4.50	6.67	4.40	4.75	5.08
3	6.25	5.33	4.80	4.80	4.33	6.33	3.80	4.00	4.96
4	4.75	6.33	5.60	5.20	5.17	6.00	5.20	3.50	5.22
5	6.00	5.00	6.20	7.00	5.67	5.00	2.80	5.25	5.36
6	6.75	6.67	7.00	5.40	5.33	5.00	2.80	6.75	5.71
7	4.50	1.00	3.20	5.80	4.67	6.33	3.40	5.50	4.30
8	6.00	5.00	6.60	2.20	3.50	5.67	1.00	4.75	4.34
9	3.50	4.67	5.80	5.20	4.17	5.67	4.60	6.00	4.95
10	No data								
11	6.50	5.33	5.60	6.40	4.50	6.00	3.80	5.00	5.39
13	6.00	4.33	4.80	4.80	4.33	2.67	1.80	4.50	4.15
14	6.25	1.33	4.00	6.20	4.83	6.67	1.80	3.50	4.32
15	5.25	7.00	6.60	3.60	4.83	3.33	3.60	1.50	4.46
16	5.00	5.33	5.60	5.40	5.00	6.33	4.20	4.50	5.17
18	7.00	6.33	6.80	6.20	6.00	4.67	2.40	5.25	5.58
19	3.50	4.33	5.20	5.60	3.67	3.00	3.80	3.75	4.11
20	5.75	7.00	4.80	6.00	5.50	5.67	5.60	4.25	5.57
22	4.75	3.67	4.60	4.20	2.33	6.67	3.80	1.25	3.91
24	5.25	6.33	6.20	6.00	4.67	4.67	4.60	3.50	5.15
25	5.50	6.33	5.40	6.40	5.17	5.67	2.80	5.00	5.28
27	7.00	7.00	6.00	5.60	5.00	6.00	4.60	4.00	5.65
28	6.00	7.00	6.40	4.60	5.50	4.67	3.80	3.25	5.15
29	5.00	1.67	4.80	3.80	3.00	5.33	1.00	2.75	3.42
Cornerstone mean	5.54	5.19	5.52	5.31	4.67	5.41	3.51	4.32	4.93
Company X(1)	6.75	7.00	6.80	6.60	6.00	6.67	6.00	6.50	6.54

Note (1): Company X was an established publicly listed pharmaceutical company.
Source: Case study reports (Yencken, 2005).

Table 2 Interview comparisons: Group A Opportunity driven entrepreneurial ventures

No.	Product or activity	Parent	Date of incorporation	Age at case study - months	Mean Corner - stone score	Age at recontact - months	Status June 2005	Comment
4	Asset location hardware and software	University, medium / small	17/11/1995	72	4.93	NA	Ceased trading	
6	Glaucoma detection instrument	University, large	29/10/1999	37	5.70	67	Active	
8	Specialised light alloy billets	CRC	1994	100	4.93	NA	No longer trading	Voluntary liquidation due to failure to obtain START grant
10	Robotic seabed drill	University, large	2/2/2001	15	No response	NA	Active	
15	Neurological evaluation of advertising	University, medium / small	16/11/1998	51	4.46	NA	Liquidated	First sold to US company.
27	Waste water filtration	University, medium/small	7/12/98	44	5.65	77	Active	
28	Minituarised reflux pH probe	University, medium/small	4/7/2000	24	5.15	57	Active	

Source: Case studies of spin-off companies from universities and other public research agencies (Yencken, 2005).

Table 3 Interview comparisons Group B Venture capital driven spin-off ventures

No.	Product or activity	Parent	Date of incorporation	Age at case study (months)	Mean Corner - stone score	Age at recontact (months)	Status June 2005	Comment
11	Nasal filter and particle measure	University, large	21/011998	51	5.39	NA	Liquidated	
13	Blood clotting factor	University, large	28/2/97	62	4.15	NA	Taken over by another biotechnology company in 2004.	Increased potential product range

Source: Case studies of spin-off companies from universities and other public research agencies (Yencken, 2005)

Table 4 Interview comparisons: Group C: Corporate

No.	Product or activity	Parent	Date of incorporation	Age at case study (months)	Mean Cornerstone score	Age at re-contact	Status June 2005	Comment
1	Java encryption software	CRC	21/12/2000	12	6.24	NA	Sold in trade sale in 2003.	
2	Polymer adhesion	CSIRO	May 2002	Awaiting incorporation	4.91	NA	No longer trading	Voluntary liquidation March 2004
5	Pain killer drugs	University, large	13/2/98	14	4.91	87	Active	
7	Stem cell therapy	University, large	12/7/2001	7	4.30	46	Active	Now based in Singapore
9	X-ray imaging	CSIRO	12/11/1996	64	4.95	NA	No longer active in Australia	Sold to overseas company
14	Fuel cells	CSIRO	27/2/1992	123	4.32	NA	Active	
16	Biomedical polymers	CRC	8/7/1997	62	5.17	NA	Active	Sold to overseas company
18	Diagnostics	CRC	1987	180	5.58	NA	Active	Listed public company
20	Driver vision assistance	University, large	24/7/2000	25	5.57	58	Active	
24	Pig growth improvement	CRC	1/6/2001	13	5.15	47	Active	
25	Plastic fibre optics	CRC	2/5/2002	15	5.28	NA	Active	Set up by CRC spin-off
29	Very large scale data storage	University, small / medium	2/2/1999	42	3.42	NA	No longer trading	Failure due to high development cost and uncertainty about the technology

Source: Case studies of spin-off companies from universities and other public research agencies (Yencken, 2005)

Table 5 Status of Direct Research Spin-offs by year of establishment from Survey of Australian Universities

Count of Company name							
Year in which established		A Actively trading	B Not trading at present	NE No longer exists	NK Not known	S Sold in a trade sale	Grand Total
Pre 1995	No.	22	3	2	24	3	54
	%	40	6	4	44	6	100
1995-97	No.	18	4	0	2	3	27
	%	67	15	0	7	11	100
1998-2000	No.	68	8	0	0	2	78
	%	87	10			3	
2001	No.	14	2	0	0	0	16
	%	87	13	0	0	0	100
Grand Total	No.	122	17	2	26	8	175
	%	70	10	1	15	4	100

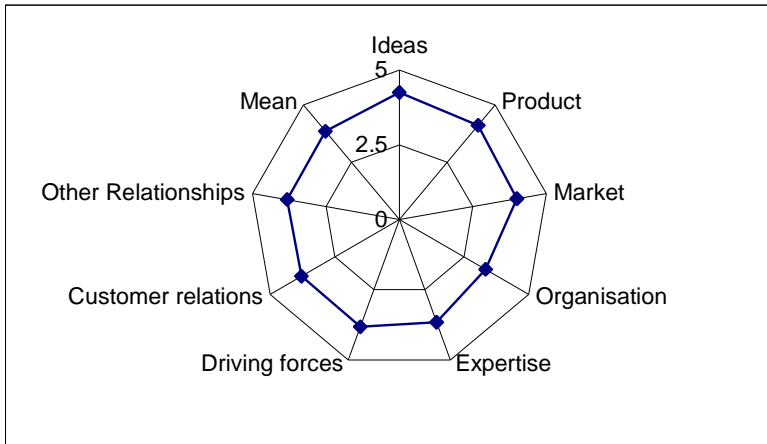
Source: Yencken and Gillin, 2002:16.

Table 6 Survival rates for university and CSIRO spin-offs: FY 2000 to FY2005

Status / Parent		Active	Active in new ownership	Liquidated	Inactive	Total
Universities	No.	18	3	7	3	31
	%	58	10	22	10	100
CSIRO	No.	6	6			12
	%	50	50			100

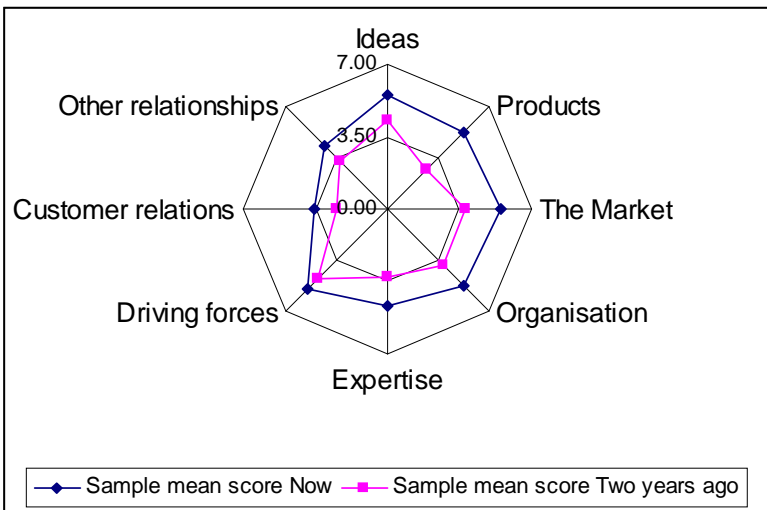
Source: Review by the present authors of spin-off companies listed in ARC/NHMRC/CSIRO, 2001

Figure 1 Cornerstone scores in Swedish survey (Maximum score 5)



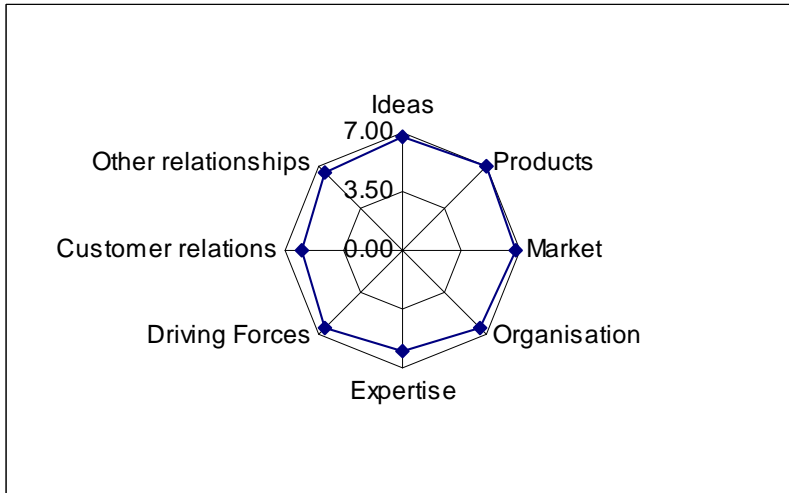
Source: Data from Davidsson and Klofsten, 2003:14.

Figure 2 Sample mean scores for Business Platform Cornerstones



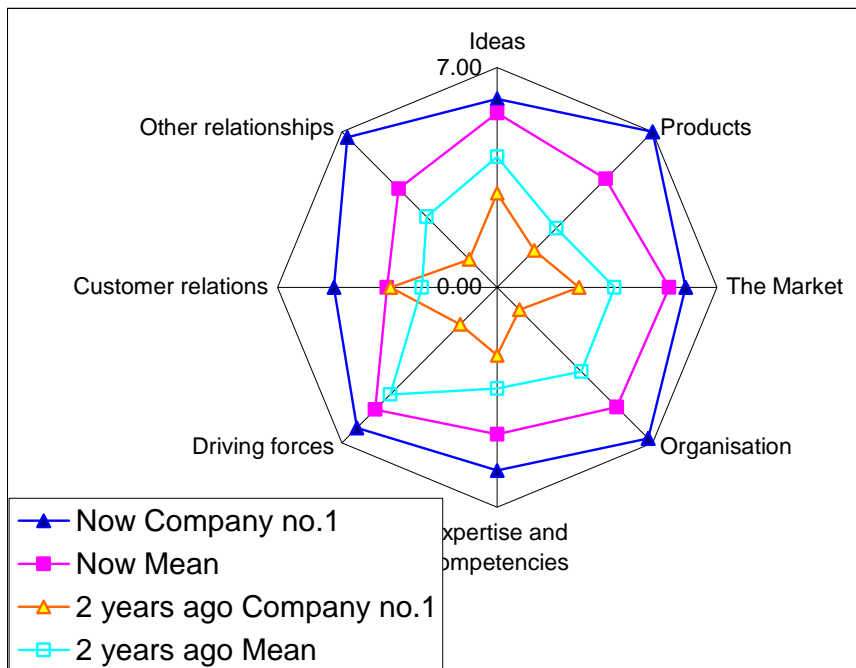
Source: Case studies of spin-off companies (Yencken, 2005:149)

Figure 3 Cornerstone mean scores: Established company 'X'



Source: Data collected by present authors.

Figure 4 Cornerstones mean scores: Company No.1



Source: Case studies of spin-off companies (Yencken, 2005)