

12-1-1993

# Managing growth and development in information technology-based new ventures: a life cycle perspective

Ken Moores

*Bond University*, [Ken\\_Moores@bond.edu.au](mailto:Ken_Moores@bond.edu.au)

Joseph Mula

*Bond University*

Susana Yuen

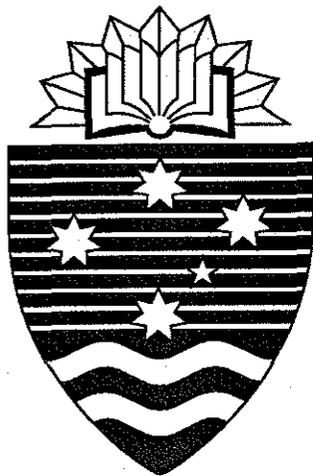
Follow this and additional works at: [http://epublications.bond.edu.au/discussion\\_papers](http://epublications.bond.edu.au/discussion_papers)

---

## Recommended Citation

Moores, Ken; Mula, Joseph; and Yuen, Susana, "Managing growth and development in information technology-based new ventures: a life cycle perspective" (1993). *School of Business Discussion Papers*. Paper 47.  
[http://epublications.bond.edu.au/discussion\\_papers/47](http://epublications.bond.edu.au/discussion_papers/47)

This Discussion Paper is brought to you by the Bond Business School at [ePublications@bond](mailto:epublications@bond). It has been accepted for inclusion in School of Business Discussion Papers by an authorized administrator of [ePublications@bond](mailto:epublications@bond). For more information, please contact [Bond University's Repository Coordinator](#).



# BOND UNIVERSITY

## School of Business

### DISCUSSION PAPERS

**"Managing Growth and Development in  
Information Technology-Based New Ventures:  
A Life Cycle Perspective"**

Ken Moores, Bond University  
Joseph Mula, Bond University  
Susana Yuen, Queensland University of Technology

DISCUSSION PAPER NO 47

DECEMBER 1993

University Drive,

Gold Coast, QLD, 4229

AUSTRALIA

# SCHOOL OF BUSINESS

## DISCUSSION PAPERS

Bond University was established by Act of Parliament in 1987 as an independent, private University. The first student intake occurred in May 1989. The School of Business offers degrees in the undergraduate (BCom and Diploma) and the graduate (MBA, MAcc, MCom and PhD) levels.

The School teaches and sponsors research in accounting, economics, econometrics, finance, marketing, management, organisational behaviour and related disciplines in hospitality and real estate fields.

The Discussion Paper series is intended to foster research and comments are invited. The views expressed in the papers are the opinion of the authors and do not necessarily reflect the views of the School or the University.

Lists of available Discussion Papers and copies of the papers (which are free of charge) may be obtained from:

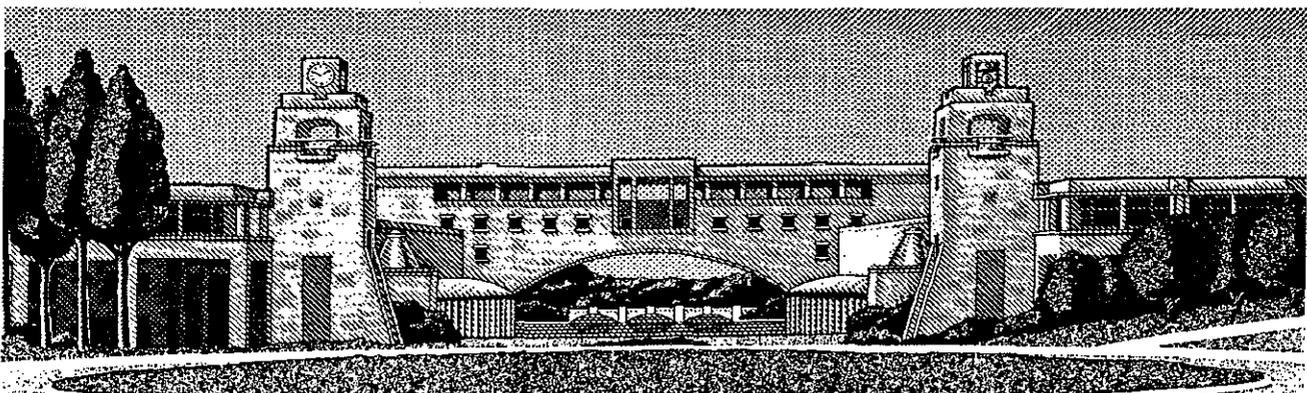
The Senior School Administrator  
School of Business  
Bond University  
GOLD COAST QLD 4229

Telephone: (075) 95 2244

Fax: (075) 95 1160

*Dean:*

Professor Ashley W. Goldsworthy AO OBE



B O N D U N I V E R S I T Y

**MANAGING GROWTH AND DEVELOPMENT IN INFORMATION  
TECHNOLOGY-BASED NEW VENTURES:  
A LIFE CYCLE PERSPECTIVE**

**by**

**Professor Ken Moores PhD FCPA  
School of Business  
Bond University  
Gold Coast, Australia**

**and**

**Associate Professor Joseph Mula PhD FCPA  
School of Business  
Bond University  
Gold Coast, Australia**

**and**

**Susana Yuen MSc MBA FCCA  
School of Accountancy  
Queensland University of Technology  
Brisbane, Australia**

September 1993

While financial assistance was provided by the Queensland Department of Business, Industry and Regional Development, this paper does not express the policy of the Queensland Government. The views, conclusions and recommendations contained in this paper are those of the authors. The paper does not commit the Government either to the views expressed or to future action.

Not to be quoted without permission from the authors.  
Comments welcomed.

# MANAGING GROWTH AND DEVELOPMENT IN INFORMATION TECHNOLOGY-BASED NEW VENTURES: A LIFE CYCLE PERSPECTIVE

## INTRODUCTION

Innovative technologies have emerged predominantly in the small firm sector (Oakey *et al*, 1988). But the successful commercialisation of these technologies has often been endangered by the limited survival and growth of such firms. The export of technology by sale to overseas buyers is frequently the only way such technology is commercialised. However the alternative of developing local commercialisation through an infrastructure which enables small domestic firms to survive and grow, especially in their formative years, would facilitate economic development through local value-added processes.

Unfortunately, little is known about how technology-based new ventures grow and develop. A better understanding of their growth patterns and associated management problems will facilitate focused government action. This paper identifies the management problems encountered by information technology (IT) firms in their endeavours to grow and develop. From this the paper distils the management measures associated with successful growth and development. The paper concludes with recommendations on government initiatives and policies designed to overcome these problems at the firm level, and which encourage the development of a state-based IT industry.

## DEVELOPMENT PROBLEMS AND PATTERNS

The growth pattern of organizations can be explained using a biological analog. Various models of the organizational life cycle have been discussed and developed in the extant literature on organizations (Adizes, 1979; Chandler, 1962; Galbraith, 1982; Greiner, 1972; Kimberley & Miles, 1980; Miles and Snow, 1978; Miller and Friesen, 1984; Quinn and Cameron, 1983; Scott, 1970; Summer, 1980). The underlying assumption of modelling the organizational life cycle is that the changes that occur follow predictable patterns characterised by sequential development. A major contribution of the literature on life-stage models is that it adds to our understanding of the rather complex phenomenon of growth, describing how growth takes place and the effect that it has on organizations.

Regardless of the number of life-cycle stages in different models, the literature typically implies that *problems* influence the internal organization structure, growth, and development of firms. Furthermore, it has been suggested that these problems give rise to patterns of primary strategic or functional tasks over time. To this end various models have been suggested to explain this pattern of growth and development indicating how problems can be overcome (Greiner, 1972; Kazanjian,

1988; Kimberley and Miles, 1980; Miles and Snow, 1978; Miller and Friesen, 1984; Moores, 1990; Quinn and Cameron, 1983).

While empirical evidence concerning *problems* encountered by new ventures in different industries has not been entirely consistent, some patterns are emerging in specific industries. Product development, resource acquisition, marketing and internal organization problems have been sequentially associated with a firm's initial *conception and development*, its *commercialisation*, its *growth*, and its *stability* in technology-based ventures (Kazanjan, 1988).

However we know less about how managers cope with these problems in terms of the strategies, structures and systems they use. A recent study of new ventures in the information processing industry unearthed eight different strategies covering both niche and aggressive approaches. Furthermore, the greatest diversity in these strategies was displayed by small firms (McDougall and Robinson, 1990). But our knowledge of the evolving structures and systems that help firms in particular industries to grow and develop is even less specific. Prescriptions that have been tendered to date are largely based on the consistency of structures and systems with a given strategy. In the light of the strategic diversities reported above, generalisations are difficult.

The life-cycle literature provides some insights. It suggests that structures and control systems of organizations at initial stages of development are simple and informal with authority being highly centralised. However as firms grow, departmental and functionally-based structures are adopted and control systems become more formal with increasing decentralisation of authority (Adizes, 1979; Griener, 1972; Miller and Freisen, 1984; Quinn and Cameron, 1983; Scott, 1970).

The disparate nature of this prior research mitigates against the statement of precise hypotheses but it does permit the statement of some expectations which guided our exploratory investigation of Queensland IT firms. These expectations generally reflect concerns that move from technical efficiency issues to more administrative issues as firms develop. The expectations with respect to a range of external and internal characteristics are presented in Table 1.

## **METHOD**

The questions of interest to emerge from these expectations are:

- What are the dominant problems confronting Queensland IT firms?
- Is the perception of these problems influenced by the stage of development of the firm?
- Do IT firms adopt a congruent set of strategies, structures and control information systems to cope with their problems?
- What lessons emerge from how successful IT firms manage growth and development transitions?

- Given the nature of these firm problems and industry needs can government action facilitate growth and development?

**TABLE 1**  
**Expectations**

	Stage 1 Conception and Development	Stage 2 Commercialisation	Stage 3 Growth	Stage 4 Stability
<b>Dominant Problems</b>	Product and technology development	Production/Marketing	Marketing Facilities and customer services	Organizational systems and people Financing
<b>Nature of Business Environment</b>	Rapidly changing	Less relevant	Changing	Changing with intense price competition
<b>Urgency of Industries Strategies</b>	Need for government support	Less relevant	Least relevant	Increasing need for government support Major emphasis on product quality
<b>Firm Strategies Pursued</b>	Product-based technological innovation	Product-based technological innovation	Market-based	Technological innovation balanced by - Integration - Competitive positioning
<b>Structures Adopted</b>	No formal structures	Centralised authority	Emerging formal structures	Decentralised and formal
<b>Control Systems Used</b>	Personal observation and simple financial reporting systems		Emerging management controls	Management controls and performance evaluation used to great extent Sophisticated financial reporting and operational controls

To answer these questions the study collected data in two ways: (1) a mailed questionnaire to all IT firms in Queensland; and (2) follow-up detailed interviews with fourteen selected firms. Questionnaire responses (most based on a seven-point Likert-scale) provided the basis for describing IT firms in terms of their dominant problems, strategies, structures and systems. These responses were factor analysed to reduce the detail arising from approximately one hundred questions. Case interviews enhanced our understanding of current descriptions but more importantly enabled us to learn of the development patterns and difficulties of these firms over their relatively short lives.

An industry profile based on age, size, rate of growth and stage of growth of respondent firms was developed. *Age* was measured by the number of years in operation, *size*, by the number of both full-time and part-time employees and *rate of growth* as the percentage of increase in sales over that of the previous year. *Stage of growth* of firms were established using instruments developed by Kazanjian (1988). These characteristics are detailed in Table 2.

The industry profile in the State is understandable given the industry's relatively recent beginnings. Many of the State's IT firms commenced operating less than a decade ago and have struggled to grow and develop. While age does not appear to be associated with development, increased numbers of employees certainly coincides with development. As expected, sales growth starts slowly but accelerates to very high levels during the *growth* stage only to level off in the *stability* phase. This profile offers support for the validity of the stage model but is imperfect in explaining how firms

move from stage to stage. Our case studies however help us to understand the dynamics of IT firm management.

**TABLE 2**  
**Profile of Respondent Firms**  
(*n* = 86 firms)

Characteristics	All Respondents	Stage 1	Stage 2	Stage 3	Stage 4	<i>F</i>	$\omega^2$
		Conception & Development	Commercialisation	Growth	Stability		
Means							
Age	8.85	7.78 <sup>+</sup> <sup>a</sup>	8.84	7.46	12.07 <sup>++</sup>	3.28 <sup>*</sup>	0.109
Size	23.66	6.11 <sup>+</sup>	15.00 <sup>+</sup>	24.86	67.38 <sup>++</sup>	7.00 <sup>**</sup>	0.206
Sales Growth Rates							
1989/90	21.42						
1990/91	48.29						
1991/92	22.75	22.43	19.50	37.79	15.36	0.54	0.022
Number of firms		28	28	14	16		

<sup>a</sup> Superscripts show the results of post-hoc comparisons based on a Scheffé test. For each factor with an overall significant ANOVA a (+) indicates a mean significantly less than a mean with a (++) (\*p £ 0.05 \*\*p £ 0.01)

## RESULTS

Overall the results indicate a general escalation in the importance attached to most problems across development stages from conception to stability. Attaining *market positioning and meeting targets* dominates as the area of concern for IT firm managers irrespective of stage of development. However the sequential development pattern is more pronounced in the area of *organizational systems and people*. Firms in later stages of development focus more management attention and resources on these problems than do their counterparts just starting out. The problems of attracting capable personnel in particular, intensifies for IT firms as they grow and develop. Developing cost controls and financial systems, defining organizational roles, responsibilities and policies, and developing management information systems certainly begin to emerge as dominant problems as firms experience rapid growth. The managerial attention devoted to solving these problems in post-growth eras helps firms attain stability.

Even more significantly different across the stages is the dominance of *production, marketing and finance* problems. While these problems confront IT managers when initially developing their businesses they return again during the stable phase. Securing financial resources and backing is an initial problem that begins to return during growth stages and reaches a peak when firms seek to develop new products and penetrate new territories. Developing *facilities and customer support* services has its greatest significance for firms seeking to interest customers through the commercialisation of their products and services. The mean scores of dominant problems perceived across the stages of growth are presented in Table 3.

**TABLE 3**  
**Problems Across Stages of Growth**  
*(n = 86 firms)*

Dominant Problems <sup>a</sup>	Stage 1	Stage 2	Stage 3	Stage 4	F	$\omega^2$
	Conception and Development	Commerciali- sation	Growth	Stability		
Mean Scores						
Market positioning and meeting targets						
Organizational systems and people	4.99	5.20	5.48	5.87	1.79	0.062
Production, marketing and finance	3.47	3.83	4.47	4.70	3.14*	0.104
Facilities and customers' support	4.01 <sup>++b</sup>	3.08 <sup>+</sup>	3.82	4.33 <sup>++</sup>	4.86 <sup>**</sup>	0.153
	3.91	4.21	4.43	4.27	0.40	0.015

<sup>a</sup> Responses were measured on a 7-point Likert scale where 1 = Minor issue, 4 = Somewhat of an issue, and 7 = Extremely dominant problem. The eighteen problems were reduced to four by factor analysis.

<sup>b</sup> Superscripts show the results of post-hoc comparisons based on a Scheffé test. For each factor with an overall significant ANOVA a (+) indicates a mean significantly less than a mean with a (++). (\*p £ 0.05 \*\*p £ 0.01)

IT firms perceive their business environment as only moderately *changing* with levels of price *competition* increasing as firms develop. However neither of these factors were significantly different across the stages. In terms of industry strategies, firms in stages 1 and 4 regard as more urgent the need for *government to support* their development than those firms seeking commercialisation and achieving growth. A similar pattern emerges at the firm strategy level where conception and development and stability firms pursue *technological innovation and marketing* based strategies moreso than firms at stages 2 and 3. However these and other firm strategies were not significantly different across any of the stages. Interestingly, dimensions of firm structure were not different across stages, perhaps due to the small size of most firms irrespective of their stage of development.

Our most important finding relates to how control information systems (CIS) have been used by managers of IT firms. The design and use of *performance evaluation and management control systems* significantly increased in sophistication across stages. Long term planning and the establishment of profit centres in particular were used to a great extent, supplementing conventional *financial reports and operational controls*. However the form of information was not significantly different across stages. All managers valued highly the receipt of *timely information* but they less extensively used broad-based (*scope*) *information*. These firm characteristics are shown in Table 4 as mean scores across stages.

**TABLE 4**  
**Firm Characteristics Across Stages of Growth**  
*(n = 86 firms)*

Characteristics <sup>a</sup>	Stage 1	Stage 2	Stage 3	Stage 4	F	$\omega^2$
	Conception and Development	Commerciali- sation Mean Scores	Growth	Stability		
<b>Environment</b>						
Rapidity of change	4.95	4.35	4.77	4.77	1.42	0.049
Competition	3.35	3.51	4.24	4.30	1.86	0.064
<b>Industry Strategies</b>						
Government support	4.52	4.28	3.93	4.77	1.18	0.041
Quality product and resources	4.44	4.70	4.38	4.98	0.07	0.025
<b>Firm Strategies</b>						
Technological innovation/marketing	5.01	4.84	4.77	5.36	1.28	0.045
Competitive positioning	2.36	2.04	2.52	2.60	1.25	0.044
Integration	1.93	1.63	1.77	2.42	1.76	0.061
<b>Structure</b>						
Activities	4.09	3.74	4.10	4.70	1.26	0.046
Authority	3.57	3.18	3.87	4.15	1.45	0.052
<b>CIS-Content</b>						
Financial reporting and operational controls	3.85	3.91	3.87	5.05	3.30*	0.108
Performance evaluation and management controls	2.59 <sup>+b</sup>	2.84 <sup>+</sup>	3.49	4.31 <sup>++</sup>	7.99**	0.226
<b>CIS-Form</b>						
Timeliness of information	5.41	5.26	5.76	5.06	0.67	0.024
Scope of information	4.18	3.70	4.42	4.53	1.97	0.067

<sup>a</sup> Responses were measured on a 7-point Likert scale where 1 = Not important or little used and 7 = Extremely important or extensively used. All characteristics have been reduced by factor analysis.

<sup>b</sup> Superscripts show the results of post-hoc comparisons based on a Scheffé test. For each factor with an overall significant ANOVA a (+) indicates a mean significantly less than a mean with a (++) (\*p  $\leq$  0.05 \*\*p  $\leq$  0.01)

## DISCUSSION

How managers pay attention to, weigh, and actually use certain types of information available to them in solving problems is an accepted way of revealing managerial priorities (Smith *et al.*, 1985). The results largely confirm our expectations. Specifically firms in their early development stages (conception and development; commercialisation) are more pre-occupied with product-related problems and strategies than firms at later stages of development (growth; stability). While the nature of the industry requires that technological innovation and marketing strategies will have salience at all stages, growth and stability firms complement their product-related focus with more marketing and administratively directed measures.

This is consistent with Roberts (1989) who found that while technological issues remain salient for technology-based new ventures in all stages many technology-based firms begin transitional evolution within a few years of their foundation. They shift their focus from a primarily inward orientation of internal technical inventiveness to more balanced operations, increasingly devoting their attention to customers and markets. For the still relatively small firm, technological innovation

must continue to play a key competitive role, differentiating it from its larger rivals in providing product performance in servicing the customers' priorities (Roberts, 1991).

The major differences that distinguish firms at the various stages relate to the evolving emphasis on key functions and the emergence of sophisticated control systems. The functional concerns proceed from production to marketing and then to financing sequentially across stages. Coinciding with these shifts is an increasing emphasis upon the design and use of formalised systems of control based on *performance evaluation techniques and management controls*. The reliance upon *financial reports and operational controls* also distinguishes firms with those at mature stages again relying more heavily upon these formal systems. These cross-sectional survey findings were reinforced by our detailed case studies and together enable us to infer how firms move from one stage to the next.

### **Managing Transitions: Case Study Lessons**

Of the fourteen case firms across all stages we classified seven as successful on the basis of their own descriptions: two from five in stage 1; two from four in stage 2; one from three in stage 3; and the two firms in stage 4. The individual successful firm patterns are generally reflective of the underlying averages revealed by our cross-sectional results. This is especially so in the area of firm strategies and decision-making structures.

Successful growth and stability firms supplemented their early product-based strategies with marketing strategies to enhance their competitive position. This finding confirms that found by Roberts (1991) in his longitudinal study of high-technology "super-success" firms that had survived five years and had attained sales of at least \$5 million. The CEOs of these high performing firms achieved corporate success through transforming them into market-oriented businesses. Aggressive forward integration, formal strategic planning and market research, organizational control of the new-product development process all correlate significantly with corporate success measures. The competitive advantages of Queensland successful IT firms also shifted over time from technological uniqueness towards price/performance and customer service dimensions.

The movement from centralised to decentralised decision making structures by these successful firms suggests that delegation also helps facilitate these developmental transitions in rapidly changing business environments. This structural feature is congruent with the demands of the IT business environment and leads to the design of administrative control systems.

However while these similarities do emerge the notable difference lies in the timing at which the successful firms seek to professionalise their operations. In general each of them has "anticipated" its needs by moving to the next average profile before absolutely necessary. This is especially evident in

the successful stage 1 and stage 2 firms that recognise the problems associated with *organisational systems and people* in advance of their contemporaries. By recognising these problems they developed congruent structures and systems of control earlier than less successful IT firms.

This anticipatory pattern was also revealed by stage 3 and 4 firms who recounted similar measures in their early development stages. Illustrative of the changing focus of local IT firms are the brief profiles presented in Table 5.

**TABLE 5**  
**Profile of Case Firms**

**Stage 1**

Company 1 is preoccupied with product problems and is seeking to find more applications for its technology to enhance its market appeal. Currently it needs external support to move quickly to the next stage otherwise the limited resources of the founders will only see the firm move to commercialisation either as and when resources become available, or the firm will fail. Given the difficulties experienced by these founders in seeking assistance, the notion of a 'one-stop-shop' for stage 1 firms to have their plans vetted and evaluated may well serve to stimulate entrepreneurial activity within the State.

**Stage 2**

Nowhere is strict financial control more evident than in Company 2. This venture has been built to a stage 2 level with \$0.5 million turnover without any injection of capital from the principals. The firm managed its transition to stage 2 by successfully pursuing risk reduction strategies. Until the business demonstrated its viability the principals did not seek to move it to an increased level of activity and commitment. Securing cash flow and maintaining solvency have been carefully monitored by manual records that have recently been computerised. In its current stage of development management perceive compliance with government requirements as their most dominant problem. However delivering customer service, attaining profitability and developing internal systems and controls are still problems demanding the focus of management attention which unless resolved will stall the firm's development into the growth stage.

**Stage 3**

Company 3 is in the classic mould of growth companies having successfully weathered the conception, development and commercialisation phases. Their initial concerns were with product development and to ensure that this focus was not lost they abandoned retailing to maintain their single focus on software development. Upon entering the market the company initially pursued a strategy of prestige pricing but as markets have become more competitive it has become increasingly more aggressive with its pricing practices. Throughout their development management controls have always been evident to ensure the survival and success of the venture. Its success is in no small measure attributable to the professionalism of the firm's management. Their north Queensland location provided the right environment to pursue growth by marketing in south-east Asia.

**Stage 4**

Company 4 came into being as a management buyout of the Queensland operation of a business that had already progressed beyond the first two stages of development. Although the CEO was responsible for all administration, sales and management, he soon appointed leaders to head projects so that he could further develop the company. The most successful period of the business in terms of profits ensued almost immediately. To support its increased activities arising from its growth period the company further formalised its structure by creating two divisions: products (software packages developed by the company) and services, each headed by a manager. This enabled the CEO to concentrate on marketing. During its stable stage, the company's structure has become increasingly hierarchical with professional managers being appointed to marketing and finance areas based on an external consultant's advice. Securing financial backing to facilitate its next stage of growth through new opportunities (government outsourcing) and penetration of geographic territories, is seen by management as the company's current dominant problem. Through strategic alliances with other IT firms in the State it has been able to assure interstate clients it is a stable company with which they can do business.

## CONCLUSIONS AND RECOMMENDATIONS

The main point to emerge from these results is that IT firms do encounter different problems at various stages. Furthermore, those firms that have, and are continuing to successfully manage their transitions have done so in distinctive ways. Most firms manage these transitions by shifting emphasis from production to marketing to organizational systems and people issues, reinforced in each case with congruent control systems. However, as we have described, successful firms in their early stages place more emphasis on organisational systems and people coupled with the appropriate controls. An increasing level of professionalism is demanded as firms confront the greater uncertainties that arise from rapidly changing, price competitive IT markets. In the latter stages, firms which delegate and decentralise their decision making are more successful than those that retain centralised controls. These results suggest a number of prescriptions for managing IT firms.

### Management Prescriptions

For IT firms to be successful they need to:

- **install control systems early and develop these to cope with evolving problems.**  
Specifically this implies an early reliance upon conventional accounting reports which are soon supplemented by management budgets and long-term planning.
- **professionalise their operations in an "anticipatory" fashion.**  
That is they must develop organizational structures to delegate decision-making authority to responsible managers on pricing, personnel and budgetary matters.
- **formulate and implement market-oriented strategies.**  
IT firms must move from technical to customer-oriented businesses relatively early in their development by supplementing their product-based strategies with diversification and distribution measures.

### Targets for Government Action

It is also apparent that government support is not relevant nor needed to overcome all problems nor to facilitate all transitions. Instead government action could be targeted to particular problems and transitions to achieve greater impact in the development of a local IT industry.

In the case of the stage 1 firms, helping them to get started by enabling their technologies and plans to be vetted and evaluated in a 'one-stop-shop' would stimulate entrepreneurial activity in the IT

industry. Stage 2 firms are still looking for some support to improve quality thus maintenance of quality assurance standards will help firms at this stage. The needs however for mature firms relate more so to their diversification and expansion. Stage 3 firms seek government support to grow their markets and north Queensland firms are especially interested in Asia-Pacific markets. Giving local firms security in their home markets by providing business opportunities through outsourcing government IT services will enable stage 4 firms to consolidate their position so that they can bid for larger interstate and overseas contracts. Firms in stages 1 and 4 rate government support relatively more significant to the development of the industry than do commercialisation and growth stage firms.

Based on the ranking of urgency of eleven industry strategies proposed by DBIRD (1992), the five most urgent as perceived by all survey respondents are:

- 1 To encourage IT companies to export their products and services;
- 2 To attract sufficient levels of seed, venture, mezzanine and export finance for the industry;
- 3 To foster an information technology culture in the Queensland community;
- 4 To reinforce the quality approach to productivity in the growth of the industry;
- 5 To encourage the government to source their IT developments and facilities management work from external IT provider companies.

Those strategies perceived as least urgent were to develop an Information Services Network and to establish and support IT Precincts.

These industry-level perceptions together with those relating to firm-specific needs suggest that government action would be most effective if targeted to address exporting, financing, education, quality, and outsourcing issues. On these grounds the following recommendations are presented for government action.

- 1 The Queensland and Commonwealth Governments should encourage and support IT firms to export by raising awareness of potential overseas markets and exposing Queensland products and services to those markets.
- 2 The Queensland Government should identify ways to provide funding through government and private financial institutions to support growth in the IT industry. One way would be to establish an Information Industries Development Fund to attract investment capital with government guarantees provided for the Fund.

- 3 The Queensland Government should help promote an information technology culture by firstly educating its own employees on the direct and indirect benefits that can flow from a sound working knowledge of IT in the workplace; and secondly by directing the Information Industries Board to conduct education programs for small to medium sized businesses and the Queensland public on the scope and applicability of IT to their day-to-day activities.
- 4 The Queensland Government should continue its policy of outsourcing IT services to quality private providers. Quality assurance requirements should be reinforced by the Government purchasing on quality as the premier condition, not price.

By far the most important finding of the study is that successful IT firms professionalise their management and introduce sophisticated financial and managerial controls as early as the first stage of growth. Although technical and entrepreneurial abilities are necessary for technology-based ventures they are not sufficient to successfully commercialise, grow and develop businesses. Consequently we would make one final recommendation.

- 5 The Information Industries Board should conduct education programs targeted at increasing the management and business skills of IT companies' owners/managers to improve the survival rate and enhance the growth of the information industry in Queensland.

## BIBLIOGRAPHY

- Adizes, I. (1979). Organizational passages - diagnosing and treating lifecycle problems of organizations. *Organizational Dynamics*, 8(1): 3-25.
- Biggadike, R.E. (1976). *Corporate Diversification: Entry, strategy and performance*. Division of Research, Graduate School of Business Administration, Harvard University, Boston, MA.
- Chandler, A.D., Jr. (1962). *Strategy and Structure*. Cambridge, Mass: MIT Press.
- Department of Business, Industry and Regional Development (1992). *Queensland Information Technology Industry Strategy*. Brisbane: DBIRD Qld.
- Galbraith, J. R. (1982). Stages of growth. *Journal of Business Strategy*, 3(1): 70-79.
- Griener, L.E. (1972). Evolution and revolution as organizations grow. *Harvard Business Review*, 50(4): 37-46.
- Gross, W. (1967). *Coping with radical competition in business policy: Selected readings and editorial commentaries*. Alfred Gross and Water Gross (Eds). New York: Ronald Press: 51-63.
- Katz, R.L. (1970). *Cases and concepts in corporate strategy*. Englewood Cliffs. NJ: Prentice Hall.
- Kazanjian, R.K. (1988). Relation of dominant problems to stages of growth in technology-based new ventures. *Academy of Management Journal*, 31((2): 257-279.
- Kimberley, J.R. & Miles, R.H. (1980). *The organizational life cycle*. San Fransisco: Josey-Bass.
- MacMillan, I.C. & Day D.L. (1987). Corporate ventures into industrial markets: dynamics of aggressive entry. *Journal of Business Venturing*, 2(1): 29-40.
- McDougall P. & Robinson, R.B., Jr. (1990). New venture strategies: An empirical identification of eight 'archetypes' of competitive strategies for entry. *Strategic Management Journal*, 11: 447-467.
- Miles, R.E. & Snow, C.C. (1978). *Organizational strategy, structure, and process*. New York: McGraw-Hill Book Co.
- Miller, D. & Friesen, P.H. (1984). A longitudinal study of the corporate life cycle. *Management Science*, 30: 1161-1183.
- Moore, K. (1990). Control, culture and cycles: Changing role of accounting controls in successful growing business. *Bond Management Review*, 1(1): 63-75.
- Oakey, R., Rothwell, R. & Cooper, S. (1988). *Management of innovation in high technology small firms*. London: Pinter Publisher.
- Quinn, R.E. & Cameron, K. (1983) Organizational life cycles and shifting criteria of effectiveness: Some preliminary evidence. *Management Science*, 29: 33-51.
- Roberts, E.B. (1989). Evolving toward product and market-orientation: The early years of technology-based firms. *MIT Sloan School of Management Working Paper No.* 1915-89.
- Roberts, E.B. (1991). Strategic transformation and success of high-technology companies. *International Journal of Technology Management, Special Publications in the Role of Technology in Corporate Policy*, : 59-80.
- Scott, B.R. (1970). *Strategies of corporate development*. Boston: Harvard Business School, Intercollegiate Case Clearing House.

Smith, K.G., Mitchell, T.R. & Summer, C.E. (1985). Top level management priorities in different stages of the organizational life cycle. *Academy of Management Journal*, 28(4): 799-820.

Summer, P.H. (1980). *Strategic behavior in business and government*. Boston: Little, Brown & Co.

Tavakolian, H. (1991). The Organization of IT Functions in the 1990s: A managerial perspective. *Journal of Management Development*, 10 (2): 31-37.

Van de Ven, A.H., Hudson, R. and Schroeder, D.M. (1984). Designing new business start ups: entrepreneurial, organizational, and ecological considerations. *Journal of Management*, 10(1): 87-107.