VICTORIA UNIVERSITY OF WELLINGTON

GRADUATE SCHOOL OF BUSINESS AND GOVERNMENT MANAGEMENT

WORKING PAPER SERIES 8/93

Criteria used by venture capitalists:

a cross country analysis.

Russell M. Knight *

and

David W. Gilbertson * *

- * School of Business Adminstration The University of Western Ontario Canada
- * * The Management Group, Victoria University of Wellington Phone +64 (4) 471 5381 Fax +64 (4) 471 2200 e-mail: daigilb@matai.vuw.ac.nz

September 1994

ISSN 0114 7420 ISBN 0 475 11466 3

Criteria Used by Venture Capitalists: A Cross Cultural Analysis

By

Russell M. Knight,
School of Business Administration
The University of Western Ontario
Canada.

David W. Gilbertson,
Graduate School of Business and Government Management
Victoria University
New Zealand.

Abstract

This paper describes a cross cultural survey of international venture capitalists to investigate the criteria they use to evaluate venture proposals. The criteria were taken from a U.S. survey of venture capital firms and the results are compared and contrasted with the original U.S. responses. The study was done in Canada and the Asia Pacific region and the responses are compared to study differences and similarities between responses from various regions. The similarities of responses are quite striking, although several differences are apparent, such as the difference in emphasis on high technology.

Keywords

Venture capital; cross cultural; decision criteria

Introduction

The idea for this study had occurred to the authors and been discussed with Canadian and New Zealand venture capitalists before, but the problem was how best to collect a composite list of criteria used to make funding decisions, since even the venture capital firms could not agree. This problem was solved when a U.S. study was published which surveyed one hundred U.S. venture capital firms using twenty four different criteria, grouped under five broad classifications (1). We decided to replicate it in Canada and the Asia Pacific region.

The results should be important not only to venture capitalists in comparing their relative ranking of criteria to those of others, but to businesses and entrepreneurs seeking capital from venture capitalists. In fact, the two primary research objectives of the study were:

- (a) to provide venture capitalists with a summary of the current criteria used by the venture capital community around the world, and
- (b) to give entrepreneurs seeking capital an idea of the key criteria used by these funding sources and how they vary around the world.

Research Methodology

The original U.S. study by MacMillan et al (1) surveyed fourteen U.S. venture capitalists to develop the twenty four criteria reported in Exhibit 1. The questionnaire using these criteria was then completed by one hundred members of the American National Venture Capital Association and respondents from a U.S. venture capital directory.

A similar survey for Canada (2) was made feasible by using the membership of the Canadian Association of Venture Capitalists. But this group numbered fewer than fifty firms, so it was decided to also survey those firms registered as Small Business Development Corporations (SBDCs) in Ontario to give a reasonable sample response. A separate questionnaire was prepared for each group, differing only in its cover letter and the title.

The usable responses totalled thirty one venture-capital firms and fifty SBDCs. Many of the latter responded that they were not actively investing or had invested in only one firm thus far. Therefore, they did not feel comfortable completing the questionnaire and may provide a bias in the Canadian data. (3)

SBDCs are firms licensed by the Ontario Government to make investments in small businesses for which the government provides a 30% refund incentive in the form of a direct grant for individuals or a tax incentive for corporations. The SBDCs in Canada are similar to the Small Business Investment Corporations so common on the early venture capital scene in the U.S. SBDCs are discussed in detail in a separate paper (4) and the Association of Canadian Venture Capital Companies publish information on their activities (5).

The final stage of the study occurred while one author (Knight) was visiting the other author's (Gilbertson's) university in New Zealand. Perhaps the most comprehensive examination of venture capital in New Zealand is Norman's paper (6), but he concludes that currently venture capital is "relatively dormant in New Zealand and barely alive in Australia".

The Criteria

The primary criteria used were those initially developed for the U.S. study, shown in Exhibit 1. The scale used in the questionnaire to rank these criteria included four points: (1) irrelevant, (2) desirable, (3) important and (4) essential.

The criteria were grouped into five different categories:

- (1) The entrepreneur's personality.
- (2) The entrepreneur's experience.
- (3) Characteristics of the product or service.
- (4) Characteristics of the market.
- (5) Financial considerations.

In addition, the respondents were invited to add further criteria of their own in each category and to rank them with the other items.

Survey Results

The average responses for each group are shown in Exhibit 1, including U.S. venture capitalists, Canadian responses and responses from the Asia Pacific region. Differences are compared between the U.S. group, Canadian and Asia Pacific responses, since sample sizes were closer, being 100, 81 and 53, respectively. These samples were compared by using non-parametric tests and significant differences (at the 0.05 level) are marked with an asterisk.

Exhibit 2 illustrates the relative ranking of the 10 most important criteria for all three samples. These relative rankings are remarkably similar, with several shifts within the ordering, but 13 criteria include the top 10 of each group. Exhibit 3 lists the main extra criteria suggested by Canadian respondents and those of Australasian firms. Extra criteria beyond the original 24 suggested by American firms were not reported in the original study.

Evaluation of Results

In evaluating the overall results shown in Exhibit 1, perhaps the most interesting obervation is their similarity, especially in the sections on "the entrepreneur's personality" and "the entrepreneur's experience".

Exhibit 1

Venture Capital Criteria and Average Responses:
The Entrepreneurs Personality

Scale Used:	Irrelevant 1	Desirable 2	Important 3	Essential 4
I. THE ENTREPRENEUR'S PERSONALITY		American Average Responses (100)	Canadian Average Responses (81)	Asia Pacific Average Responses (53)
The entrepreneur must:				
Be capable of sustained intensive effort.		3.60	3.56	3.74
	Be able to evaluate and react to risk well.		3.31	3.45
3. Be articulate in discussing his ve	3. Be articulate in discussing his venture.*		2.74	2.77
4. Attend to detail.		2.82	2.68	2.77
5. Have a personality compatible with r	nine.	2.09	1.99	2.19
Total Personality		2.99	2.86	2.98

^{*} Denotes significant difference at the 0.05 level.

Exhibit 1 (cont'd)

Scale Used:	Irrelevant 1	Desirable 2	Important 3	Essential 4
II. THE ENTREPRENEUR'S EXPERIENCE		American Average Responses (100)	Canadian Average Responses (81)	Asia Pacific Average Responses (53)
The entrepreneur mus	t:	3.58	3.68	3.57
Be throughly famile market targeted		3.58	3.68	3.57
2. Have demonstrated leadership ability in the past.*		3.41	3.01	2.98
3. Have a track record relevant to the venture. *		3.24	2.68	2.92
4. Be referred to me by a trustworthy source.		2.03	2.10	2.22
5. Be someone with whose reputation I am already familiar.		1.83	1.50	1.72
Total Experience		2.82	2.59	2.68

^{*} Denotes significant difference at the 0.05 level.

Exhibit 1 (cont'd)

Scale Used:	Irrelevant 1	Desirable 2	Important 3	Essential 4
III. CHARACTERISTICS OF THE PRODUCT OR SERVICE		American Average Responses (100)	Canadian Average Responses (81)	Asia Pacific Average Responses (53)
The product or service	: :			
1. Is proprietary or ca otherwise be pro		3.11	2.28	2.64
2. Enjoys demonstrate market acceptan		2.45	2.66	2.81
3. Has been developed of a functioning		2.38	3.05	2.92
4. May be described a "high tech".*	s	2.30	1.25	1.42
Total Characteristics		2.49	2.31	2.45

^{*} Denotes significant difference at the 0.05 level.

Exhibit 1 (cont'd)

Scale Used:	Irrelevant 1	Desirable 2	Important 3	Essential 4
IV. CHARACTERISTICS OF THE MARKET		American Average Responses (100)	Canadian Average Responses (81)	Asia Pacific Average Responses (53)
1. The target market enjoys a significant growth rate.*		3.34	2.86	3.15
2. The venture will stimulate an existing market.		2.43	2.37	2.52
3. The venture is in an industry with which I am familiar.*		2.36	1.81	2.10
4. There is little threat of competition during the first three years.		2.37	2.40	2.42
5. The venture will creat a new market.*	5. The venture will create a new market.*		1.63	2.17
Total Market		2.46	2.21	2.47

^{*} Denotes significant difference at the 0.05 level.

Exhibit 1 (cont'd)

Scale Used:	Irrelevant 1	Desirable 2	Important 3	Essential 4
V. FINANCIAL CONSIDER	ATIONS	American Average Responses (100)	Canadian Average Responses (81	Asia Pacific Average Responses (53)
1. I request a return equal to at least 10 times my investment within 5 to 10 years.*		3.42	2.56	2.94
2. I require an investment that can be easily made liquid (eg. taken public or acquired).*		3.17	2.39	2.67
3. I require a return equal to at least 10 times my investment in at least 5 years.*		2.34	1.99	2.12
4. I will not be expected to make subsequent investments.*		1.34	1.92	1.72
5. I will not participate in later rounds of investment (requires my participation in the initial round of investment).*		1.20	1.56	1.24
Total Financial		2.29	2.08	2.14

^{*} Denotes significant difference at the 0.05 level.

However, differences soon begin to arise between Asia Pacific, Canadian, and U.S. respondents until the financial considerations section, where all criteria are significantly different in weight. Overall, U.S. respondents ranked nearly all criteria as more important than did Canadian and Asia Pacific respondents. On only four of the twenty four criteria were Canadian responses higher on average than U.S. and Asia Pacific responses. Of the criteria examined, and many others may be considered in the evaluation of new ventures, U.S. venture capitalists require higher ratings overall (on half of the variables) for a new venture than did Canadian or Asia Pacific sources. Asia Pacific responses are generally between the American and Canadian responses, with only eight variables higher and two lower. Canadian responses were lowest overall, for 16 of the 24 variables.

In the section on "the entrepreneur's personality", responses are remarkably similar across all groups. For the criterion "articulate in discussing his venture" there is a significant difference, with the U.S. average weighting being above those for Canadian and Asia Pacificgroups. Apparently, the ability to make a good oral presentation for the venture proposal is more important to U.S. sources. In the Asia Pacific, personality compatibility is significantly more important than in North America.

In the section on "the entrepreneur's experience", two of the five criteria show significant differences, with the U.S. responses placing more importance on

"demonstrated leadership ability in the past" and "a track record relevant to the venture".

For the "characteristics of the product or service" criteria, all four are significantly different, with the U.S. responses ranking higher on two criteria, "proprietary protection" and "high tech", and lower on "developed prototype" and "demonstrated market acceptance". Here are perhaps the most significant differences between the American and other responses, with others being much more emphatic about requiring a prototype, but much less interested in high technology.

For the "market characteristics", significant differences exist on three of the five criteria, "create a new market", "significant market growth" and "a familiar industry". In each case, U.S. responses average higher than others, except for "little competitive threat" for which responses are about equal, with the American slightly lower. Even here, it is the SBDCs which emphasize this criterion, while Canadian venture capitalists rate it lower than those in the U.S. Asia Pacific respondents rate "create a new market" higher overall than North Americans.

Finally, for the "financial considerations" category, all five criteria are significantly different in rating. The return criteria and the liquidity requirement show U.S. responses higher on average, while the last two investment criteria rank much lower for the U.S. Apparently, the U.S. firms seek a higher return and are more concerned over investment liquidity than other countries, but are less reluctant to get involved in later rounds on investment.

Relative Criteria Ranking

Exhibit 2 illustrates the relative ranking of the top criteria for U.S., Canadian and Asia Pacific samples.

Exhibit 2
Criteria Rated as Essential

Criterion	Position in U.S. ranking	Position in Canadian ranking	Position in Asia Pacific ranking
Capable of sustained intense effort	1	. 2	1
Throughly familiar with market	2	1	2
At least 10 times return in 5 to 10 years	3	11	7
Demonstrated leadership in the past	4	5	6
Evaluates and reacts well to risk	5	3	3
Significant market growth	6	6	4
Track record relevant to venture	7	8	8
Investment can be made liquid	8	13	12
Articulates venture well	9	7	11
Proprietary protection	10	15	13
Attends to detail	11	9	10
Demonstrated market acceptance	12	10	9
Will stimulate existing market	13	14	14
Prototype available	14	4	5

Most of the criteria have remarkably similar ratings in all lists, but there are some exceptions. U.S. respondents ranked the required return criterion "at least ten times return in 5-10 years" much higher (3rd) than the Canadian (11th) or Asia Pacific respondents (7th). This indicates higher expectations for returns by U.S. investors. Also, U.S. respondents were much more concerned over investment liquidity (8th) than were Canadians (13th) or Asia Pacific respondents (12th), and emphasised proprietary protection for a product more (10th) than did Canadians (15th) or Asia Pacific respondents (13th). However, Canadians and Asia Pacific respondents were much more concerned over whether a prototype was available (4th and 5th) than are those in the U.S. (14th). All groups rated "high tech" well down the scale, but it was the lowest overall criterion for Canadians and Asia Pacific respondents rated it irrelevant, while only one Canadian firm and no Asia Pacific respondents considered a "high tech" label as essential. Americans rated it as a much more desirable attribute.

Additional Criteria

Exhibit 3 illustrates additional criteria suggested by Canadian and Asia Pacific respondents. This shows the value of having respondents report their own criteria. It is not known if any of these criteria were suggested in the original U.S. study, but these extra criteria shown carried a high rating, close to 4, where they were suggested.

Exhibit 3 Addition Criteria Suggested by Canadian and Asia Pacific Respondents

I. THE ENTREPRENEUR'S PERSONALITY

Honesty, integrity Self confidence Doer Team Player

II. THE ENTREPRENEUR'S EXPERIENCE

Functional areas ability Technical understanding Willing to hire for weakness

III. CHARACTERISTICS OF THE PRODUCT OR SERVICE

Export potential Competitive advantage Economically justifiable

IV. CHARACTERISTICS OF THE MARKET

Known distribution system Sound Business plan Strong financial management

V. FINANCIAL CONSIDERATIONS

Entrepreneur's commitment Sound business plan Strong financial management Exit route Time frame Risk vs. return Other financing

VI. OTHER

General business conditions Trend of venture capital activity

Asia Pacific Comparison

Exhibit 4 illustrates a breakdown of average responses by area of the Asia Pacific. Although sample sizes are rather small in certain countries to be representative of the country's venture capital community, we will attempt to compare responses from individual countries with one another.

Exhibit 4
Criteria and Average Responses

Scale Used:	Irrelevant 1	Des	sirable 2		ortant 3	Essent 4	ial
I. THE ENTREPRENEUR'S PERSONALITY	S N.Z.	Aust	H.K.	Korea	Japan	Sing	Other
The entrepreneur must:							
Be capable of sustained intensive effort.	3.82	3.75	3.55*	3.75	4.00	4.00	3.88
2. Be able to evaluate and react to risk well.	3.45	3.25	3.55	3.50	2.67*	4.00*	3.38
3. Be articulate in discussing his venture.	3.00	3.75*	2.55	2.25	3.33	2.50	2.63
4. Attend to detail.	2.82	2.75	2.65	2.25*	3.67*	3.00	3.00
5. Have a personality compatible with mine.	2.73	2.25	1.95	2.50	2.67	1.50*	1.88
Total Personality	3.16	3.15	2.81	2.85	3.21	3.00	2.95

^{*} Denotes significant difference at the 0.05 level.

Exhibit 4 (cont'd)

Scale Used:	Irreleva 1	nt Des	sirable 2	Important 3		Essent 4	ial
II. THE ENTREPRENEUR'S EXPERIENCE	N.Z.	Aus	H.K.	Korea	Japan	Sing	Other
Be throughly familiar with the market targeted by venture.	3.55	3.00*	3.65	3.75	3.67	4.00	3.38
2. Have demonstrated leadership ability in the past.	2.91	3.00	3.15	3.00	3.00	2.50*	2.75
3. Have a track record relevant to the venture.	2.81	2.75	3.25*	2.25	2.33	3.00	2.75
4. Be referred to me by a trustworthy source.	2.27	1.75	2.25	2.50	2.67	1.50*	2.25
5. Be someone with whose reputation I am already familiar.	1.55	1.25*	1.75	1.75	2.00	1.50	1.75
Total Experience	2.61	2.35	2.83	2.15	2.73	2.50	2.58

^{*} Denotes significant difference at the 0.05 level.

Exhibit 4 (cont'd)

Scale Used:	Irreleva 1	nt De	sirable 2	Importa	int . 3	Essent 4	tial
III. CHARACTERISTICS OF THE PRODUCT OR SEI		Aus	H.K.	Korea	Japan	Sing	Other
The product or service:							
Is proprietary or can otherwise be protected.	2.45	2.75	2.65	2.25*	3.67	2.50	2.50
Enjoys demonstrated market acceptance.	2.54	2.75	3.10	2.50	2.00	2.00	3.00
3. Has been developed to the point of a functioning prototype.	3.09	3.75*	3.06	3.00	2.33	2.50	2.25
4. May be described as "high tech".	1.00*	1.50	1.15	2.00	2.00	1.50	2.13
Total Characteristics	2.27	2.69	2.49	2.44	2.50	2.13	2.47

^{*} Denotes significant difference at the 0.05 level.

Exhibit 4 (cont'd)

Scale Used:	Irreleva 1	nt De	sirable 2	Importa	int 3	Essent 4	ial
IV. CHARACTERISTICS OF THE MARKET	N.Z.	Aus	H.K.	Korea	Japan	Sing	Other
The target market enjoys a significant growth rate.	3.27	3.75	2.95	3.25	2.33*	3.00	3.63
2. The venture will stimulate an existing market.	2.45	2.75	2.37	2.50	3.00	1.50*	3.00
3. The venture is in an industry with which I am farmiliar.	2.36	2.50	2.00	1.50	2.00	1.50	2.25
4. There is little threat of competition during the first three years.	2.18	2.75	2.42	2.00	2.00	2.50	2.88
5. The venture will create a new market.	1.91	3.00	1.84	2.25	3.33	1.50*	2.63
Total Market	2.43	2.85	2.32	2.30	2.53	2.00	2.88

^{*} Denotes significant difference at the 0.05 level.

Exhibit 4 (cont'd)

Scale Used:	Irreleva 1	nt De	esirable	Importa	ınt 3	Essent 4	ial
V. FINANCIAL CONSIDERATIONS	N.Z.	Aus	H.K.	Korea	Japan	Sing	Other
1. I request a return equal to at least 10 times my investment within 5 to 10	3.00 years.	3.00	2.75	2.75	3.00	3.00	3.38*
2. I require an investment that can be easily made li (eg. taken public or acqui		2.25	2.55	3.53*	3.00	2.00*	3.00
3. I require a return equal to a least 10 times my investment in at least 5 years.	2.20 ears.	2.50	2.00	1.50	1.67	2.50	2.50
4. I will not be expected to make subsequent investm	1.55 ents.	2.00	1.95	1.50	1.67	1.50	1.50
5. I will not participate in later rounds of investment (req my participation in the ini round of investment).		1.25	1.33	1.00	1.33	1.00	1.38
Total Financial	2.09	2.20	2.12	2.00	2.13	2.00	2.35

^{*} Denotes significant difference at the 0.05 level.

In "the entrepreneur's personality" category, responses on the intensive effort issue rank within a half point across all countries, all at the top end of the scale. Responses vary more for the rest of the category, while Japanese respondents put much less emphasis on evaluating risk than anyone else, but more emphasis on all other aspects of "the entrepreneur's personality".

For "the entrepreneur's experience" category, U.S. responses are highest overall, and for three of five variables in this section. Japanese responses were highest of all on "familiarity with the market", but lowest on "referral by a trustworthy source". Australian responses were lowest of "all on familiarity with the market" and with "the entrepreneur's reputation".

For "characteristics of product or service", Japan is highest on "proprietary protection", but lowest on two other variables in this category. New Zealand investors are least "high tech" oriented and Australia is by far the most "prototype oriented" and prefers a "demonstrated market" most of all.

For "market characteristics", Japan is surprisingly low on "market growth" and "competition," but high on "new market creation", while the U.S. is high on "market familiarity". The other category (including respondents from India, Malaysia, Indonesia, Thailand and the Phillipines) rates highest on "market growth" and "absence of competition" dimensions.

For "financial considerations", the U.S. and Australia rank highest, along with the "other" category mentioned above, while Korea and Singapore rank lowest on their expectations.

Overall, however, American investors demand much higher ratings on all dimensions than investors from other countries.

Conclusions and Recommendations

Our overall conclusion is that Canadian and Australasian investors in new venture deals are more lenient in requiring fewer of the twenty four criteria than their U.S. counterparts. All groups have similar concerns and rank the criteria in a similar way, with a few exceptions. The "entrepreneur's personality and experience" rate much higher in general than the "product or market characteristics" or "financial considerations". This is especially true of the Canadian firms. The entrepreneur's staying power and ability to handle risks, familiarity with the target market, demonstrated leadership ability and a relevant track record all were ranked high by all respondents. U.S. investors are far more concerned with financial returns and with the liquidity of their investment than are other investors. Non-Americans prefer to have a prototype available, but are not high-technology oriented.

Prospective clients seeking venture capital should pay attention to their own personal characteristics and experience more than the product, market or financial criteria listed. They should complement their weaknesses by hiring people who are stronger on particular dimensions than they are themselves. A multi-disciplinary team is a must. Non-American entrepreneurs will have to deal with venture capital investors who are not primarily interested in high technology and definitely want products developed to at least the prototype stage.

It seems that venture capitalists try to handle the various risks of their investment in several ways. Competitive risks are countered by a preference for proprietary products which stimulate an existing market. Bail-out risk requires industries with which the investor is thoroughly familiar and where investments have high liquidity. Investment risk is usually covered by having capable enterpreneurs, with good track records, in growing markets with a high return rate. Management risk is covered by having entrepreneurs capable of intense effort who know the market throughly and who react well to risk. Implementation risk requires an entrepreneur with a clear idea of the venture, a functioning prototype and demonstrated market acceptance. It is doubtful whether any venture ranks high on all scales. But applicants for venture capital should attempt to cover as many of these criteria as possible in their business plans and need to tailor their plans and presentations so that those criteria used by local sources of funds are addressed directly

Overall, however, American venture capitalists seem to be more demanding in their requirements before they will invest in a venture than are their colleagues in other parts of the world.

We urge our academic colleagues in other countries to continue to extend this research to compare venture capital criteria used around the world. Further research in matching criteria to business plans is necessary for entrepreneurs to be successful today.

References

- 1. MacMillian, I.R. Seigel and P.N.S. Narasimha, 1985 Criteria Used By Venture Capitalists to Evaluate New Venture Proposals, *Journal of Business Venturing*, 1, No. 1.
- 2. Knight, R.M, 1988 Criteria Used By Venture Capitalists <u>Journal of Entrepreneurship and Small Business</u>, 3, No. 4.
- 3. Fells, A.G, 1984 Venture Capital in Canada A Ten Year Review, *The Business Quarterly* Spring.
- 4. Knight, R.M. and W.K. Ferguson, 1984 The Success of Ontario's SBDC Program *Journal of Small Business Canada*, 2, No. 1, Summer.
- 5. Ernest and Whinney, 1984 Characteristics of Successful Companies Financed by Canadian Venture Capital Sources, for the Association of Canadian Venture Capital Companies, May.
- 6. Norman, G.R, 1989 The Venture Capital Industry in New Zealand: An International Perspective, Report prepared for New Zealand Trade Development Board, May.

THE GSBGM WORKING PAPER SERIES

The main purpose of this series is to reach a wide audience quickly for feedback on recently completed or in progress research. All papers are reviewed before publication.

A full catalogue with abstracts and details of other publications is available, for enquires and to be included in our distribution list, write to:

The Research Co-ordinator, GSBGM, Victoria University of Wellington, PO Box 600, Wellington, New Zealand Tel: (04) 495 5085; Fax: (04) 712 200

Code in bold denotes order number, eg: WP 1/91

--- Group denotes the author's academic discipline Group (note this does not necessarily define the subject matter, as staff's interests may not be confined to the subjects they teach).

1990 - 1991 titles available on request.

WP 1/92

Money and Finance Group

Burnell, Stephen J. and David K. Sheppard 'Upgrading New Zealand's competitive advantage: a critique and some proposals.' 1992 pp 26.

'Upgrading New Zealand's competitive advantage: a critique and some proposals.' New Zealand Economic Papers Vol 26(1), 1992 pp101-125.

WP 2/92

Quantitative Studies Group

Poot, Jacques and Jacques J. Siegers 'An economic analysis of fertility and female labour force participation in New Zealand.' 1992 pp 27.

New Zealand Economic Papers Vol. 26, No. 2, December 1992, pp. 219-248

WP 3/92

Money and Finance Group

Lally, Martin 'Project valuation using state contingent claim prices.' 1992 pp 9.

W/P 4/92

Economics Group

Kim, Kunhong, R.A. Buckle and V.B. Hall 'Key features of New Zealand Business Cycles.'

WP 5/92

Management Group

McLennan, Roy 'The OD Focus Group: A versatile tool for planned change.'

WP 6/92

Information Systems Group

Jackson, Ivan F. 'Customer-oriented strategic information systems.'

'A customer-oriented IS model: from factory to "Information Factory".' In Proceedings of the Third Australian Conference on Information Systems. Woollongong, Australia. 1992 pp 406-420.

WP 7/92

Quantitative Studies Group

Krawczyk, Jacek B. and Boleslaw Tolwinski 'A cooperative solution for the three-nation problem of exploitation of the southern blue tuna.'

'A cooperative solution for a three-agent southern bluefin tuna management problem' In System Modelling and Optimisation, Lecture Notes in Control and Information Sciences. No. 180. P. Kahl, ed. Springer Verlag, 1992. pp 747-756.

WP 8/92 Marketing Group

Thirkell, Peter and David Stewart `A description of the advertising and direct marketing decision processes of New Zealand marketing managers.'

WP 9/92 Quantitative Studies Group

Jorgensen, H.P. and J.B. Krawczyk 'Application of optimal control to the determination of an environmental levy.'

WP 10/92 Economics Group

Kim, Kunhong 'A stochastic overlapping generations real business cycle model of a small open economy'

WP 11/92 Quantitative Studies Group

Wu, Ping X. 'Testing fractionally integrated time series.'

WP 12/92 Quantitative Studies Group

Wu, Ping X. 'A test for fractionally integrated time series.'

WP 13/92 Quantitative Studies Group

Nijkamp, Peter and Jacques Poot 'Endogenous technological change, innovation diffusion and transitional dynamics in a nonlinear growth model.'

WP 14/92 Management Group

Cavana, R.Y. 'Railway system in New Zealand: Case study in strategic change.'

WP 1/93 Economics Group

Bertram, I.G. 'Economy-wide effects of a major increase in the wholesale price of electricity: New results from the JOANNA Model.'

WP 2/93 Economics Group

Michael Williams and Geert Reuten 'The political-economic transformations in central and eastern Europe: A tragic neglect of civil society.'

WP 3/93 Information Systems Group
Pak Yoong 'Computer-Supported Environmental Scanning: A case study.'

Tak 100/1g Computer-Supported Environmental Scanning. A case study.

WP 4/93 Management Group

Everett Jr., Adam E., Lawrence M. Corbett and Boo Ho Rho 'A comparison of Quality Improvement Practices in Korea, New Zealand and the United States of America.'

WP 5/93 Management Group

Campbell-Hunt, Colin, David Harper and Bob Hamilton 'National renewal and strategic change - First lessons from an early-mover in deregulation.'

WP 6/93 Management Group

Cavana, R.Y. 'Coastal shipping policy in New Zealand: economy wide implications.'

WP/793 Economic History

Group

Mulcare, Tim 'Gross Capital Formation and Improved Estimates of Real Gross and Net Capital Stocks to 1990 for the New Zealand Non-Market Production Sector.'

Knight, Russell M. and Gilbertson, David W. 'Criteria used by venture capitalists: a cross country analysis.'