ORGANISATIONAL CHARACTERISTICS, CULTURAL QUALITIES AND EXCELLENCE IN LEADING AUSTRALIAN – OWNED INFORMATION TECHNOLOGY FIRMS

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ABSTRACT

This paper reports empirical findings of an initial series of field case studies aimed at identifying and modelling the organisational characteristics and cultural qualities of excellence in top Australian-owned information technology firms. A common set of critical success factors, missions, and core business activities was identified by executive managers and owners of 10% of the top Australian IT firms. Management described other organisational characteristics including size, revenue, growth projections, the role of software, information systems functions, project teams, customer relations, organisational resources and technology uptake. Staff were asked to identify and describe cultural aspects of the organisations such as the importance of key individuals, orthodoxy, watershed events, key functional values and beliefs, folklore, rites and rituals. They provided metaphors for the organisation culture, the organisation itself, their manager, an employee, the ideal work environment, and the ideal manager.

1 INTRODUCTION

The computing software industry has long held attractive prospects for Australians. The industry is traditionally easy to enter due to relatively low initial capitalisation requirements. It is environmentally friendly. Each year young, ambitious Australian software professionals start their own development and consultancy firms in the belief that success will result from technical originality, competence, and hard work. Each year, many of those startup firms fail.

The volatility of the software and I/T industry is legendary. The sector is known for its high rate of business failure. Various factors contribute to this phenomenon, including undercapitalisation, small firm size, and lack of business and marketing skills by the principals. Many software firms are started by talented, energetic software professionals. Many possess world-class levels of originality, problem-solving ability, and technical competence but all too often lack sufficient business skill to survive in the commercial environment beyond the limit of their personal resources.

Yet, some do make it. Why? What did they do? If others know what the survivors did, can they do it too? Why do some Australian software firms survive and prosper? What do successful firms do that contribute to their longevity and success? What cultural, organisational, and technological factors contribute to their success? What steps did they take, in what order, to achieve their preeminence? What guidance can the experience of

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successful Australian software firms provide for newcomers?

Preliminary results from an initial series of six case studies suggest that managerial, organisational, and cultural factors, rather than technological ones, determine success in the software and information technology industry.

The last comprehensive study of the sector, conducted in 1987 by the Australian government, (Morris, et al., 1987) estimated the size and scope of the industry and identified several of its chronic problems. These include small firm size, lack of critical mass, and an inability to undertake large scale projects. No attempt was made in that study to examine how individual firms in the sector operate or to identify organisational characteristics, practices, and other factors that contribute to success. We believe that the main reason that others have not attempted systematic study of the sector as proposed here is because of the magnitude of the work involved.

2 THE RESEARCH PROGRAM: AIMS, SUBJECTS, AND METHODOLOGY

The purpose of this research program is to produce a valid Business Development Model for startup software and information technology firms based on the characteristics and experience of top Australian-owned software and information technology firms. Most firms in this sector began on a very small scale, typically in someone's garage or workroom. While a considerable body of anecdote and folklore exists which focuses on one or another practice or technique that was a "key" to business success, there exists no known body of studies that systematically examine and model successful Australian software and information technology organisations. The mature BDM will identify and suggest priorities between critical factors which new firms must achieve to succeed. It will indicate chronological stages from startup to success which are based on the experience of top Australian firms.

2.1 AIMS

This research program has three aims. The first aim is to establish a baseline of business practices and cultural characteristics critical to the success of top Australian software and information technology organisations. The second aim is to develop a staged sequential business development model suitable to guide startup and established Australian software organisations to achieve "best practice" standards. The third aim is to compare the characteristics of startup organisations with those of the top firms.

2.2 Subjects

The majority of subjects of this research program are 58 Australian-owned firms listed in the annual *Software 50* (Kennedy, 1996) and in *The Computerworld: Computing 100* publications of IDG Communications. (Kennedy, 1994) The first series of 6 case studies was completed in December, 1995. A second and third series will be completed 1996. The program will conclude with 27 case studies of fledgling or "startup" Australian-owned software and IT firms, providing a basis for comparison and recommendation.

2.3 METHODOLOGY, DATA ANALYSIS AND TRIANGULATION

The research methodology used is the field case study. Although labour-intensive, case studies provide an in-depth richness of data unavailable through other approaches. Each case study required a five-day on-site visit by a researcher. The individual firm is the unit of analysis. The authors have developed a software engineering audit and assessment instrument which guides the data gathering activity. The instrument is described in some detail in previous papers. (Lowry and Morgan, 1995a) (Morgan and Lowry, 1996)

The UTas instrument subsumes the content of earlier instruments developed by Pressman (Pressman, 1988) and the Software Engineering Institute (Humphrey, 1989) (Humphrey *et al*, 1989) The instrument was exhaustively piloted in 1995 and is currently in its 19th revision. It is approximately 100 pages in length, containing a minimum of 208 closed and 225 open items. It is organised into five sections: the organisation, software engineering processes, tools, IS staff characteristics, and pricing. Numerical data derived from the closed items are compared with narrative data derived from the open items, facilitating "biangulation" within each case. Findings from subsequent series will provide the basis for triangulation: within cases, between cases in a series, and between series.

3 WHAT MANAGEMENT SEES: CRITICAL SUCCESS FACTORS FOR IT FIRMS

3.1 WHAT THEY SAID . . .

Each field visit began by asking senior management the following question:

> *What are the CSFs for your software organisation? What are the three (or four, or two, or six) critical areas*

which you must "get right" to succeed as a software organisation? (Lowry & Morgan, 1995b. Item 1.6)

The responses to this item were remarkably similar. *Every* respondent identified offering a high quality product to clients as critical to success. All but one indicated that high quality staff were also critical. Profitability was frequently mentioned as well. No surprises, certainly.

Other ***business*** factors included:

Selecting and focusing on a market niche that has a future: producing software that is wanted in the market;

Identifying and taking up correct leading technologies;

Effective and satisfying communication with clients;

Management of client expectations;

Delivering value for money to clients;

Setting and meeting realistic development and sales targets;

Adequately resourcing developers with appropriate hardware and software tools;

Effective teamwork;

A reputation as a leader in product functionality;

Short time-to-market for new products;

Stability of critical products.

Other ***technical*** factors included:

Platform independence, ease of product customisation, modification, and enhancement;

Achieving a correct architecture for the product;

Deep understanding of development technologies;

Getting the functional requirements right;

Version control and quality management;

Effective project management;

Containment of problems.

In summary, every senior manager interviewed recognised the paramount importance of product quality, of employing and retaining the right people, and of profitability.

3.2 WHAT THEY HAVE DONE . . .

What have these leading firms actually done to achieve success? How do they express their mission? What are some of the critical characteristics of their organisations?

3.2.1 Mission (Lowry & Morgan, 1995b. Item 1.1.1)

The missions of all of the firms are similar. In the words of one managing director, the mission of his firm is offering "innovative products and innovative IT solutions." The goal is growing a "world-class company ... by offering a world class product", and "maximising the return to shareholders."

Other mission elements included focusing on enterprise rather than desktop systems, moving to embedded rather than toolbox software, re-engineering client applications, and helping clients to achieve their business goals.

3.2.2 Organisation Characteristics

Several areas were reviewed. They included core business activity; size, revenue, and growth; information systems functions; the role of software; growth projections; project teams; customer relations: and organisation resources and technology uptake

3.2.2.1 Core Business Activity (Lowry & Morgan, 1995b. Item 1.1.2)

Core business activities identified by management focus on technical product innovation and on sales and marketing. They include:

Client support and training;

Development of a suite of unique products in a particular market. Markets include banking, accounting, geographic information systems, warehousing and distribution, legal and court administration, general accounting, telemarketing, Internet access provision, health insurance, and local government administration.

Deriving ongoing revenue through implementation, modification, and support of those products;

Development of strategic alliances and third-party relationships;

Recruitment and training;

Identification of niche areas where new technologies and existing business knowledge provide competitive advantage.

3.2.2.2 Size, Revenue, and Growth

Each subject provided data about the firm, including size and revenue and growth projections for the coming year shown in **TABLE 1** below.

The IT firms in the group studied are among 8% of the largest and most profitable in Australia. (Morris, *et al*, 1987) They are profitable, earning a

minimum of $1,000,000 in annual revenue. With one exception all are growth oriented. None plan to downsize and there is little interest in outsourcing business activity. However, employing as they do between 35 and 130 people, they are relatively small in international terms.

TABLE 1
SIZE, REVENUE, AND GROWTH PROJECTIONS

Aspect	Response	*n* Resp.	AAINST Item No
Size of organisation	35	1	1.2.1
	45	1	
	48	1	
	55	1	
	85	1	
	130	1	
Nature of business	For profit – Software vendor	6	1.2.1.1
Annual revenue	$1,000,001 – $2,000,000	1	1.2.1.2
	$2,000,001 – $5,000,000	2	
	$5,000,001 and over	3	
Expected annual growth	0%	1	1.2.1.3
	3%	1	
	8%	1	
	25%	1	
	28%	1	
	40%	1	
Plan to downsize	No	6	1.2.1.4
	Yes	0	
Plan to outsource	Yes	1	1.2.1.6
	No	5	
Projected outsource level	0%	5	1.2.1.6.1
	1– 25%	1	

3.2.2.3 Information Systems Functions

(Lowry & Morgan, 1995b. Items 1.2.2.1 – 1.2.2.8)

In all but one case, each software development project has a designated software manager who reports directly to the project manager. All organisations have a software quality assurance (SQA) function in place. In four cases the (SQA) function has a management reporting channel separate from project management. Only half of the respondents have a designated individual or team responsible for the control of software interfaces.

Software system engineering is represented on the system design team in five cases. All firms have a software configuration control function for each project that involves software development. In four cases, a software engineering process group function is an integral part of the development cycle. Mechanisms range

from standards compliance checks by the project manager and quality manager through a procedure which includes file checking; change assessment; review of the set-up of the project area; prototype and testing; insuring that code is native language compliant; and that language and code presentation standards are followed.

3.2.2.4 The Role of Software **(Lowry & Morgan, 1995b. Items 1.2.2.9 – 1.2.2.12)**

TABLE 1 reported data about firm size, revenue and growth projections for the coming year. In contrast **TABLE 2** indicates the level of resources dedicated to software development and training.

TABLE 2
Expenditures for Software Development, Training, and Software Tools

Aspect	Response	*n* Resp.	AAINST Item No
Annual software development budget	$ 500,000 – $1,000,000	1	1.2.2.9
	$2,000,001 – $5,000,000	4	
	$5,000,001 and over	1	
Annual budget for software related training	$ 0.00 – $ 100,000	3	1.2.2.10
	$100,001 – $ 250,000	1	
	$250,001 – $ 500,000	1	
	$500,001 – $1,000,000	1	
Annual budget for software tools	$ 0.00 – $ 100,000	3	1.2.2.12
	$100,001 – $ 250,000	0	
	$250,001 – $ 500,000	2	
	$500,001 – $1,000,000	1	

Comparison of annual revenue with annual software expenditure indicates that participants expend the majority of their revenue in software development activity. Together, they spend between $13,500,000 and $26,000,000 of a revenue base of between $20,000,000 and $35,000,000, or approximately 67% – 74% of annual revenue on software development. Substantial sums are also invested in software related training and tools.

Training activities included in-house courses, external technical courses aimed at skills upgrade and technology acquisition, product-specific training, and training in project management. Training in the use of specific tools and techniques included specialist and process tools, languages, database, and attendance at revenue-earning courses by in-house staff.

3.2.2.5 Growth Projections

All subjects anticipate continued growth into the future. **TABLE 3** indicates levels and areas of growth in software development, training, and software related tools.

As indicated, most firms anticipate modest growth in software development activity, under 25% in all but one case. Slightly more growth in software related training and tools is indicated. Substantial portions of software are developed for IS, engineering, and manufacturing applications, with most software developed as products for sale to customers.

TABLE 3
Expected Growth In Resources Dedicated to Software Development, Training, And Software Related Tools

Aspect	Response	*n* Resp.	AAINST Item No
Software development	0% – 25%	5	1.2.2.13.1
	26 – 50%	1	
Software related training	0% – 25%	4	1.2.2.13.2
	26 – 50%	1	
	76% – 100%	1	
Software tools	0% – 25%	4	1.2.2.13.3
	26% – 50%	2	
Percentage developed for IS applications	0% – 25%	4	1.2.2.14.1
	26% – 50%	1	
	76% – 100%	1	
Percentage developed for engineering and manufacturing applications	0% – 25%	6	1.2.2.14.2
Percentage developed for sale to customers	0% – 25%	1	1.2.2.14.3
	26 – 50%	1	
	76% – 100%	4	

3.2.2.6 Project Teams (Lowry & Morgan, 1995b. Item 1.2.2.16)

All participants are organised into project teams. Three use a matrix organisation structure in which each project is overseen by a project manager and each project phase is managed by a functional manager. The others organise project teams under the control of a project manager. In one firm a given project team is responsible for each customer. Each project is "owned" by a company director in another. Technical specialists are called upon as needed. Most staff are multi-skilled.

3.2.2.7 Customer relations

Each firm reported a spectrum of relationships with clients. For example, one characterised itself as developing "Close relationship with clients. Those relationships range from client/provider to adversarial." One operates with a single designated client contact person while another has developed a pattern of multiple developers interacting with the client.

Several indicated that they saw a need to improve relationships with clients. One respondent identified three levels of client contact: strategic contact through an account manager, day-to-day contact through the project manager, and post-installation contact through a "hot-line support" desk. (Lowry & Morgan, 1995b. Item 1.2.2.17)

Similarly, most participants would like to see greater understanding of software development practice standards in the customer/user community. They describe their clients as "ranging from naive to aware and reasonable sophistication" in this area. Clients who resell the product have a greater understanding than those who are exclusively end users. Large clients in a vertical market tend to have a good understanding while small ones tend to have little or none. (Lowry & Morgan, 1995b. Item 1.2.2.17.2)

The level of client understanding may be related to problems associated with communication between clients and software development staff. The classic pattern of dichotomies between developers who are technical people and clients who are business people emerged. Distance and cultural differences also appear to exacerbate difficulties. This relationship will be further explored in subsequent series of case study series. (Lowry & Morgan, 1995b. Item 1.2.2.17.3)

3.2.2.7 Organisation Resources and Technology Uptake

Resourcing developers and taking up new technologies are central requirements for all subjects. **TABLE 4** indicates organisation resource levels and technology uptake practices.

TABLE 4
Organisation Resources and Technology Uptake

Aspect	*n* Responses	AAINST Item No
Each developer has individual computer / supported workstation?	YES (6) NO (0)	1.3.1
Project management training required for new development managers?	YES (4) NO (2)	1.3.2
Required software engineering training program for software developers?	YES (5) NO (1)	1.3.3
Required software engineering training program for first line supervisors?	YES (0) NO (6)	1.3.4
Required software engineering training program for design and code review leaders?	YES (0) NO (6)	1.3.5
Is a mechanism used for maintaining awareness of state-of-the art in SE technology?	YES (3) NO (3)	1.4.1
Is a mechanism used for evaluating technologies used internally versus. those externally available?	YES (3) NO (3)	1.4.2
Is a mechanism used for deciding when to insert new technology into development process?	YES (3) NO (3)	1.4.3
Is a mechanism used for managing and supporting the introduction of new technology in process?	YES (3) NO (3)	1.4.4
Is a mechanism used for identifying and replacing old technologies?	YES (3) NO (3)	1.4.5

Developers are well-resourced. Most firms provide training in software engineering for developers and most train new project managers. In contrast, none provides training for new first line supervisors or code review leaders. It is surprising that only half of the firms studied have addressed the issue of technology awareness and uptake in a formal way.

3.3 Summary: Senior Management's Dilemma

Senior managers unanimously agree that superior products, excellent staff, and happy clients are the major critical success factors for their organisations. In all cases, the majority of revenue is expended in software development activity, resourcing and training staff, and in sales and promotion. However, there was some agreement that most participants have a way to go to improve relationships and communication with clients. The shortfall can be attributed to differences of perspective and orientation between developers and clients. Client relations would improve *if only* developers would become more client oriented!

4 Organisation Culture: How the Troops See Things

Company owners and directors can be expected to be the strongest proponents of their organisation and its products. They have invested more of themselves in the enterprise and reap the greatest rewards from its success. Their views may be more positive than those of the people who do the work.

Each organisation develops a unique culture which reflects and shapes the world-view of its members. Organisations can be seen as mini-societies having their own distinctive patterns of culture and sub-culture; as a family; as a tight-knit team; as highly fragmented, seeing the world in very different ways (Morgan, 1986, p. 121).

The culture of an organisation has as great an effect on the way systems are developed as management skill or the qualities of the development methodologies and technologies used. It is beyond the scope of the Tasmanian instrument to investigate organisation culture in great detail but it is important to place the organisation into a broad cultural framework. The Organisational Culture Assessment Inventory developed by Steinhoff & Owens (1989) forms the basis for this section of the study instrument.

To gain another perspective, many developers were interviewed during the site visits. There is considerable overlap in the views of senior managers and staff developers. There are some interesting differences as well. A set of twelve questions aimed at characterising the culture of participating organisations was asked of six developers in each organisation, for a total of 36 individual replies per item. While space precludes exhaustive presentation of these responses, the questions asked and a summary of replies are presented in the sections below.

4.1 Importance of Key Individuals

> *Organisations seem to have at least one person, either now or in the past, who is thought of with great respect (or even reverence) because he or she is/was so outstanding in the life of the organisation. If you can think of such an individual in the history of your organisation please describe in a brief paragraph why it is that the individual is so well regarded.* (Lowry & Morgan, 1995b. Item 1.5.1.1)

Three themes; personal, leadership, and technical qualities and achievements of key people, emerged in response to this question. Frequently mentioned personal qualities include integrity, intelligence, and commitment to the success of the firm.

Other ***personal qualities*** that were often mentioned included:

Enthusiasm;

Easy to talk to;

A "people person": nice person, humble, approachable;

Good communication skills;

Respected, down to earth;

Generous - has welfare of staff at heart;

Personal modesty regarding achievements. One managing director refers to himself as the firm's "highest paid office boy".

Leadership qualities included:

Willingness of key people to give of themselves and to assist others; knowledge;

Mentoring new people through the transition into the organisation. In one firm, the Managing Director personally carries out the induction course for new staff;

Teaching: developing people, encouraged staff to take responsibility for own work;

Business acumen: has a clear vision of where the organisation is going;

An architect – detached from problems, can put things into perspective, cut through issues, possesses great insight;

Drive and capacity for work;

Good salesman;

Doesn't control everything - lets staff to make decisions;

Takes time to talk to staff, respects confidences;

Sets goals worth achieving;

Brings people together. Open management style;

Survivor. Does more things right than wrong. Most decisions are right, are usually sound

Technical qualities and achievements included:

Encyclopedic knowledge of the industry and product;

Can answer any question: always on top of things;

Foresees coming technology trends;

One respondent commented that his firm had several "dominant characters in their own teams who are of genius calibre".

Designed the 4GL;

Deep knowledge of product;

Proven record, capacity for work;

Seen as outstanding in field due to long record of achievement;

Built company from nothing;

Originally wrote the tools; is the company linchpin. Pioneered package development;

Focuses on quality assurance - conducts QA training, carries out system testing and quality control, enforces standards.

In contrast, several respondents in one firm remarked that the key person was more respected than liked. The key person was described as ruthless in pursuit of company welfare, a person who was feared and respected rather than liked. He was described as a domineering personality who uses people, who puts company before the staff.

4.2 ORTHODOXY

> *Every organisation has established but unwritten expectations for behaviour on the job. In a brief paragraph, please describe some of the most important expectations that have to be met by individual staff members in your organisation in order for one to get along.* (Lowry & Morgan, 1995b. Item 1.5.1.2)

Meeting deadlines was the nearly universal response. Other frequent responses included team playing, adherence to policy and standards, offering only constructive criticism, willingness to put oneself out for others, doing whatever it takes to complete the work on time.

4.3 WATERSHED EVENTS

> *Every organisation has a unique history all of its own. Employees know something of that history even if they have not worked there for a long time, because people talk about things that went on in former times. Some of these events may have been powerful incidents in the community that affected the organisation, and others may be purely internal matters that might seem unimportant or even mundane to outsiders. Please describe in a brief paragraph some of the more important events or trends that helped to shape the character of your organisation as it is today.*
> (Lowry & Morgan, 1995b. Item 1.5.2.1)

Surviving the economic recession which began in 1990 was cited over and over by many respondents. Choosing a correct new technological direction on a timely basis was also mentioned several times. Examples included changing from Wang to UNIX-based technologies, moving to RDB and Object technologies, and choosing the right technology partner. Successful mergers and acquisitions of competitors at critical times were cited as critical events in a number of instances. Stability of core staff and products during periods of radical change were also critical to survival.

4.4 KEY ACTUAL, FUNCTIONAL VALUES AND BELIEFS

> *Organisations usually espouse some official formal, public set of values and beliefs. Ordinarily, these appear in handbooks, newsletters, speeches and so on. But in day-to-day work, an organisation may sometimes seem to be operating from values and beliefs that are different from the official public statements. The latter values and beliefs are, of course, often implicitly understood but not often talked about. In a brief paragraph, please describe the actual, functional values and beliefs that are important to your organisation.* (Lowry & Morgan, 1995b. Item 1.5.2.2)

Throughout the range of responses, tension between ***product quality*** and ***expedience*** is ever-present. Responses included a high level of client service, maximisation of chargeable hours to provide good return to shareholders, the development and sale of quality software products, ownership of the work, *esprit de corps*, and technical competence. Staff development, pride in work, and working in the clients' interests were also mentioned.

4.5 FOLKLORE: HOW THINGS ARE REALLY DONE AROUND HERE

> *People who work in organisations very often tell stories - perhaps mythical, or apocryphal, or humorous - that help to explain what life in them is really like. Briefly describe a common story that is likely to be told to a newcomer by an "old hand" in your organisation to impress upon the individual "how things are really done around here."* (Lowry & Morgan, 1995b. Item 1.5.2.3)

Most cases included stories told about clients and how they react to things or to the *faux pas* of employees. A few illustrative examples are worth retelling here:

One developer summed up his firm's view of technologies: "Without the application generator the company would be nothing. Machine language was like digging with the hands; assembly language was like digging with a stick; COBOL was like using a shovel; the report generator is akin to using a small Bobcat that anyone with a license can drive; the application generator is like a big earth mover but needs training to use properly."

Another developer related political realities when dealing with one company director: "One of the directors regularly got drunk at lunchtime. A salesman took him to an important client presentation after lunch where the director heckled the presentation. When the salesman complained to the Managing Director, he was told that it was his own fault for scheduling the presentation after lunch".

Yet another staff member related an embarrassing incident when "A team was to give a demonstration on the North Coast using expensive hired equipment. The hire car was parked outside the motel overnight and was gone in the morning. It was reported stolen but was later found that the handbrake had slipped and the car had rolled down the street into a paddock".

Another related a tale of customer misconceptions. "A customer wanted an analysis of inventory to track costs on large items which were viewed as contributing to the profit. Analysis found that these items actually lost money and that profitability was found in the small 10 cent items over which absolutely no control was exercised. The lesson from this is to ignore the customer's preconceptions about his business."

4.6. Rites and Rituals

> *Organisations often develop informal customs, or rituals, that are more or less unique. For example, one organisation may have a bridge game going on in the staff lunch room every day with different people sitting in as they go to lunch. And so on. In a brief paragraph, please describe any such rituals that are important in the daily life of your organisation.* (Lowry & Morgan, 1995b. Item 1.5.2.4)

A wide variety of rites and rituals were found in the field. They include Friday drinks (every week and at month's end), a Lotto syndicate, rotating baking of muffins, barbeques, company dinners to farewell staff, Melbourne Cup celebrations which range from a hour's pause to a full day's celebration, an annual camping trip, celebrations of new software releases, "free dress days", birthday cakes, and the ubiquitous Christmas party.

4.7 The Metaphorical Organisation Culture

> *In responding to the questions in this section you have provided a rich description of the important aspects of the culture of your organisation. But the culture of an organisation is a total entity, even greater than the sum of its parts. We would now like you to summarise the descriptions that you have provided by using metaphors as a way to convey the essence of the culture of your organisation. A metaphor identifies one object with another and ascribes to the first object one or more qualities of the second. For example, some organisations may be spoken of as a "family", another as a "prison". People often use metaphors to succinctly describe complex ideas. For example, when we say that an organisation is a "well-oiled machine," that metaphor makes clear what that particular organisation is really like in the eyes of the people who work there. For another example, for staff to speak of a manager as being a "Jekyll and Hyde" character tells us a lot about the impact of the behaviour of that individual manager on the staff in that particular organisation.* (Lowry & Morgan, 1995b. Item 1.5.2.5)

The most common response was "a family", which included modifiers such as "comfortable, organised chaos, ant hill, school, club, bus, inertia, train, anarchy, school boys, rebels, beehive, maverick, poorly-serviced machine, firefighters, relay race, playground, roller coaster, tiger in the market, a football match, a mob of sheep, sometimes a salt-mine".

Other metaphors included "a hole, Luna Park, sweat shop, a ship sailing uncharted and dangerous waters, a club, a team, *laissez-faire*, abandoned, risk-takers, a factory, a multicultural melting-pot, a university, a Rolls-Royce production line of craftsman in a guild, re-

actionary – an organisation in a time-warp being dragged kicking and screaming into the 20th century, old soldiers in conflict with the new guard, a tortoise, a museum (management), trailblazers (new staff), an ant heap, beehive, collection of tribes, a tight cell, a bamboo scaffold, and a duck paddling under water but seeming to be calm on top.

4.8 THE METAPHORICAL ORGANISATION

In this sense, considering the descriptions that you have already provided, what one best metaphor would you use to complete the following sentences? My organisation "is" a (an, the) [eg., **museum ...**] (Lowry & Morgan, 1995b. Item 1.5.1.5.1)

Responses included a cash register, family, waltz, castle, farmyard, rat race, factory, adventure, craft motor assembly line, old sailing ship, technological dinosaur, amoebae, backward, drifting ship, collection of tribes, penny-pinching, elastic, grown family, and fun park.

4.9 THE METAPHORICAL MANAGER

The manager of my organisation "is" a (an, the) [eg., **museum curator** *...]* (Lowry & Morgan, 1995b. Item 1.5.2.5.3)

Responses included dead fish, bean counter, despot, headmaster, microscope, unflappable, a king, the admiral, coach, playing coach, listener, father, sergeant-major, expedition leader, glue, progressive father, chairman, cruise line captain, "master gunna", a spreadsheet, an open door, a large ear, a relic, incomplete, action man, dealer, whip cracker, hopeless father, bright spark, father figure, cowboy, honest entrepreneur, and engine driver.

4.10 THE METAPHORICAL EMPLOYEE

The typical employee in my organisation "is" a (an, the) [eg., **information sharer and helper to other staff** *...]* (Lowry & Morgan, 1995b. Item 1.5.2.5.5)

Responses included ambitious and self-centred individual, strong willed, survivor, genius, modest, relaxed, friendly, hardworking, follower, work horse, isolated, know what they are doing, willing to share, an uncommitted worker, information sharer, orphans, relaxed, an isolated unit, a quiet achiever, a resource, team mate, self-motivated, studious, proud of work, above and beyond the call of duty, heroes, have potential, eager beaver, some aloof and two-faced, doer, personable, sociable, self-contained, technical, specialist in the field, hard worker, head down tail up, a game player, intelligent, good sense of humour, a busy bee.

4.11 THE IDEAL WORK ENVIRONMENT

What, in your opinion, would be the metaphor for the ideal working environment? [eg., a warm, supportive workplace where success is celebrated and issues are discussed openly ...] (Lowry & Morgan, 1995b. Item 1.5.2.5.7)

Responses included reward effort, reasonable demands, minimal politics, employee contributions rewarded and acknowledged, one without clients, a team environment, a dynamic and controlled think-tank, structured with controlled procedures, mechanism for reward, staff accountable and properly appraised, some standards set, people treated alike and taken on their merits, a good team that is motivated, city-based (to minimise overnight travel), relaxed, tolerant, supportive, a laboratory, issues resolved, trusting, flexible, collegial, respect of others, complementary, vibrant, exciting, time to work away from client, variety of work, one in which one can be noticed, and "a classroom on a sunny afternoon with the windows open".

4.12 THE IDEAL MANAGER

What, in your opinion, would be the metaphor for the ideal manager? [eg., **a leader, an entrepreneur, a risk taker** *...]* (Lowry & Morgan, 1995b. Item 1.5.2.5.8)

Responses included a coach, an entrepreneur, one who manages by walking around, diplomat, molly-coddler, good communicator, open door policy, close to employees, interested in progress, looks up to and respects staff, a leader, supporter, promoter of the best in people, juggler, fair with salaries and conditions, approachable, playing coach who is prepared to help and encourage, takes responsibility for projects and consequences for shortcomings, stands up for staff, teacher, listener, proactive, directional, maintains momentum, enthuses the team, a large ear, and finally, Superman.

5 findings

While the findings to date cannot be viewed as conclusive, we believe that they are indicative of what is ahead.

Senior managers unanimously agree that superior products, excellent staff, and happy clients are the major critical success factors for their organisations. Achieving these goals appears to be necessary for eminence and success in the industry. Truisms such as these gain strength when they are supported by a foundation of empirical evidence. Strong belief and focus on CSFs characterise *all* of the firms that participated in this first series of case studies. We suspect that leading organisations have a higher degree of congruence between aspiration and achievement of these three goals than less successful firms.

All of the firms identified technical product innovation and sales/marketing as their core business activities. Technical virtuosity and competence is of paramount importance.

Employing as they do between 35 and 130 staff, all of the firms studied are considerably larger than the average Australian software firm. In the last DITAC study of the industry, only 100 of some 1,200 firms employed more than 20 employees. Those 100 firms, which certainly include the participants, accounted for 80% of export sales. (Morris, *et al.*, 1987)

The firms studied all take considerable care with product development and testing. All see a superior technical product as central to their mission and survival.

While there is some variation in arrangements for contact with customers, all of the firms are organised into project teams.

In all cases, a majority of revenue is expended in software development activity and on resourcing and training staff. While important, sales, promotion, and customer relations are somewhat subordinate to technical issues.

Most participants acknowledge that they have a way to go to improve relationships and communication with clients. Most indicated that the shortfall can be attributed to differences of perspective and orientation between developers and clients. Client relations would improve *if only* developers would become more client oriented!

In five of the six cases, there is a noticeable similarity in the views of management and staff. However, there is in all cases a small "reality gap" between the expectations and ambitions of owners and directors and that of the members of staff. The gap is small in successful organisations, with staff sharing the vision and willing to pull in the direction set by management. This characteristic may be a prerequisite for success. The one organisation with a large perceived "reality gap" is not a happy place to work. This firm was the least successful of the cases studied.

Newer and less successful firms may have a larger gap between goals and actions, between owners and staff. We anticipate that we will consistently find small "reality gaps" in leading firms and that the gap may be significantly larger in startup firms.

A tension between the core of older, longer-serving staff and younger, more peripheral staff, a classic "Old Guard / Young Turk" rivalry, seems to exist in all cases. New staff seem to see themselves as "trailblazers" while older staff are cautious about being pushed off into unproven and unprofitable technologies. This phenomenon is by no means peculiar to the software industry but is present nonetheless.

Successful software organisations do not see themselves as "trailblazers". In fact, the organisations studied go to some length to *avoid* use of unproven new technologies.

Successful organisations appear to have few but well-established social rituals. The less successful organisation had no noticeable social dimension.

Non-managerial staff have a high regard for themselves and their colleagues. They are somewhat less complimentary about management, as noted above.

From the staff point of view, the ideal working environment confers more control on the staff member for their own work and would be more supportive of proactivity, planning, and thinking than at present.

An ever-present tension between product quality and expedience pervades all of the organisations studied.

6 DISCUSSION AND CONCLUSION

This initial series of six case studies covered just over 10% of the 58 leading Australian-owned I/T firms. Each subsequent series will cover an additional six firms until all have participated. The researchers have been so encouraged by the positive interest shown by the firms that have hosted us that we are confident that a high percentage of the population will voluntarily participate when first contacted.

Two firms initially contacted declined to participate. When we have completed the majority of case studies, we plan to re-contact firms that initially declined to participate in the expectation that they will not want to be left out of a study that included most of their peers

The stability and long service of staff in these leading firms contrasts sharply with the common perceptions of rapid turnover in the industry. The low observed rate of staff turnover in the firms studied reflects the situation at the *present time*. The picture may have been quite different a decade or two ago. It is likely that people who didn't fit into or who didn't like working in these firms moved on, voluntarily or otherwise. Were we to have been able to look at these organisations in their earlier years, we might find a much different picture, one which mirrors common perceptions of high industry turnover.

The most common metaphor used to describe the *software organisations* studied was some variation of "family". This contrasts sharply with the *war metaphors* more commonly used to characterise business organisations. The most frequently reported metaphor for the *manager* in these organisations is "coach". Again, this is markedly different from the *adversary* metaphors which are commonly used to describe business colleagues. (Kendall & Kendall, 1993, 1994)

Representing as they do only 10% of the population, no generalisations can or should be made from the data. However, we have no reason at this stage to believe that the firms studied so far are anomalous or dissimilar to the rest of the population. We believe that some of the major findings have emerged from the first case study series and anticipate that subsequent cases will enrich and add detail to themes which have emerged from the work to date.

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