Building a theory about change in Australian software firms

by

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A thesis submitted to the University of Western Sydney in partial fulfilment of requirements for the degree of Doctor of Philosophy

2008

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University of Western Sydney
DEDICATION

To my mother Joan and to my late father Roger for their continuous love and encouragement and for their selflessness in providing me with the education that started this journey.
ACKNOWLEDGMENTS

First and foremost, I must thank Professor John Gray for the support and guidance that he has provided throughout my candidature. From our first meeting John has patiently listened as I espoused my ideas about the Australian software industry, occasionally interjecting with a comment that guided me back towards the path I needed to take. I am, and will continue to be, indebted to John for what has been an extremely enjoyable and enlightening three years and, in particular, for his friendship which I am sure will endure into the future.

Many of my colleagues from the academic and the business worlds and an eclectic group of golfing friends have offered valuable advice or listened as I described my latest ideas or a paper that had just excited my interest. They are deserving of my heartfelt thanks for their patience, tolerance and assistance.

Finally I would like to especially thank Leticia, Dean, David and Ali who have been at times confused, and often bemused, as I have explained their behaviour in terms of institutional theory, but always supportive of my return to university.
STATEMENT OF AUTHENTICATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material to which a substantial extent has been accepted for the award of any other degree or diploma of a university or other institute of higher learning, except where due acknowledgement is made in the text of the thesis.

Signed

Date 28th October 2008
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ABSTRACT

This thesis describes the development of a body of theory explaining why the principals of Australian software firms have difficulty in changing the organizational structures of their businesses. The need for change is predicated on the view that availability of capital is an essential prerequisite for sustainable growth in Australian software firms and that firm principals, in the main, have not implemented organizational structures preferred by Australian investors.

A grounded theory approach is used, drawing upon personal knowledge of the software industry using sensemaking and self ethnography research methods. Personal knowledge is complemented with data from semi-structured interviews and secondary sources. Concepts developed from the data are related to theoretical and empirical work under the rubric of organization studies.

What emerges from the data and the literature is: firstly, the Australian software industry is likely to consist of multiple organizational fields each one of which encompasses a small number of software firms servicing customers in specific vertical markets; secondly, to attract capital the principals of Australian software firms will need to change the structure of their organizations and thirdly, change will be radical and revolutionary in nature and may be difficult to achieve.

This thesis contributes to the organizational studies literature by extending existing work to include an analysis of issues affecting small Australian software firms. The use of institutional theory addresses a gap in the present understanding of the manner in which the principals of Australian software firms approach the establishment of structures required of sustainable growing businesses. A future research agenda is presented building upon the findings of this study.
1. PURPOSE AND CONTEXT

Whoever considers the past and the present will readily observe that all cities and all people are and ever have been animated by the same desires and the same passions; so that it is easy, by diligent study of the past, to foresee what is likely to happen in the future in any republic, and to apply those remedies that were used by the ancients, or, not finding any that were employed by them, to devise new ones from the similarity of the events. (Machiavelli 1950, p. 216)

Why do the principals of Australian software firms have difficulty in building sustainable growing businesses?

This question has been asked by observers of the Australian software industry for many years.

Participants in the industry believe the quality of the software products being produced by Australian software firms and the skills of Australian software developers are of world class.

Examples of Australian software firms that have been able to sustain profitable operations for many years, but with little growth in sales or market share, are readily provided by industry observers.

Examples are also available of Australian software firms that have enjoyed rapid growth in sales or market share but have then been unable to maintain momentum, or have disappeared completely.

Examples of Australian software firms that have been able to sustain profitable growth in sales or market share over an extended period are not easily obtainable.

If the products and people are of world class, why then aren’t there more sustainable, growing Australian software firms?
Data obtained in this study suggests the availability of venture or development\(^1\) capital is a major factor affecting the ability of the principals of Australian software firms to build sustainable growing businesses. It is further suggested that the implementation of inappropriate organizational structures is a major impediment, which makes it difficult for the principals of Australian software firms to attract investment.

This thesis examines the development of Australian software firms in the context of the organizational structures implemented by the principals of software firms and the structures investors consider to be appropriate for sustainable growing software firms.

A body of theory is developed, using a grounded theory approach, which explains why the principals of Australian software firms have difficulty in changing their firm’s organizational structure to the structure preferred by Australian investors.

1.1 Background to the study

As an active participant in the software industry for more than twenty five years I contributed to, and listened to, the continuing debate on why the principals of Australian software firms experience difficulties in building sustainable growing businesses. In this vein I also attended conferences and read management books dealing with issues of building organizations. While these activities were of interest, at no time was I convinced the debate was based on detailed research into the issues confronting the principals of Australian software firms in their quest to build sustainable growing businesses.

In 2003 I was able to take a less active role in the software industry. This gave me the opportunity to undertake the doctoral studies I had first contemplated

\(^1\) The main form of finance required by Australian software firms is capital which may be provided as equity or debt. In this thesis the term capital is used to include the many forms of finance.
undertaking in 1975. My interest was in developing a better understanding of how the principals of Australian software firms build sustainable growing businesses. I felt this issue was poorly understood by, and of central importance to, the principals of Australian software firms.

I was not to know it then but a sensemaking approach to research (Weick 1995) was to become singularly influential in the way I could, with sufficient academic rigour, utilise my personal knowledge of the software industry to convert data into theory.

My undergraduate studies were in Computer Science and Structural Engineering but, since graduation in 1975, much of my business career involved the formation and management of small software firms.

In 1984, after nine years as an employee of software firms developing products utilising mainframe and minicomputers, I formed a company to develop engineering oriented software on Unix workstations. In 1994 I took the company public on the Australian Stock Exchange and moved the operational headquarters to Silicon Valley in California. From then until 2000, having appointed an American based chief executive, I served as an executive director of the Australian, European and American subsidiaries of the company, finally acting as a non-executive chairman until the company was taken over and privatized by the major shareholder. Since 2000 I have, as a non-executive director of a listed software company and in a continuing role as chairman of the advisory board of a small Western Sydney based software firm, continued to take an active role in the Australian software industry. I also carried out a number of consultancy commissions on behalf of the NSW and federal governments. These experiences, as a practitioner, a consultant and an observer provided me with opportunities to view the development of the Australian industry from its earliest days and to appreciate the problems and opportunities confronting current day industry participants.

2 Throughout this thesis I have used America to mean the United States of America.
While working in the software industry I was able to see how software organizations succeeded in international markets and to ask, as many others have (see Benson, Bull and Standen 1999, Marceau, Manley and Sicklen 1997, Richard 2008), why the principals of Australian software firms have found it so difficult to build sustainable growing businesses. During the time I spent in some of the world’s technology centres (‘Silicon Valley’ in California, ‘Route 128’ in Massachusetts and Cambridge, England) I met many technologists, managers and entrepreneurs, but few impressed me as being more able than similar people in Australia. Indeed, on many occasions, I saw first hand evidence that Australian trained technologists were in demand because of their skills and work ethic. However, particularly in America, I perceived a very different attitude towards management and growth. In American organizations the principal’s attitude seemed to be to use the technology as leverage to put in place the foundations to create a sustainable growing business, whereas in Australia the emphasis seemed to be far more focused on the technology, then the survival of the business and then, and only then, growth and sustainability. In Australia I observed that lack of finance was often the issue highlighted, by industry leaders, as the most significant reason why the principals of Australian software firms found it difficult to build sustainable growing businesses. Conversely, my interactions with members of the Australian financial community suggested there was no lack of finance for suitable applicants. These observations led me to ask if a focus on implementing better organizational structures, by the principals of Australian software firms, might result in them being able to obtain appropriate levels of financial support and consequently enable them to achieve better growth and sustainability for their firms.

Having decided, in 2003, that I would like to undertake a doctoral program, to investigate the issue of sustainable growth in Australian software firms, my next task was to establish if there was an appropriate school where I could undertake research into this area. I determined that the Organization Studies group within the School of Management at the University of Western Sydney best met my criteria and I was fortunate to be offered a place in its doctoral program. The choice of school, and my experiences in the software industry, therefore defined an initial framework on which to develop a research program and approach.
In many ways it was fortunate, having not undertaken formal courses in organizational studies or research methods, that I was able to look at the way in which I should approach this work with few preconceived ideas of the best means of achieving my desired research goals. To this end I undertook a program of attendance at internal and external courses and conferences with the aim being to better frame my research objectives. I also undertook an extensive review of the literature on organizational studies to provide me with an understanding of the schools of thought, within that discipline, that might provide me with a theoretical platform on which I could develop my research program. During this process my attendance at the annual conference of the Academy of Management and an external program on mixed methods in research conducted, by the Australian Consortium for Social and Political Research Incorporated (ACSPRI), were to have considerable impact on further framing the approach I was to use.

Very early in my candidature I attended the Academy of Management annual conference in America. In her presidential address, at that conference, entitled ‘Is there such a thing as ‘Evidenced-Based Management’?’, Professor Denise Rousseau asked the audience:

Why, when we as academics spend so much time and effort in studying management practice, does management not take more account of our research into their management practices?

In putting the case for a more ‘Evidenced-based Management’ approach, as a means of improving management practices through organizational research, Rousseau identified the opportunities and the main issues (2006, p. 256):

Evidence-based management…derives principles from research evidence and translates them into practices that solve organizational problems. This isn’t always easy. Principles are credible only when evidence is clear, and research findings can be tough for both researchers and practitioners to interpret. Moreover practices that capitalize on a principle’s insights must
suit the setting. ...Evidence-based management, despite these challenges, promises more consistent attainment of organizational goals, including those affecting employees, stockholders, and the public in general.

Rousseau’s question and the growing emphasis within the academic community, on increasing the impact of academic research in an industry context, set the scene for my approach to this study. Whereas my initial thoughts were to attempt to couch my research in a very structured positivist research program, Rousseau’s address and my subsequent readings convinced me that my work would be of more value if I were to successfully marry my experiences as a practitioner with the discipline of the academy. As I developed my ideas in this area my colleagues guided me in the direction of sensemaking and self-ethnography. This provided me with an understanding of how to integrate my experiences into a formal research program, with the potential to have impact within academic and practitioner communities.

In commencing my doctoral program I had anticipated my research would be very quantitative in nature, because of my strong engineering and scientific background. As I delved further into the literature on organization studies, and reflected upon my experiences in the software industry, the difficulty of establishing precise research questions, which fitted neatly into a quantitative study, became apparent. I struggled further with this approach when it became apparent that there was very little in the literature, on growth and sustainability of software organizations, to guide me in the direction of a body of theory that would neatly provide a platform upon which I could define an appropriate quantitative research program.

My readings of the literature on organizations studies, in general, and the work of my colleagues and their associates, in the area of professional organizations, showed promise but left many questions unanswered. My attendance at the ACSPRI course entitled ‘Using mixed methods in Research and Program Evaluation’ provided me with a better basis upon which I could consider my approach to this study, and again my colleagues guided me as I developed my ideas. The conclusion I reached was that before quantitative studies could be undertaken, there was a need to establish a body of theory that explained the process by which the principals of Australian software
firms could build sustainable growing businesses. The work of Glaser and Strauss (1967), on grounded theory, provided a sound basis to guide me in the development of a body of theory.

1.2 Research Question and Study Approach

The research question to be answered in this thesis is:

Is there a body of theory that explains how the principals of Australian software firms can develop their organizations from small ‘surviving’ organizations to sustainable growing organizations?

My experiences in the software industry, and the growing focus on research impact and community engagement within the academic community, led me to believe this study should examine this question from the perspective of a researcher seeking to marry practitioner experiences and knowledge with a base of existing organizational theory in a manner that will be of value to both academic and practitioner communities.

Within the context of a grounded theory approach this suggested the emphasis in this study should be on developing a body of theory utilising the concepts of sensemaking and self-ethnography, available primary and secondary data sources and existing theoretical models of organizational behaviour.

1.3 The study in context

Software can range from the instructions embedded in the simplest calculator to the computer programs developed to handle the online transactions of the world’s major industries. In each specific computer system there are many different software systems provided by many different suppliers. A typical system may have an operating system supplied by Microsoft, a resource planning system supplied by Oracle and myriad, small to large, purpose-built applications developed by a gamut of international and Australian software firms, self employed contract programmers, or in-house programming staff. The implementation and management of the
computer facilities, in any organization, may be carried out by the developer of the software systems, by a specialist information technology consultancy, a small Australian consultancy or in-house resources. Software developers can come from many industries. Software developers’ training may emanate from extensive formal programs or from ‘self help’ books.

As organizations within the software industry are involved in many diverse facets of the industry, firstly I define the term ‘Australian software firm’ as used in this study, secondly, I position Australian software firms in the context of the world and Australian information technology industries and thirdly, I identify literature sources that pertain to this study.

1.3.1 Australian software firms
In this study Australian software firms are defined as those wholly Australian owned organizations that, as their main business, develop software products (often referred to as packaged software) which they license to multiple customers.

1.3.2 The Australian software industry in an international context
Australians are recognised as significant users of information technology and as being competitive on an international basis but this has not translated into the establishment of a successful local software industry.

1.3.2.1 Use of Computers
In world terms, Australia is a significant user of computer software and computer services, ranking tenth in total spending and sixth amongst the top ten countries on a per capita basis (see Table 1).
Table 1 International Software and Services Spending

<table>
<thead>
<tr>
<th>Country</th>
<th>Software &amp; Services Total $A Millions</th>
<th>Rank</th>
<th>Total ICT Spending</th>
<th>Rank</th>
<th>Population Millions</th>
<th>Rank</th>
<th>Per Capita Software &amp; Services Spending</th>
<th>Rank</th>
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<td>16,419</td>
<td>4</td>
<td>$1.27</td>
<td>4</td>
<td>$3.11</td>
<td>4</td>
</tr>
<tr>
<td>Australia</td>
<td>$20,719</td>
<td>10</td>
<td>$59,637</td>
<td>9</td>
<td>20,743</td>
<td>6</td>
<td>$1.00</td>
<td>6</td>
<td>$2.88</td>
<td>5</td>
</tr>
</tbody>
</table>

(Source: SIIA 2008, UNDESA 2006)

1.3.2.2 International Competitiveness

In terms of the ability of a country’s information technology industry to compete internationally, Australia is very well regarded. In a study conducted by the Economist magazine (EIU 2007), Australia was ranked fifth in overall information industry competitiveness when compared with sixty four other nations. A detailed comparison of the categories comprising the competitiveness index, with respect to the top ten countries (in terms of total spending on computer software and computer services), shows that Australia is consistently ranked in the top five of each category (see Table 2) of information technology industry competitiveness in this grouping.
### Table 2 International IT Industry competitiveness

<table>
<thead>
<tr>
<th>Country</th>
<th>Overall Index Score</th>
<th>World Ranking</th>
<th>Business Environment Rank</th>
<th>IT Infrastructure Rank</th>
<th>Human Capital Rank</th>
<th>Legal Environment Rank</th>
<th>R&amp;D Environment Rank</th>
<th>Support for IT Industry Development Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>77.4</td>
<td>1</td>
<td>1</td>
<td>97.0</td>
<td>1</td>
<td>92.0</td>
<td>1</td>
<td>86.8</td>
</tr>
<tr>
<td>Japan</td>
<td>72.7</td>
<td>2</td>
<td>2</td>
<td>82.0</td>
<td>8</td>
<td>79.0</td>
<td>8</td>
<td>77.1</td>
</tr>
<tr>
<td>UK</td>
<td>67.1</td>
<td>4</td>
<td>3</td>
<td>95.0</td>
<td>2</td>
<td>88.5</td>
<td>2</td>
<td>84.9</td>
</tr>
<tr>
<td>Germany</td>
<td>58.2</td>
<td>16</td>
<td>7</td>
<td>88.0</td>
<td>5</td>
<td>85.0</td>
<td>5</td>
<td>88.5</td>
</tr>
<tr>
<td>France</td>
<td>55.8</td>
<td>18</td>
<td>8</td>
<td>83.0</td>
<td>7</td>
<td>83.5</td>
<td>6</td>
<td>73.6</td>
</tr>
<tr>
<td>Italy</td>
<td>46.4</td>
<td>23</td>
<td>9</td>
<td>72.0</td>
<td>9</td>
<td>74.5</td>
<td>9</td>
<td>69.8</td>
</tr>
<tr>
<td>Canada</td>
<td>64.6</td>
<td>9</td>
<td>5</td>
<td>88.0</td>
<td>5</td>
<td>82.0</td>
<td>7</td>
<td>86.8</td>
</tr>
<tr>
<td>China</td>
<td>27.9</td>
<td>49</td>
<td>10</td>
<td>47.0</td>
<td>10</td>
<td>44.7</td>
<td>10</td>
<td>58.0</td>
</tr>
<tr>
<td>Netherlands</td>
<td>62.9</td>
<td>12</td>
<td>6</td>
<td>91.0</td>
<td>4</td>
<td>87.0</td>
<td>3</td>
<td>89.5</td>
</tr>
<tr>
<td>Australia</td>
<td>66.5</td>
<td>5</td>
<td>4</td>
<td>92.0</td>
<td>3</td>
<td>87.0</td>
<td>3</td>
<td>86.2</td>
</tr>
</tbody>
</table>

(Source: EIU 2007)

#### 1.3.2.3 Sources of ICT Income

However, a more detailed analysis of the nature of the Australian software industry reveals why there is a perception within government and the industry, that Australian software firms could be more successful.

A breakdown of the contributions to total spending on computer software and computer services, prepared by the Australian Bureau of Statistics (ABS), shows the total income in Australia, from the sale and licensing of packaged software in the year ending June 2005, amounted to $A4,354 million (see Table 3). Of this amount Dennis, Houghton, Hogg, Singleton, McLean, Eames and Xydias (2006, p. 9) estimate that $830 million went to Australian developers with the balance of $A3,524 million being earned by non Australian owned software organizations.
Table 3 Australian ICT Income 2004-2005

<table>
<thead>
<tr>
<th>Income Source</th>
<th>ICT Manufacture</th>
<th>ICT Wholesale</th>
<th>ICT Services</th>
<th>Total ICT Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web site design</td>
<td>$707.5</td>
<td>$707.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other internet applications</td>
<td></td>
<td>$143.1</td>
<td>$143.1</td>
<td></td>
</tr>
<tr>
<td>Other customised software services</td>
<td></td>
<td>$1,836.0</td>
<td>$1,836.0</td>
<td></td>
</tr>
<tr>
<td>Other software consultancy services</td>
<td></td>
<td>$2,959.0</td>
<td>$2,959.0</td>
<td></td>
</tr>
<tr>
<td>Software maintenance services</td>
<td></td>
<td>$1,608.0</td>
<td>$1,608.0</td>
<td></td>
</tr>
<tr>
<td>Sale of packaged software</td>
<td>$3,059.8</td>
<td>$1,295.0</td>
<td>$4,354.8</td>
<td></td>
</tr>
<tr>
<td>Total software related income</td>
<td></td>
<td>$8,548.6</td>
<td>$8,548.6</td>
<td></td>
</tr>
<tr>
<td>Other ICT Income</td>
<td>$3,136.3</td>
<td>$27,984.8</td>
<td>$13,634.7</td>
<td>$44,755.8</td>
</tr>
<tr>
<td>Total Income</td>
<td>$3,136.3</td>
<td>$27,984.8</td>
<td>$22,183.3</td>
<td>$53,304.4</td>
</tr>
</tbody>
</table>

(Source: ABS8126 2005)

1.3.2.4 Software Export and Import

This disparity between the sale value of software being developed by Australian software firms and the sale value of software developed by non Australian owned software organizations is also reflected in the analysis of software imports and exports, carried out by the Organisation for Economic Co-operation and Development (OECD) in 2005 (OECD 2006). While the OECD study only considered the value of software imported and exported on physical media, the results of their study show that of the OECD member countries, Australia is ranked twenty third out of thirty countries, in terms of the ratio of software exports to software imports (see Table 4).
## Table 4 OECD Software Exports and Imports 2005

<table>
<thead>
<tr>
<th>OECD Member Country</th>
<th>Software Exports ($US millions)</th>
<th>Software Imports ($US millions)</th>
<th>Ratio of Exports to Imports</th>
<th>OECD Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland</td>
<td>$2,029</td>
<td>$246</td>
<td>8.24</td>
<td>1</td>
</tr>
<tr>
<td>United States</td>
<td>$3,030</td>
<td>$1,244</td>
<td>2.44</td>
<td>2</td>
</tr>
<tr>
<td>Austria</td>
<td>$1,174</td>
<td>$545</td>
<td>2.16</td>
<td>3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>$1,663</td>
<td>$837</td>
<td>1.99</td>
<td>4</td>
</tr>
<tr>
<td>Germany</td>
<td>$3,210</td>
<td>$1,813</td>
<td>1.77</td>
<td>5</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>$135</td>
<td>$96</td>
<td>1.41</td>
<td>6</td>
</tr>
<tr>
<td>Poland</td>
<td>$151</td>
<td>$133</td>
<td>1.13</td>
<td>7</td>
</tr>
<tr>
<td>Denmark</td>
<td>$128</td>
<td>$114</td>
<td>1.12</td>
<td>8</td>
</tr>
<tr>
<td>Sweden</td>
<td>$512</td>
<td>$481</td>
<td>1.06</td>
<td>9</td>
</tr>
<tr>
<td>Mexico</td>
<td>$255</td>
<td>$282</td>
<td>0.90</td>
<td>10</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>$1,523</td>
<td>$1,754</td>
<td>0.87</td>
<td>11</td>
</tr>
<tr>
<td>Japan</td>
<td>$468</td>
<td>$596</td>
<td>0.79</td>
<td>12</td>
</tr>
<tr>
<td>France</td>
<td>$783</td>
<td>$1,345</td>
<td>0.58</td>
<td>13</td>
</tr>
<tr>
<td>Belgium</td>
<td>$362</td>
<td>$626</td>
<td>0.58</td>
<td>14</td>
</tr>
<tr>
<td>Korea</td>
<td>$231</td>
<td>$441</td>
<td>0.52</td>
<td>15</td>
</tr>
<tr>
<td>Hungary</td>
<td>$51</td>
<td>$114</td>
<td>0.45</td>
<td>16</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>$64</td>
<td>$143</td>
<td>0.45</td>
<td>17</td>
</tr>
<tr>
<td>Switzerland</td>
<td>$235</td>
<td>$713</td>
<td>0.33</td>
<td>18</td>
</tr>
<tr>
<td>Greece</td>
<td>$41</td>
<td>$140</td>
<td>0.29</td>
<td>19</td>
</tr>
<tr>
<td>Canada</td>
<td>$341</td>
<td>$1,232</td>
<td>0.28</td>
<td>20</td>
</tr>
<tr>
<td>Spain</td>
<td>$179</td>
<td>$778</td>
<td>0.23</td>
<td>21</td>
</tr>
<tr>
<td>Finland</td>
<td>$44</td>
<td>$233</td>
<td>0.19</td>
<td>22</td>
</tr>
<tr>
<td>Australia</td>
<td>$80</td>
<td>$478</td>
<td>0.17</td>
<td>23</td>
</tr>
<tr>
<td>Norway</td>
<td>$42</td>
<td>$255</td>
<td>0.16</td>
<td>24</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>$6</td>
<td>$44</td>
<td>0.14</td>
<td>25</td>
</tr>
<tr>
<td>Turkey</td>
<td>$17</td>
<td>$125</td>
<td>0.13</td>
<td>26</td>
</tr>
<tr>
<td>Portugal</td>
<td>$20</td>
<td>$181</td>
<td>0.11</td>
<td>27</td>
</tr>
<tr>
<td>Italy</td>
<td>$109</td>
<td>$1,301</td>
<td>0.08</td>
<td>28</td>
</tr>
<tr>
<td>New Zealand</td>
<td>$9</td>
<td>$121</td>
<td>0.08</td>
<td>29</td>
</tr>
<tr>
<td>Iceland</td>
<td>$0</td>
<td>$16</td>
<td>0.01</td>
<td>30</td>
</tr>
</tbody>
</table>

(Source: OECD 2006, p. 69)

It is this gap between the value of software sales generated by Australian software firms and the sales generated by non Australian owned organizations that concerns Australian industry participants, industry advisers and government. Why, they ask, if Australia is so highly regarded in terms of its international information technology competitiveness do Australia’s software firms perform so badly when compared with other nations in terms of software sales? It is this issue which suggests Australian software firms should be more successful and therefore invites the question of why do the principals of Australian software firms have difficulty in building sustainable growing businesses.
1.3.3 The literature pertaining to this study

At the same time the literature that can be considered to pertain to this study is both expansive and very limited.

The literature is expansive because of the ubiquitous nature of the international software industry. As described above, software forms a vital part of the simplest calculator and the most complex supply chain management systems used by the world’s largest retail organizations. A person developing a spreadsheet can be rightly described as a software developer, as can the key developer of Microsoft’s latest operating system. As a result the literature referring to aspects of the software industry can be as diverse as a study on how to implement a statistical procedure using a spreadsheet (Thissen, Steinberg and Kuang 2002) or a study on the contracts used in offshore software development projects (Gopal, Sivaramakrishnan, Krishnan and Mukhopadhyay 2003). Both of those studies, and most of the multitude of other studies that refer to aspects of software, are important to specific sections of the software industry but have little or no applicability in this study. At the same time, literature from many other disciplines can be very applicable to this study. The entrepreneurial literature has applicability when looking at the issue of agency and interest with respect to the principals of Australian software firms. The literature on small business is applicable because most of the organizations being considered in this study can be categorized as being small or micro businesses. Marketing is an important issue for the principals of Australian software firms and so literature relating to small enterprise marketing is relevant. The difficulty a researcher has, when surveying this expansive range of potential sources of information, is as Dennis, Houghton et al (2006) observed, defining and delineating the software industry and, as a consequence, in identifying specific sources of relevant literature.

By limiting the field of interest, to the literature pertaining to organizational issues relating to small software organizations, the sources of relevant literature become very limited. To some extent this is to be expected because, as will be seen, the software industry has existed for less than fifty years and the major developments in the industry have occurred in the 1980s and 1990s. The research conducted in the
software industry has, to date, naturally focussed on the larger organizations, and it is reasonable to expect it will be some time before attention focuses on smaller organizations. It is also reasonable to expect, in an industry that has reported many spectacular success stories during its short history, there will have been far less focus on those organizations that have been less successful.

A review of the many sources of literature that may have been of value to this study revealed almost none dealing with organizational issues in the software industry, and none that directly dealt with issues related to my experiences in the Australian software industry. Those studies that have dealt with organizational issues and the software industry, (or in most cases, the Information, Communications and Technology industry) have, in the main, been concerned with the relationship between organizational issues and technological adoption in organizations. Indeed, there is a growing interest in the organizational literature dealing with organizational change precipitated by the introduction of Information, Communications and Technology (see Barrett, Grant and Wailes 2006).

This study, however, is concerned with organizational issues in businesses that develop software, rather than organizational issues arising because of the use of software. In this context the literature is very sparse.

Nonetheless, I was drawn to the literature on organizational studies, and in time, to the work of the institutional theorists. While much of that work dealt with professional organizations the manner in which the literature dealt with how socially constructed belief and rule systems exercise control over organizations seemed to reflect my experiences in the Australian software industry. Therefore, while the literature that is directly relevant was very limited, as will be seen in Chapter Four, I was able to draw extensively upon the literature dealing with institutional theory in developing this thesis.
1.4 Overview of the study

In Chapter Two I first describe the process by which a grounded theory approach was chosen as a basis for marrying my experiences in the software industry with data from a number of other sources and with existing theory, in order to develop a body of theory dealing with sustainable growth in the Australian software industry.

I describe procedures I established, to reduce the effects of bias, and then describe the manner in which I selected the various data sources to be used in the study. Semi-structured interviews were an important source of data used in this study, and the selection of interview participants, in the context of the grounded theory approach, is described in some detail.

In Chapter Three I describe my analysis of the data by use of the constant comparative method.

In Chapter Four I describe how I sought to increase my theoretical sensitivity in the field of organization studies. The work described in this chapter proceeded in parallel with the work described in Chapters Two and Three. I recognized that while I brought to this study many years of practitioner experience, in the software industry, my relative newness to the field of organization studies required me to develop a level of theoretical sensitivity enabling me to marry the results of my analysis with existing and emerging theory.

I used Richard Scott’s (2003) seminal work on organizations to frame my study of organizational theory, in the context of the information technology industry. This led me to the view that an institutional theory approach would best enable me to study the Australian software industry. I then considered the work of Meyer and Rowan (1977) and DiMaggio and Powell (1983) on institutional forces in the context of the Australian software industry. This confirmed my view of the validity of an institutional approach in the development of theory in this study, but left unanswered questions with respect to the effects of agency and interest, and the definition of an organizational field, in an industry where professionalization does not seem to be a
driving force towards organizational isomorphism. DiMaggio’s work on institutional entrepreneurship (DiMaggio 1988) provided a basis for dealing with the issue of agency and interest and, as is described in Chapter Five, his work on the development of an organizational field in art museums in America (DiMaggio 1991) provided me with guidance in identifying and defining organizational fields in the Australian software industry.

In Chapter Five I ask:

What organizational structure is appropriate for an Australian software firm whose principals wish to attract capital? What is the predominant organizational structure that has been implemented by the principals of Australian software firms?

I consider this question in the context of classification schemes of organizational structure. I determine firstly that I need to identify and define one or more organizational fields encompassing Australian software firms. This task was somewhat problematic as, by this stage, I had identified that existing knowledge of the nature of the Australian software industry is very limited. I therefore followed the approach used by DiMaggio (1991) wherein he examines the process of institutional definition (structuration) of organizational fields in American art museums. In light of the limited data available, I undertook my analysis of organizational fields in the Australian software industry based upon my understanding and sense of the history and institutional context of that industry. In doing this I argue that the issue of ‘ownership’ of the customer is a dominating influence on the structuration of organizational fields that encompasses Australian software firms.

I then consider the work of Burns and Stalker (1966) and Mintzberg (1980) in determining classification schemes describing organizational structures implemented by the principals of Australian software firms. From this work I conclude the Australian investment community prefers Mintzberg’s adhocracy structure and the organizational structure implemented by most principals of Australian software firms corresponds to Mintzberg’s entrepreneurial structure. This then led me to ask if the
principals of Australian software firms can change the structure of their organizations from entrepreneurial to adhocracy.

In Chapter Six I first attend to a preliminary question where I ask:

Why and when do the principals of Australian software firms seek to change the prevailing structure of their organizations?

I consider this question in the context of data obtained from my initial semi-structured interviews with industry participants, and follow up specific questions asked of participants who deal with Australian technology organizations. I conclude it is probable the precipitating event for a principal of an Australian software firm to seek advice is a financing shock, in the form of a need to raise capital, or the desire to sell an organization. I conclude it is probable that only when the principals of Australian software firms seek advice, upon encountering a financing shock, that they become aware of the importance of organizational structure. I also conclude, organizational fields encompassing Australian software firms are likely to be tightly coupled and impermeable and therefore, if the principals of Australian software firms attempt to change the structure of their organizations, change will, of necessity, be radical and revolutionary in nature.

I then ask:

Can the principals of Australian software firms change the structure of their firms from entrepreneurial to adhocracy so as to be able to present their firms to potential investors as being investment ready?

My answer to this question is grounded in the work of Greenwood and Hinings as described in two seminal papers.

Greenwood and Hinings (1996) consider radical organizational change in an institutional context. In their paper Greenwood and Hinings propose the use of a model of organizational change which I extend to describe radical organizational
change, in the context of the Australian software industry, based on the ideas that have emerged from the previous chapters of this thesis.

In an earlier paper, Greenwood and Hinings (1988) consider what might happen during an attempted change from one organizational structure towards a different organizational structure, using the concept of organizational tracks. I extend Greenwood and Hinings’ model by relating it to my observations of the manner in which change occurs in Australian software firms. Of importance in presenting my extensions is my view, developed from many observations, that changes will take much longer than envisaged by the principals of Australian software firms and by investors in Australian software firms.

I then combine the two models, developed by extension of Greenwood and Hining’s work, to provide a unified model explaining the process by which principals of Australian software firms can change their firm’s structure from entrepreneurial to adhocracy.

In developing the model and the supporting theory emerging from the data collected and analysed in this study, I answer the research question of this thesis. The developed model and the supporting theory explains the process of change in structure of Australian software firms from entrepreneurial to adhocracy which is necessary if the firm’s principals are to build sustainable growing businesses.

In Chapter Seven I first provide a summation of the work described in this thesis. I then outline a proposal for a research project that has developed from this thesis. I finish this thesis with a short concluding commentary.
2. METHODOLOGY AND DATA SOURCES

The manner in which I arrived at the methodology, upon which this work is based, was prescient of the methodology itself. My first inclination, reflecting my undergraduate studies in engineering and mathematics, was to undertake a very structured quantitative study. As I considered the issues, broadened my learning experiences and read the organizational studies literature, the single path I assumed I would follow branched out. While the ensuing journey involved many dead ends the route that enabled me to effectively develop appropriate theory is described in this chapter.

The starting point for this journey was that I considered organizational issues to be at the heart of why the principals of Australian software firms find it difficult to build sustainable growing businesses. My research into how I might best investigate these matters led me to being accepted into the doctoral program in the Organization Studies group within the University of Western Sydney.

My review of the organizational studies literature, the available data pertaining to Australian software firms and my discussions with academic and industry colleagues suggested an institutional perspective would be appropriate. However, much of the institutional work was oriented towards the professions in an organizational setting which meant I needed to reconsider the existing theory if it was to be relevant in the context of the Australian software industry. In my attempts to do this I found the work of Glaser and Strauss (1967), in *The Discovery of Grounded Theory*, provided a means by which I could develop a body of theory to deal with growth and sustainability issues in Australian software firms.
The chapter proceeds in two parts. The areas dealt with in these sections and their subsections are:

Section 2.1  my choice of a grounded theory approach, the manner in which I implemented the approach and the steps taken to collect and analyse the data

Section 2.2  the various sources of data used in this study.

2.1 Methodology

Glaser and Strauss argue (1967, p. 3) ‘generating grounded theory is a way of arriving at theory suited to its supposed uses’. This concept drives my thesis. As will be seen in the ensuing work, many reasons for the espoused lack of success of Australian software firms have been posited by researchers and government commissioned study groups. However none of these seem to develop theory which can be used to critically examine the issues affecting this industry.

A grounded theory approach is, essentially, a set of flexible analytical guidelines that promotes the development of appropriate theories through successive levels of data analysis and conceptual development. It is this successive development that is important for this work, as it was only by a process of continual analysis, review and reflection that a realistic picture emerged of how this industry operates. Within a grounded theory approach the issues of closeness to the field and the interaction of data collection and analysis are very significant:

A grounded theory approach encourages researchers to remain close to their studied worlds and to develop an integrated set of theoretical concepts from their empirical materials that not only synthesize and interpret them but also show processual relationships.

Grounded theory methods consist of simultaneous data collection and analysis, with each informing and focussing the other throughout the research process. Charmaz (2005, p. 508)
These three interacting aspects; closeness to the studied world, data collection and analysis, are central to the development of grounded theory as described by Glaser and Strauss (1967) yet, as is illustrated to some extent by their later disagreements (see Glaser 1992), the researcher has a degree of latitude in choosing the implementation methodology. In this study I chose to deal with these three aspects in the following manner.

2.1.1 Closeness to the studied world

The collection of data was not conducted in a sequential fashion. As I collected data I analysed, reviewed and reflected on the data in concert with my increasing knowledge of organizational theory before I moved on to further data collection, analysis, review and reflection. At times that approach meant I collected data of little use to me or I had to discard parts of the developing theory that could not be reconciled with insights that emerged from newly collected data. The benefit, however, of taking a reflexive approach was that I was able to continually review the development of the work with my colleagues and with participants in the field.

In this manner my approach was very much that of a phronetic organization researcher where the emphasis is on using experience and judgement in focussing on what is variable, on that which cannot be encapsulated by universal rules and on specific cases (Flyvbjerg 2006, p. 372).

For contemporary studies researchers get close to the organization, phenomenon or group that they study during data collection and remain close during the phases of data analysis, feedback, and publication of results…this strategy typically creates interest in the research by parties outside the research community. These parties will test and evaluate the research in various ways. Phronetic organization researchers will consciously expose themselves to positive and negative reactions from their surroundings and are likely to derive benefit from the learning effect, which is built into this strategy. Flyvbjerg (2006, p. 377)
By maintaining a continued closeness to the studied world positive reactions assisted me in developing my ideas but in many cases it was the negative reactions which were most useful in promoting the validity of my research. An example of this is well illustrated in the following chapter (see section 3.4.2 ) where I describe how my thinking on the role of advisers, to the principals of Australian software firms, changed significantly because of negative feedback.

2.1.2 Data Collection

Every researcher tries to base the development of theory on accurate and consistent evidence. The ideal is to identify clearly those data sources that accurately represent the field. For me, this was problematic as the field encompassing the Australian software industry is ill defined. Indeed I discovered defining the boundaries of the Australian software industry was a very important part of the development of a fit theory. Initially this presented me with a circuitous problem (particularly as my initial leaning was towards a quantitative study). Until I had identified the field I could not properly select participants to be studied, yet I needed data on the field in order to be able to properly define it. Glaser and Strauss (1967, p. 23) provided strong guidance on how to deal with this issue:

In generating theory it is not the fact upon which we stand, but the conceptual category (or a conceptual property of the category) that was generated from it...In discovering theory, one generates conceptual categories or their properties from evidence; then the evidence from which the category emerged is used to illustrate the concept. The evidence may not necessarily be accurate beyond a doubt...but the concept is undoubtedly a relevant theoretical abstraction about what is going on in the area studied.

Therefore, the approach I used was to garner evidence from the following sources (which are described in more detail in Section 2.2) so as to develop as accurate a picture as possible upon which to develop the theory. This approach was used because my goal was the development of theory which could subsequently be tested with appropriate explicit verification studies.
1. Sensemaking wherein I looked back on my experiences in the software industry to make sense of the other data sources and to fill gaps in the data from those other sources.

2. Self-ethnography wherein I was able to, as an ‘observing participant’, record aspects of the Australian software industry at close hand in a rigorous manner.

3. Secondary data from Australian government and industry reports on aspects of Australian technology industries and management issues.

4. Secondary data from international studies on aspects of the information technology industry.

5. Commentaries obtained from documents Glaser (1992, p. 33) describes as non-professional, popular and ethnographic literature.

6. A program of field research based upon the use of semi-structured interviews conducted with Australian venture capital managers, advisers to the principals of Australian software firms and principals of Australian software firms.

7. Informal discussions with information technology industry participants, lawyers, accountants, investors and others who expressed an interest in my work.

As a substantial amount of the data used in the study emanates from my personal experiences or depends upon interpretation in the context of my experiences it might be argued that the methodology used could be more accurately described as a reflective case study than a grounded theory study. I am conscious of this distinction, particularly in the light of Suddaby’s advice (2006) on ‘What grounded theory is not’. To emphasise this distinction I have categorised my study as using a Grounded Theory Approach which reflects that the approach I have followed is based upon the advice of Glaser and Straus’s initial work but that I have also been influenced by the writings other scholars such as Schön (refer to section 4.1) and Flyvbjerg (refer to section 2.1.1) in conducting this study.

2.1.3 Analysis
Glaser and Strauss (1967, p. 1) emphasize the general method of comparative analysis to be a major strategy used for furthering the discovery of grounded theory.
However, as acknowledged by Glaser and Strauss (1967, p. 21), ‘The term comparative analysis - often used in sociology and anthropology – has grown to encompass several different meanings and thereby to carry different burdens.’ They delimit their use of comparative analysis to the generation of theory but, as Boeije (2002, p. 391) observes, the application of their method continues to remain rather unclear. While this ambiguity presents some problems to the researcher, three issues are regularly referred to (see Boeije 2002, Glaser and Strauss 1967, Urquhart 2001) as having considerable importance in the application of a comparative analysis strategy: relevance, theoretical sampling and theoretical saturation. These three concepts underpinned my implementation of the comparative analysis methodology.

2.1.3.1 Relevance and bias

The starting point for this study was to ask ‘what issues are referred to in studies on the Australian information technology industry, by industry participants and by industry advisers that most affect the growth and sustainability of Australian technology organizations?’ This formed the basis for more specific questions which I used in the comparative analysis of the data sources available to the study. From then, at each new stage of development of the study, after reflection and review I posed further questions to be used for comparative analysis. The relevance of each question was subjective as it was based upon my interpretation and analysis of the data available to me at each stage. As that data included sensemaking and self-ethnography data its value also had to be considered in the light of my potential biases.

On the issue of bias and objectivity, Agar (1996, p. 99) comments:

> Whether it is your personality, your rules of social interaction, your cultural bias towards significant topics, your professional training, or something else, you do not go into the field as a passive recorder of objective data. During field work, you are surrounded by a multitude of noises and activities. As you choose what to attend to and how to interpret it, mental doors slam shut on the alternatives. Although some of the choices may be consciously made,
others are forced by the weight of personal and professional background that you bring to the field.

In an ideal world a researcher will dispassionately and objectively develop procedures to undertake theoretical and empirical research. These will meet the exacting requirements of objectivity and rigour the academic community demands and minimise the effects of personal and professional biases. However it is not an ideal world and consequently this is a hotly contested field. Neopositivists argue by the development of well structured research instruments and procedures objectivity can, and must, be achieved whereas Romantics argue there is the need to explore complex issues that cannot be achieved in a context free environment (see Alvesson 2003a, p. 20). Consistent with this advice, I argue to conduct this research without taking into context my own experiences and continuing involvement within the software industry would be to ignore the contribution these experiences add to the understanding of the issues being canvassed. It is probable however, as suggested by Agar, I could not avoid a level of bias and so my approach was to pragmatically seek a balance between the views of the Neopositivists and the Romantics and, by a process of reflection and review, to as much as is possible reduce the effects of bias.

I was very aware reliance on statements of pragmatism might provide some comfort but would carry little weight if they were not accompanied by a clear strategy to minimise the effects of bias so as to increase the validity of the research. I therefore took the following approach to minimising bias in all aspects of my study.

Norris (1997) acknowledges while it is easy to label potential sources of bias it is difficult to specify procedures that, if followed, will systematically eliminate bias and error. He therefore suggested, to keep research honest and fair (1997, p. 174):—

A consideration of self as a researcher and self in relation to the topic of research is a precondition for coping with bias. How this can be realised varies from individual to individual. For some, it involves a deliberate effort at voicing their prejudices and assumptions so that they can be considered openly and challenged. For others it happens through introspection and
analysis. The task, if you like, is seeing what frames our interpretations of the world.

I have voiced those factors that may have influenced my interpretations and, as will be seen in the ensuing chapters, framed my work in the context of questions encouraging a continuing process of introspection and analysis. Nonetheless, even by the use of these processes, charges may fairly be laid that I relied too much on experiences that did not carry, with them, the rigour of disciplined research. With the objective of introducing an additional layer of disciplined research to complement my experiences as an ‘observing participant’ (see section 2.2.2) I therefore developed and undertook a program of field research based upon the use of semi-structured interviews.

Ideally one would be able, in the research design of the data collection instrument, to eliminate the threats to validity inherent in the use of a qualitative research program. This is no easy task as Maxwell (1992, p. 296) observes:

...prior elimination of threats is less possible, both because qualitative research is more inductive and because it focuses primarily on understanding particulars rather than generalizing to universals.

My approach to the elimination of threats to validity was to establish and use a checklist.

Maxwell suggests a strategy of addressing particular threats to validity after a tentative account has been developed rather than by attempting to eliminate these in the research design. To aid in that approach he presented a model of the types of validity that he considers to be relevant to, and often implicit in, qualitative research which he sees as being (1992, p. 296) ‘...useful both as a checklist of the kinds of threats to validity that one needs to consider and as a framework for thinking about the nature of these threats and the possible ways that specific threats might be addressed.’
Based upon the work of Maxwell (1992) and later works by Johnson (1997) and Norris (1997) I developed a validity checklist (Table 5) which I used in all aspects of my study.

**Table 5 Validity Checklist**

<table>
<thead>
<tr>
<th>Checkpoint</th>
<th>Summary Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive Validity</td>
<td>Did what has been reported happen? Did events that were inferred from other data happen? Has any relevant part of an event been omitted?</td>
</tr>
<tr>
<td>Interpretive Validity</td>
<td>Have the research participants’ viewpoints, thoughts, feeling, intentions and experiences been accurately understood and portrayed by the researcher?</td>
</tr>
<tr>
<td>Theoretical Validity</td>
<td>Does the theoretical explanation developed from the study fit the data and therefore is the theory credible and defensible?</td>
</tr>
<tr>
<td>Generalizability</td>
<td>Is the extent to which the accounts of particular situations or populations have been extended to other persons, times or settings appropriate?</td>
</tr>
<tr>
<td>Evaluative Validity</td>
<td>If an evaluative framework has been used has it been applied consistently?</td>
</tr>
</tbody>
</table>

(adapted from Johnson 1997, Maxwell 1992, Norris 1997)

2.1.3.2 Theoretical Sampling

At each stage of the study having posed a new question the next task was to identify the source of the data that would enable appropriate answers to be derived. The choice of data was made by the process of theoretical sampling (Glaser and Strauss 1967, p. 45) whereby the decision on what data to collect is based upon the incremental development of theory as it emerges from the data. A simple coding scheme was adopted wherein whenever a match was identified between an identified theme and a statement in a report or a response from a participant a cell in a matrix was highlighted with an x (see for example Table 10 Issues affecting sustainable growth). As the aim of the coding scheme was to identify themes rather than to
attempt to introduce a level of quantification, counts of occurrence were not noted. At each stage of the study I collected, coded and analysed data and then made the decision on the next step in the process. It is the answer to the question posed in each stage of this process that drove the decision on which data to collect next in this study or whether I needed to undertake further analysis of existing data sets.

2.1.3.3 Theoretical Saturation

How much data to collect was considered in the light of Glaser and Strauss’s (1967, p. 61) advice:

The criterion for judging when to stop sampling the different groups pertinent to a category is the category’s theoretical saturation. Saturation means that no additional data are being found whereby the sociologist can develop properties of the category.

2.1.4 The collection and analysis process

The process by which I collected and analysed the data can be summarised as follows:

1. A question was posed, based upon the analysis performed to date.
2. The relevance of the question was considered in the light of a validity checklist (see Table 5) to reduce the effects of bias.
3. The question was modified until I was satisfied it met the requirements of relevance and objectivity.
4. Data was collected that could be used for comparison against the posed question.
5. I compared the question against the data and coded it in the light of the procedures adopted to reduce the effects of bias.
6. I collected additional data that I considered necessary to enable continuing analysis until theoretical saturation was achieved.
2.2 Data Sources

Growth and sustainability issues of small software firms have received very little attention to date in Australia or internationally. This presented a problem to me because choosing a starting point was problematic. Traditional approaches of review of the available literature within the field of interest, or perhaps consultation with other researchers who had shown an interest in this particular area were, to a large extent, not available. Indeed my choice of school in which to undertake this work was (and to a lesser extent, continues to be) questioned by some who have asked if the work would be better dealt with in schools that focus on information technology or entrepreneurial studies. While these questions are fairly put, my reasons for the choice of school and approach to growth and sustainability issues of Australian software firms were firmly seated in my years of experiences within the Australian software industry. It is those experiences of my direct and continuing involvement in the Australian software industry, from its earliest days, that suggested my knowledge of the industry would form a valuable source of data for this study.

Whilst I contend that sensemaking and self ethnography provided important sources of data for this study, to rely solely upon those sources would have diminished their value. I also obtained data from Australian industry reports, from international studies, from non-professional, popular and ethnographic literature and from a program of field work. I describe these sources of data in detail in the following sections.

2.2.1 Sensemaking

Karl Weick’s simple description of sensemaking as (1995, p. 4) ‘the making of sense’ encompasses much of the way in which I approached this study. The use of personal experiences as a basis of understanding is one of the central themes of the phenomenon of sensemaking. Making sense of data often relies on the accumulation of real world experiences in a manner that cannot easily be codified. In the ensuing chapters when I document my thinking on development of suitable theory a reader might see a logical development of an argument based upon clear facts. The reality is that the documenting of the path taken represents a very small window into the
reflection and review that led to this written representation of the process in a manner which is well described by Weick (1995, p. 12):

...think about the wonderfully compact account of sensemaking mentioned by Graham Wallas. “The little girl had the making of a poet in her who, being told to be sure of her meaning before she spoke, said: ‘How can I know what I think till I see what I say?’ ” (Wallas 1926, p. 106)

Sensemaking has long been recognized as an essential skill where the experienced practitioner’s diagnostic skills rely on making sense of an array of sometimes seemingly unrelated facts. Polanyi (1961) termed this skill as ‘knowing and being’ by which he credits the acquisition of knowledge as transcending the mere accumulation of facts. He considers the capacity to acquire knowledge is often (1961, p. 468) ‘exercised within an accidentally given framework that is largely unspecifiable.’ My approach to problem solving throughout my career has been to gather as much relevant data as can be obtained within the time and resources available to me and then to commence interpretation. Whilst this continues to be fundamental to my research approach I am increasingly aware of the veracity of Polanyi’s observations.

In considering the use of an organizational studies approach I used supporting evidence (which I describe below) but I also relied on personal reflections and input from my peers when little historical data was available. The manner in which sensemaking showed me a means of learning from those sources is surmised in Weick, Suttcliffe and Obstfeld’s description (2005, p. 409):

Sensemaking involves the ongoing retrospective development of plausible images that rationalize what people are doing. Viewed as a significant process of organizing, sensemaking unfolds as a sequence in which people concerned with identity in the social context of other actors engage ongoing circumstances from which they extract cues and make plausible sense retrospectively, while enacting more or less order into those ongoing circumstances.
Upon reflection, I perceive retrospection and the use of cues as essential guiding influences in my business career and in this study retrospection and the use of cues have continued to strongly influence the manner in which I have attempted to make sense of the interaction of organization theory and Australian software firms.

And so, while it now appears self evident that sensemaking was an essential part of my business decision making and the foundation upon which I have made sense of the interaction between organization theory and the Australian software industry it was only when I reflected upon past cues that the sense becomes self evident. Indeed it was only after much writing and editing that a clear picture began to emerge. As Weick, Sutcliffe and Obstfeld observe, the quest for meaning in organizational life involves three important points (2005, p. 409):

First, sensemaking occurs when a flow of organizational circumstances is turned into words and salient categories. Second, organizing itself is embodied in written and spoken texts. Third, reading, writing, conversing, and editing are crucial actions that serve as media through which the invisible hand of institutions shapes conduct.

It was in the writing, reviewing, reflecting and rewriting of this thesis in consort with my reflections on my past experiences, my discussions with my peers and my reading of an eclectic collection of papers from academic journals and management books that I was able to make some sense of the interaction between organization theory and the Australian software industry.

2.2.2 Self-Ethnography
The focus on retrospection, suggests Weick (1995, p. 24), is perhaps the most distinguishing characteristic of the present conceptualization of sensemaking. In this study I had had some thirty years of experiences to reflect on as I attempted to make sense of the interaction of organization theory and the Australian software industry. So retrospection made a strong contribution in this study. This process relied, to a large extent, on memory aided by reference to a variety of documents hoarded in
archive boxes from years past. In referring to those old documents I was conscious, while they were valuable resources, they were produced as records of specific business activities, as memoranda to colleagues and as records of results and actions taken, but not to suit the needs of potential undefined future research projects.

When I commenced my doctoral candidature I was the chairman of the advisory board of a small software company located in Western Sydney. Despite my retirement from active participation in the Australian software industry as a practitioner, I continued to be actively involved in the industry by attendance at industry seminars, conferences and social functions. The software company asked me to continue in the role of chairman and I have continued my active involvement in the industry. In the years prior to the commencement of my candidature I observed the development of the industry in a non-systematic, unstructured manner with little or no thought about the potential future use of my observations. However, since the commencement of my candidature, I have observed and recorded the continuing development of the software industry (in the context of this study) in a systematic and rigorous manner. The undertaking of research in this manner is firmly grounded in the discipline of ethnographic studies in its modern form (sometime referred to as ‘organizational ethnography’ (Swanson and Holton 2005, p. 291)) where one ‘...makes contacts, finds a trail into a research site, hangs around and asks questions, struggles to figure out how to analyse uncontrolled material, and worries about the generalizability of the results.’ (Agar 1996, p. 7)

This approach, because of the extent of my direct involvement, is more specifically described by Alvesson as self-ethnography (2003b, p. 174):

A self-ethnography is a study and a text in which the researcher-author describes a cultural setting in which s/he has a ‘natural access’, is an active participant, more or less on equal terms with other participants.

Alvesson comments in this role the researcher might better be described as an ‘observing participant’ rather than in the well understood ethnographic role of participant observer (Agar 1996, p. 32) because the ethnographer who takes on a role
in an organization does so in order to be able to carry out the research whereas the idea of self-ethnography (Alvesson 2003b, p. 175) ‘is to utilize the position one is in also for the other, secondary purposes, i.e. doing research on the setting of which one is a part.’

2.2.3 Studies on the Australian information technology industry

An important source of secondary data, that contributed to this study, was significant government and industry reports produced since 1983 on the information technology industry. While very few of these sources refer directly to the Australian software industry, they did provide insights into the thinking of government and its advisers on the key issues affecting the growth and sustainability of Australian software firms.

Whether or not there is a need for the development of sustainable and growing Australian owned businesses within the information technology industry has generated much debate. Many studies (see Benson et al. 1999, Charles, Allen and Buckeridge 1997, Espie 1983, Goldsworthy 1997) have argued for the development of a strong domestically owned industry principally on the basis of a worsening trade deficit in information technology products. Other studies (see Gretton, Jyothi and Parham 2002, Parham, Roberts and Sun 2001) have argued that productivity gains come from the use of information technology rather than from the production and ownership of information technology. In recent years changes in government policies suggest the emphasis on reducing the balance of trade deficit in information technology products has lessened. However for much of the last twenty five years continuing concerns in this area seem to have been the main impetus prompting the production of many studies.

In 1983 the Espie report was released which marked a watershed for technology industries in Australia. During the decade following its release, the implementation of many government initiatives mooted by the Espie report resulted in an improved operating environment for the principals of technology organizations. In the 1990s two very significant reports were produced, the Karpin report in 1995 which focussed on management and industry development issues in general, and the
Goldsworthy report in 1997 which focussed specifically on information technology issues. Since the release of the Karpin and Goldsworthy reports many other industry-specific studies have been conducted that look at the place of Australian industry in an increasingly knowledge focussed world. Some of these studies considered the role of Australian organizations in the international software industry.

2.2.3.1 The Espie Report 1983

In the early 1980s the High Technology Financing Committee of the Australian Academy of Technological Sciences, under the Chairmanship of Sir Frank Espie, was commissioned to examine issues relating to the creation and growth of Australian high technology enterprises. The resulting report (Espie 1983), *Developing High Technology Enterprises for Australia* (Espie report) set the scene for many of the issues affecting the development of the information technology industry in Australia since then.

Espie believed Australia had failed to grasp the opportunities offered by high technology industries for wealth creation and employment growth. As employment in Australian manufacturing industry was in decline he identified high technology industry development as a major issue to be addressed by government (1983, p. 1). He identified a number of impediments to the creation of viable, new, high technology enterprises but noted three major obstacles (Espie 1983, p. 10).

1. Finance Obstacles – The lack of a venture capital market with the complementary management skills of the venture managers was seen as a serious gap in the Australian financial markets. The deficiency in this area was seen as substantially reducing the prospects for the establishment and subsequent successes of Australian high technology enterprises when compared with the opportunities offered to equivalent firms in American markets where there was an established venture capital market. The lack of a viable venture capital market was seen to result in existing financial institutions being requested to fulfil an inappropriate role as providers of start up and early stage patient capital, a role they were reluctant to embrace.
2. Market and Taxation Obstacles – The self evident limitations of Australia’s small domestic market and remoteness from international markets were seen to have been compounded by negative community attitudes that saw entrepreneurs as taking advantage of, rather than contributing to, the community’s development. Similarly, restrictive taxation arrangements and the lack of appropriate technology infrastructure were seen to disadvantage high technology industries.

3. Management Obstacles – The report identified a number of limitations in the management capabilities of the principals of Australian high technology enterprises. Many of the limitations centred around the lack of management training for entrepreneurs from science and engineering backgrounds and the inability, or reluctance, of these to acquire appropriate skills or to recruit trained managers or advisers. Lack of adequate planning for the future, lack of experience in framing investment proposals and the failure of principals of high technology enterprises to appreciate the importance of balanced management teams comprising a mix of skills were stressed as significant issues.

2.2.3.2 Other information technology oriented reports

In 1984 Coopers and Lybrand looked at opportunities for software product development in New South Wales (CAL 1984). In addition to the self evident limitations of a small local market and distance from major software markets the report identified the limited availability of capital and shortage of technical skills as being factors limiting the growth of the local software industry.

In 1985 the Federal Department of Industry, Technology and Commerce (Morris and McAlister 1987) reported on a series of surveys that had been conducted to examine issues relating to the Australian software industry. Their report indicated (Morris and McAlister 1987, p. 46) ‘for all firms (but especially fast growers), lack of finance was viewed as the major impediment to industry growth and to its ability to export.’
The researchers recognised the growth potential of the Australian software industry but noted a major prerequisite was rationalisation of the domestic industry into fewer and larger entities. They reasoned (Morris and McAlister 1987, p. 54):

This is due to the fact that the industry faces a major structural problem: because of their small size, firms are unable to generate sufficient revenues to undertake the appropriate development or marketing of new software products. In stating this it is important to note another finding of this Chapter. This concerns analysis of the survey data relating to the ability of firms in the industry to obtain external finance for growth. The results suggest the problems faced here are no different from those faced by small firms operating in other areas of the economy.

The Industry Commission’s report on Computer Hardware, Software and Related Service Industries published in 1995 echoed many of the issues raised in previous reports, made a number of recommendations about specific government supported programs and noted (Parker and Johns 1995, p. 17):

However, many firms have little access to equity finance…The reluctance of investors to fund small and medium sized firms is well documented. It reflects the relatively high incidence of failure of small businesses and the difficulty that investors face in assessing the risks – particularly where the business is based upon a piece of intellectual property.

These, and many similar reports, provided insights into quite specific aspects of the information technology industry. In 1997 a major study of the totality of the Australian information technology industry was conducted under the chairmanship of Professor Ashley Goldsworthy. This is still referred to as, arguably, the most significant study on the Australian information technology industry.

2.2.3.3 The Goldsworthy Report 1997

By the mid 1990s, despite the implementation of many of the initiatives mooted in the Espie report, the deficit in information technology trade in Australia had grown
from $A1.7 billion in 1985 to $A3.5 billion (Goldsworthy 1997, p. 48) and was projected to grow to a deficit in excess of $A46 billion by 2005 (Goldsworthy 1997, p. i). In part recognition of this growing problem the Information Industries Taskforce was established in 1997 by the Australian Federal Government’s Department of Industry, Science and Tourism to provide advice on the development of a National Information Industries Strategy.

The report of the Information Industries Taskforce (Goldsworthy Report) identified seven key challenges to be the focus of a National information Industries Strategy (Goldsworthy 1997, p. 5):

1. Recognition of the size, impact and strategic importance of the information industries, and the need for a National Information Industries Strategy;
2. National Leadership commitment to information technology;
3. Proactive investment attraction;
4. Going global – exporting information and communication technology to the world;
5. Enabling and empowering users across the economy;
6. Enhancing skills formation, education and training; and
7. Enhancing research, development and innovation.

Of the seven challenges, the issue of proactive investment attraction warrants more detailed examination because successive studies, and the Australian information industry, have argued a major barrier to success has been the lack of investment capital. The ease of access to venture capital in California’s Silicon Valley has often been cited as the major determinant of the success of new firms within the American information technology market whilst the lack of capital in Australia has been cited as a significant reason explaining the relatively poor performance of Australian information technology organizations. Yet one of Silicon Valley’s pre-eminent venture capitalists, Donald Valentine says (Kenney and Florida 2000, p. 98):
Very few people understand why what works here and in Boston works. It's very difficult to clone those environments. Too many people think that the criticality in the environment is the money. For me the criticality in the environment are the entrepreneurs.

Of course it is easy to downplay the importance of the money when it is readily available. There is a body of evidence supporting the view that the level of capitalisation positively contributes to the marginal survival and growth of new organizations (Cooper, Gimeno-Gascon and Woo 1994, p. 391). In addition to the self evident positive effects of increased financial viability that accrue after a successful financing round, the support of an appropriate investor has an important signalling effect on an organization’s employees, customers and suppliers and this signalling effects can also exert a positive influence on growth and sustainability (Davila, Foster and Gupta 2003, p. 706).

The relationship between investment capital and growth was well recognised by the Information Industry Taskforce (Goldsworthy 1997, p. 35):

> Access to capital is fundamental to the development of the information industries. There must be fully functioning venture capital markets in Australia. Venture capital backed companies can make a very substantial contribution to employment and growth.

The taskforce specified an agenda of eleven separate actions to be taken to attract of investment in Australian information technology. The agenda items (Goldsworthy 1997, p. 28) included recommendations on the establishment of agencies to promote investment in Australia, taxation reform, rationalisation of government support programs and programs designed to improve the quality of management.

In setting the action agenda the taskforce also recognised that the quality of the potential investments was significant (Goldsworthy 1997, p. 35):
During our consultations we received mixed messages. Many of those seeking finances for start-up ventures complain that there is not enough capital available. Many of those running venture capital funds claim that they have sufficient funds for the good ventures, but not enough good ventures come forward. Probably, the truth lies somewhere between the two extremes. It is clear that many ventures are not investor ready. Many lack sufficient management skills and a convincing business or marketing plan. Australia must achieve a rise in the number and quality of venture capital proposals.

The lack of management skills was an issue that was not unique to the information industry as documented in a number of general industry reports produced during the 1990s.

2.2.3.4 Management Skills

In parallel with the efforts of the Information Industries Taskforce there was a growing awareness during the mid 1990s of the inadequacies of Australian management. In 1992 the Australian government established the Industry Taskforce on Leadership and Management Skills which produced the Enterprising Nation report for the Department of Employment, Education and Training in 1995 (Karpin 1995). The report presented an unflattering picture of Australian management skills at the small and medium enterprise level (Karpin 1995, p. xvi):

For small and medium enterprises, bridging the gap to world best practice will be an even more challenging exercise. The nature of small business tends to make their managers more entrepreneurial and customer oriented than those of their larger counterparts, and also to engender functional or soft people skills. However, in the other areas there are significant gaps to be bridged and major constraints of size to be overcome by leveraging mechanisms. In the main, small to medium enterprise managers are not tertiary qualified and do not undertake management development to any significant extent. While there are many who are globally oriented, the vast majority are not. The small scale of these enterprises also makes a
commitment to quality, and the development of longer-term strategic skills, difficult.

The issue of low levels of management skills within the small and medium business sector and the scarcity of development capital are themes running through many of the reports relating to Australian business efficiency, produced during the 1990s. While not limited to an examination of information technology industries much of the commentary in these reports is of relevance to this study.

Marceau, Manley and Sicklen in examining alternatives for Australia’s future observed (1997, p. 9):

The quality of Australian management appears to be low by world standards and this is a concern for the future of industrial innovation. This is reflected in a relatively low export propensity by Australian companies, an apparent inability to commercialise Australian inventions and an apparent low priority given to human resource development programs.

They also pointed to survey results suggesting the lack of capital was the major impediment to innovative activity by firms.

These themes of management ineffectiveness and the importance of finance continue to appear in various industry reports and commentaries produced since the Goldsworthy and Karpin reports, as indicated by the following selected industry commentaries.

2.2.3.5 Industry commentary

Charles, Allen and Buckeridge comment that reasons for the lack of competitiveness of Australia’s information technology industry included (1997, p. 41):

Low local company survival rates and growth constraints are critically affected by the lack of private equity (capital) resources.
In their report on the Australian Software Industry, Dennis, Houghton et al (2006, p. 10) observed:

There was a strong feeling among those consulted that the relative strength of Australian software producers was under-appreciated and under-valued by other industries and by many in Government...

and they identified the industry’s major weaknesses as including the difficulty in obtaining appropriate levels of investment capital, maintaining domestic market share and developing supportive relationships with the public research base. They further observed:

A number of studies of the information technology industry in Australia have concluded that the availability of appropriate investment, and especially second-tier, patient capital, is its most significant weakness

but countered this with statements from an Australian Information Industry Association submission (in Dennis et al. 2006, p. 76):

A common view within the local information technology industry is that there is a low level of availability of venture capital and later stage private equity funds.

On the other hand the venture capital sector and business angel networks believe that capital availability is not the problem; rather it is one of quality deals being available.

In a report to the Innovation Council on a project aimed to match Western Sydney SME software companies with Multinational Corporations to increase export leverage, Dougan and Rankine (2003, p. 1) concluded:

Most SMEs are not partnership or investment ready. Even if they have sound profitable businesses they, in most cases, do not have the supporting
documentation and business discipline to enable MNCs to evaluate their potential as partners.

Bill Ferris, one of the recognised founders of the Australian venture capital industry, in reflecting on some of the important lessons he has learnt, succinctly summarises what he sees as the key issue for the principals of Australian software firms (2000, p. 79):

If a high quality and experienced management team is in place, be prepared to pay full price for the deal. If there’s a low quality and inexperienced team, chances are that no price will prove to be cheap.

2.2.4 Specific studies on Australian software firms

Apart from government and industry sponsored reports, referred to above, there is little evidence of detailed research into the factors affecting the building of sustainable growing Australian software firms. This probably reflects dramatic changes that have occurred in the economics of the operation of software organizations.

Until the 1990s software licensing costs, while small in proportion to hardware costs, were very high. For example: the first two sales in June 1984, made by the software company formed by me in May 1984, realised gross margins of over $90,000 on a total sale value of less than $120,000. Those sales covered the salaries of the three employees for the next six months. The equivalent sales today would realise well under $10,000 in gross margins on a total sale value of $25,000 which would not cover the cost of one employee for one month. The high margins generated from software sales during the 1980s meant the principals of software firms could readily absorb mistakes by a few sales in a sellers’ market. In the 1990s the dot.com boom convinced many entrepreneurs that all they needed was some technology and a good story in order to raise seed capital, make an initial public offering and make their fortunes (see Cassidy 2002, Collins 2000).
So from the earliest days of the software industry until the dot.com boom ended in the early part of the 21st century there was little to suggest an entrepreneur needed to worry about the mundane task of building a sustainable growing business. Even those books that vicariously allowed one to follow the careers of Gates, Ellison, Page and Brin (see Battelle 2005, Symonds and Ellison 2003, Wallace and Erickson 1993) as they, in a very few years, built very large software organizations and joined the lists of the world’s richest people perpetuated the myth that all that was needed was a good product. These books, while providing insights into the world’s software industry, don’t provide insights into the organizational issues that confronted the industry icons and, to that extent, they are of little relevance to the principals of an Australian software firms operating in a very small market

2.2.5 International Studies

There have been few international studies dealing with issues of organizational structure in information technology organizations. The Stanford Project on Emerging Organizations (SPEC) carried out by a group within the Stanford Graduate School of Business tracked nearly two hundred high technology start ups in California’s Silicon Valley from 1994 until 2002. Papers produced by SPEC researchers (see Baron, Hannan and Burton 1999, Baron, Hannan and Burton 2001, Baron and Hannan 2002, Hannan, Baron, Hsu and Koçak 2006) provide valuable insights into factors affecting the development of high technology organizations. None the less one has to be cognisant of significant differences between the environment under which the SPEC project was carried out and the Australian environment. The organizations under consideration in the SPEC study were not necessarily involved in software type activities and on average employed 75 people (Baron and Hannan 2002, p. 8) whereas the majority of Australian information technology organization employ fewer than 20 people. (Houghton 2003) More importantly, Silicon Valley occupies a unique position as the model invariably cited when cities or countries endeavour to foster information technology innovation within their precincts. Michael Porter categorises Silicon Valley as one of the premier examples of an industrial cluster and observes (Porter 1998, p. 84):
Clusters are conducive to new business formation…The formation of new businesses within a cluster is part of a positive feedback loop. An expanded cluster amplifies all of the benefits I have described - it increases the collective pool of competitive resources which benefits all the cluster’s members. The net result is that organizations in the cluster advance relative to rivals at other locations.

The advantage organizations involved in the SPEC study enjoy because of their location in the high technology cluster in Silicon Valley and because of their direct access to a very large domestic market delimit comparisons with organizations located within Australia. That comparisons between the development of software firms in Australia and those in Silicon Valley might be invalid is well illustrated by Campbell-Kelly’s (2003, p. 306) observation on the development of the American software industry that, even for those firms based in the America, proximity to like firms is a critical issue in their development.

The Secrets of Software project carried out under the auspices of McKinsey and Company involved interviews with the chief executives of one hundred of the world’s software organizations. The resulting book (Hoch 2000) provides an overview of the development of the international software industry and provides many insights into what made some of the largest software organizations so successful. Microsoft Secrets (Cusumano and Selby 1998), written in 1996, delves into many of the organizational issues confronting Microsoft executives as they built the world’s largest and most profitable software company. It is telling, however, that in the preface to the paperback edition published in 1998 the authors acknowledge the research into the book was conducted before the release of Windows 95 and the emergence of the Internet, events of great significance in the continuing development of Microsoft and the world’s software industry. A more recent book by Michael Cusumano (2004), The Business of Software, delves more into the management and strategy issues of organizing and running software organizations but with a strongly America-centric flavour. As the international software industry matures it is to be expected there will be increased interest in the issue of organization of software
businesses but, at this time, the literature covering organization of small and medium software firms is very sparse.

The literature that does exist provides insights that were useful in this study but just as the SPEC study, with its focus on the unique environment of Silicon Valley, might be of limited value to the principals of Australian software firms so too are there limitations on how much could be interpreted from other works mentioned above, in the context of the Australian software industry. Therefore, in the development of theory covering the growth and sustainability of Australian software firms, I referred to aspects of many of these works as a relevant source of secondary data but with a continuing awareness of the significant differences existing between the Australian and international environments for software organizations.

2.2.6 Other works

I have also, throughout this thesis, referred to commentaries obtained from documents that Glaser describes as non-professional, popular and ethnographic literature. There is an absence of formal studies on the history of the development of the information technology industry, and books by Cringely (1993) and Rose (1989), reflections from industry veterans (see Ferranti 1994, Head 2001, Rogers 2004) and extracts from industry websites and magazines (see for example: ACS 2001, Jones 2007, McAdam 2007) offer little in the way of conceptualizations. However they do offer contemporary insights into the development of the information technology industry and as Glaser explains, these documents (1992, p. 37) ‘...may be read at any stage of the research as data...They help generate concepts and hypotheses just like all data and no one knows the difference when studying the theory. These readings are just more data for analysis.’

2.2.7 Field Research

I implemented a program of field research using semi-structured interviews. I did this to promote the validity of my interpretations rather than, in a positivist sense, to attempt to introduce some level of quantitative confirmation of validity. While some theorists argue, as does Smith (1984, p. 389), that ‘the antifoundationalist nature of
interpretive inquiry means that no epistemological privilege can be attached to any procedure for doing or criterion for judging this approach to inquiry’, I see the process of systematic qualitative enquiry as providing value in the sense as espoused by Johnson (1997, p. 282) that ‘when qualitative researchers speak of research validity, they are usually referring to qualitative research that is plausible, credible, trustworthy and, therefore defensible.’

This of course invites the question, ‘How do you conduct plausible, credible and trustworthy research?’ I applied a validity checklist (see section 2.1.3.1) and I maintained closeness to the studied world so as to reduce the effects of bias. This approach was used in developing the semi-structured interview questions and in the analysis of data from the interviews. There were, however, two additional threats to validity of which I was conscious.

Firstly, as Hatch and Yannow (2003, p. 67) note: ‘Both researcher and researched are, then, situated entities: their meaning-making and meaning is contextualised by prior knowledge and history and surrounding elements.’ In the small marketplace of the Australian software industry the degrees of separation between any of the participants are few. Many of the interview participants were known to me from past associations or by reputation and similarly it is probable to some extent they were aware of my previous involvements in the industry. Prior knowledge and history can potentially, if only subtly, influence the manner in which questions are put or responses are given.

Secondly, Baxter and Eyles suggest immersion in the research context of interest is a traditional means of lending credence to qualitative research but caution (1997, p. 509): ‘The researcher may “go native” whereby the study group, and not the community of researchers, becomes the main group with whom the researcher identifies.’ It is this issue of ‘going native’ that is often the significant challenge for researchers who have joined the community of researchers after an extended period of involvement within the study group. My counter to this is that it is this very
immersion in the study group that helped me develop suitable theory for the Australian software industry.

The first step in the interview process was to develop a semi-structured interview instrument. A draft instrument was developed and trialled with academic colleagues. The instrument was then revised and submitted to the University of Western Sydney Human Research Ethics Committee for approval. Following the granting of approval, by that committee, the instrument was further tested by conducting pilot interviews with an experienced venture capital manager and a lawyer who had been involved in documenting many Australian technology investments. Based on the pilot testing some small modifications were made. The letter sent to participants, the confirming approval of the research methodology by the UWS Human Research Ethics Committee and the initial instrument utilised in the interviews are included in Appendices A, B and C.

At each stage of the development of the theory the decision on the data needed in order to progress the study was reviewed and, when appropriate, new interview instruments were created and a list of potential participants was developed. Therefore the use of semi-structured interviews in this study was in the context of the process which Glaser and Strauss term theoretical sampling (1967, p. 45):

Theoretical sampling is the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges.

Using this method of sample selection I decided to interview participants from the following groups.

2.2.7.1 Venture Capital Managers

In commencing the collection of data in this process Glaser and Strauss (1967, p. 45) advise the researcher to not base initial data source decisions on a preconceived
theoretical framework, but that it is acceptable to begin the research with a partial framework encompassing a few gross or principal features of the structure and processes in the study. It is in this manner I selected the first participants to be interviewed and the nature of the semi-structured questions to be used.

As has been noted previously, my decision to undertake doctoral studies was strongly influenced by my perception that factors affecting the ability of the principals of Australian software firms to build sustainable growing businesses might be closely related to the organizational structures implemented by those principals. Therefore while not having identified a particular theoretical framework upon which I could develop my research I had, in my choice of research area and school, established a partial framework for my project. Central to this approach was the need to develop an understanding of the Australian investment community’s preferred organizational structure for Australian software firms.

Of equal importance was the need to compare the views of the Australian investment community, on the factors affecting the ability of the principals of Australian software firms to build sustainable growing businesses, with the views espoused in the studies previously noted. I thought Australian venture capital managers were the group that could assist me because they are regularly involved in making non-emotional decisions about investing in Australian software firms. The reasons for choosing to start with them were:

1. The primary aim of venture capital managers is to invest in organizations which they have identified as being capable of rapid sustainable growth (see AVCAL 2007, Davila et al. 2003, Golis 2002, Gupta 2000, Kenney and Florida 2000). Venture capital rewards are heavily weighted to the achievement of a large increase in value in the organizations they invest in. For most software organizations value is maximised for those having a history of continuing rapid growth (see Golis 2002, p. 46). Therefore it was reasonable to expect successful venture capitalists would have developed a high level of expertise in
evaluating the characteristics most typifying organizations capable of achieving rapid sustainable growth.

2. Venture capitalists typically consider thousands of potential investments but only invest in a very small number of organizations. In 2005-2006 Australian venture capital managers reviewed 6,688 potential new investments, conducted further analysis on 724 of those and invested in 201 organizations (ABS5678 2006, p. 5). This suggests these managers would have been well placed to comment on the reasons affecting the ability of a company to achieve sustainable growth.

3. A common refrain from principals of Australian software firms, and their advisers, is that the ability of principals to build sustainable growing businesses is directly affected by the scarcity of capital available to them in Australia. The commentary of venture capital managers on this issue may have provided insights on this issue.

Having developed an initial survey instrument the next step in the process was to select participants to be interviewed. In undertaking this task I continued to be guided by the advice of Glaser and Strauss (1967, p. 48) in that the selection criterion, in the context of a grounded theory approach, is that of theoretical purpose and relevance in the support of the generation of theory rather than that of verification. To this end I developed a short list of venture capital managers who had an extended history within the Australian technology investment community and who were generally recognised by the Australian technology and investment community as being the pre-eminent Australian venture capital managers. How I developed this shortlist was as follows:

1. From my experiences I nominated those managers whom I believed should be included in this list. This was based on personal experience, by reference to their continuing exposure in the technology and investment press and to their representation on industry and government committees relating to the information technology industry.
2. I asked acquaintances, who had some exposure to investment in technology, to nominate managers whom they thought should be included on the list. These acquaintances included the partner of an international accountancy firm who is responsible for the operation of the Australian section of the firms international ‘Entrepreneur of the Year’ competition, the senior commercial partner of a major Australian law firm and a stockbroker who has been actively involved in promoting technology stocks.

3. I reviewed the list of member organizations of the Australian Private Equity and Venture Capital Association (AVCAL) who had been classified as being involved in investment in information technology in order to identify any additional managers that might satisfy my criteria.

My initial shortlist included six venture capital managers whom I felt could best add value to my research because of their reputations within the Australian venture capital industry. I also included in my list an investment banker who had worked closely with the venture capital community for many years. I then, with the assistance of the three acquaintances mentioned above, made direct contact with each manager to ask them if they would participate in my research. The response was excellent and all but one of the managers on my shortlist agreed to participate. Of the seven managers on my shortlist I was able to interview four plus a senior manager nominated by one of my short list candidates. Circumstances prevented me from carrying out a formal recorded interview with one manager (VC6) but I was able to have an extended informal meeting with him. The venture capital managers who were interviewed are detailed in Table 6.
Table 6 Venture Capital Managers

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>VC1</td>
<td>Venture Capital Manager in Australia since 1984 after 16 years in the information technology industry in Europe. Author of book on Enterprise and Venture Capital.</td>
</tr>
<tr>
<td>VC2</td>
<td>Formed a specialist information technology investment firm in 1987 after 30 years of working in the Australian information technology industry.</td>
</tr>
<tr>
<td>VC3</td>
<td>Early stage investments director of one of the largest Australian technology investors since 2001, after eight years corporate finance experience with an international accounting firm.</td>
</tr>
<tr>
<td>VC4</td>
<td>Formed corporate advisory firm specialising in raising capital for small businesses in 1983. Provides specialised programs for entrepreneurs in commercialisation and manages the annual Pitchfest competition.</td>
</tr>
<tr>
<td>VC5</td>
<td>Formed corporate advisory firm specialising in small and medium firms in 2001 after 25 years as an investment banker.</td>
</tr>
<tr>
<td>VC6</td>
<td>Over twenty years experience in Australian and international venture capital firms. Now serves on the board of a number of publicly listed technology organizations and has chaired several Australian government technology review committees.</td>
</tr>
</tbody>
</table>

2.2.7.2 Industry Advisers

I also developed a short list of industry advisers to interview who might provide me with different insights than from those provided by the venture capital managers. For this section of the study my aim was to canvass a wide range of views. My list of potential participants might best be described as eclectic rather than specific. My reasons for this approach were:

1. Advisers to the Australian software industry can range from former industry practitioners who now advise the principals of Australian software firms on aspects of their business where the advisers have some experience to specialists who provide advice on compliance and regulatory matters. This would
encompass advisers who assist in developing software development strategies to accountants who advise on appropriate international transfer pricing strategies. A cursory glance at the backgrounds of the panels formed over the last twenty years to advise government on information technology matters (for example: Dennis et al. 2006, Ferranti 1994, Goldsworthy 1997, Houghton 2003, Mumby, Dougan, Rankine, Watson and Marriott 2003) reveals a plethora of backgrounds and levels of formal training in information technology areas.

2. Principals of firms learn how to operate their organizations from many sources. They do this by attending industry specific seminars conducted by industry organizations (for example: the Australian Computer Society and the Australian Information Industry Association), by attending seminars conducted by government organizations (for example: NSW Department of State and Regional Development or the Federal Department of Information Technology and the Arts) or by attendance at general or specific seminars provided by various academic, business, legal and accountancy bodies. Also they commission advisers to work on specific projects.

The range of sources of advice and the number of seminars held each year suggested this advice must be under consideration, to some extent, by the principals of software firms and therefore would, probably, be having an effect on how they developed their strategies for achieving sustainability and growth in their organizations. While the sources and nature of information are diverse it was important, within the resource constraints of this study, to canvas the views of a range of advisers.

In carrying out the interviews with industry advisers, I was able to use the interview instruments developed for the venture capital managers with some minor amendments. By the time I commenced adviser interviews I had already interviewed several venture capital managers and had refined the interview instruments. I had reduced questions and relied more on open questions. The main preparatory work then involved selection of interviewees. The selection of participants for this series of interviews differed markedly from the process used in the development of the short list of venture capital managers in that the number of venture capital managers in
Sydney is limited, their role with respect to information technology organizations is clearly defined and I was able, with relative ease, to develop a list of those venture capital managers who would be most likely to provide me with data that would assist me in my development of an understanding of the main issues. As there is a large range of those people who might describe themselves as advisers to the principals of Australian software firms, a different approach to the development of a short list of potential participants had to be used in this stage. My approach in developing the short list of potential participants in this stage is often referred to as purposeful sampling or judgement sampling (see Patton 2002, p. 230) where the emphasis is on learning about the central issues rather than in generalising from a representative sample. In developing my short list of potential participants in this section I followed the advice of Patton who said (2002, p. 244) ‘Sample size depends on what you want to know, the purpose of the inquiry, what’s at stake, what will be useful, what will have credibility, and what can be done with available time and resources.’ Acting upon this advice I developed a short list on the following basis:

1. I looked for advisers who had been involved in the industry for at least ten years and those who seemed to have had some involvement in the Australian software industry. I used my own experiences as a preliminary guide and sought advice from venture capital managers, from lawyers and from accountants who had dealt with participants in the Australian software industry.

2. I reviewed the lists of speakers who had made presentations at industry seminars over the last five years to obtain the names of people who had spoken regularly on issues pertaining to the company development issues with respect to Australian software firms.

I then added to this list the following people:

1. Representatives of selected industry and professional associations and government officers directly involved in advising the principals of Australian software firms.
2. Four people, three of whom had achieved success in their information technology businesses and one in a non information technology industry, who now invest in Australian software firms.

3. Two principals of Australian software firms who had successfully listed their organizations on the Australian Stock Exchange. These two people were selected because of their experiences in the Australian software industry and because both continue to be very much involved in advising government and industry on the development of the industry.

As might be expected the list of potential participants satisfying the above criteria was too large to allow me to interview them all within the time available. I therefore ranked my preliminary list, firstly in order of my perceived value of them to this study and secondly, in order of their involvement in serving on government and industry panels related to the Australian software industry. In this manner I was able to reduce my short list to twenty potential interview participants. Again the response to my requests to conduct an interview with potential participants was excellent and I was able to conduct interviews with sixteen people on my short list of potential participants. The advisers who were interviewed are detailed in Table 7.

<table>
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<tr>
<th>Code</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ADV1</td>
<td>One of the founders of the Australian information technology industry. Assisted in the building of SILLIAC, established ICL in New York – adviser to Australian Information Technology organizations since 1975</td>
</tr>
<tr>
<td>ADV2</td>
<td>Introduced first computer timesharing service to Australia in 1963. Spent 16 years in the Australian information technology industry then 19 years as managing director of the Australian division of a major international information technology research company. Advises small and medium information technology organizations and publishes a widely read industry newsletter.</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
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<tr>
<td>ADV3</td>
<td>Spent 22 years in marketing and management roles in the Australian information technology industry before establishing corporate marketing information and planning advisory company specialising in information technology in 1988.</td>
</tr>
<tr>
<td>ADV4</td>
<td>Formed advisory firm in 1987 specialising in advising small firms on implementation of computer systems after 12 years as a user of information technology. Since 1992 has focussed on business planning for start-ups and small businesses.</td>
</tr>
<tr>
<td>ADV5</td>
<td>Worked in the computer industry since 1966 as a programmer then in sales and marketing with US computer organizations. From 1992 worked in the recruitment industry and developed an online recruitment system. Now advises Australian software firms on marketing strategies and convenes the Australian Computer Society’s Small and Medium Enterprise Special Interest Group in NSW.</td>
</tr>
<tr>
<td>ADV6</td>
<td>Worked in a number of federal government departments in policy roles associated with information technology and now has a policy and management role in the Australian Information Industry Association.</td>
</tr>
<tr>
<td>ADV7</td>
<td>Worked in the mining industry in a business development role for 15 years then worked with the Australian branches of two international computer organizations from 1983 until 1992 where he was responsible for managing the commercial arrangements with Australian information technology organizations. Since 1992 has advised small and medium organizations in utilising information technology products.</td>
</tr>
<tr>
<td>ADV8</td>
<td>Joined IBM in 1970 then worked for major international computer organizations until 2002. In those organizations was directly involved in commercial projects in partnership with many smaller Australian information technology organizations. Now provides marketing advice to larger information technology organizations including one of Australia’s largest software firms.</td>
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</table>
Table 7 Industry Advisers

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<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADV9</td>
<td>Urban and regional planning, politics and sociology background. Planning and policy role in regional growth with a focus on innovation networks in state government. Currently responsible for managing a government sponsored information technology cluster initiative.</td>
</tr>
<tr>
<td>ADV10</td>
<td>Worked in private sector in management roles then state government for last six years in innovation and technology roles. Currently involved in managing a government sponsored information technology cluster initiative.</td>
</tr>
<tr>
<td>ADV11</td>
<td>Joined the Australian subsidiary of a US hardware company in 1964. Formed a contract programming company with three other colleagues in 1975. Is chief executive of that company providing packaged software solutions in the legal industry</td>
</tr>
<tr>
<td>ADV12</td>
<td>Joined UK technology infrastructure company as Managing Director of Northern Europe after 25 years in the information technology industry in Australia and Europe. Over five years employees grew from 250 to 5,000 and revenues grew from £28million to £450million. Now acts as an ‘Angel Investor’</td>
</tr>
<tr>
<td>ADV13</td>
<td>Worked as a chartered accountant in the UK and Australia for ten years the formed a company to develop applications in Lotus Notes working closely with IBM. Now also invests in software organizations in the environmental area.</td>
</tr>
<tr>
<td>ADV14</td>
<td>Trained as a chemical engineer but started a tree felling business in 1977 which he built into Australia’s largest vegetation management company. Now also invests in technology organizations as an ‘Angel Investor’</td>
</tr>
<tr>
<td>ADV15</td>
<td>Completed Science and Engineering degrees in 1977. Formed a contract programming company in 1980 which he built into one of Australia’s largest software and services organizations. Listed on the ASX and then was acquired by Telstra. He now invests in technology organizations and is actively involved in information technology industry associations.</td>
</tr>
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</table>
Table 7 Industry Advisers

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<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>ADV16</td>
<td>Left school at 16 then did a Control Data programming course in 1974. Joined the Australian subsidiary of a US hardware company in 1975. Started a software company in 1988 which he listed on the ASX. He now invests in technology organizations and is actively involved in information technology industry associations.</td>
</tr>
</tbody>
</table>

2.2.7.3 Principals

During the initial stages of this study I thought semi-structured interviews with the principals of Australian software firms would be at the heart of this work. However, as I developed my ideas and a body of theory began to emerge I learned that interviews with a large sample of principals of Australian software firms may not add materially to my understanding of the issues because:

1. The definition of a field encompassing Australian software firms began to assume central importance in this study. The definition of an Australian software firm, in itself, was problematic as the description could fit: a one employee contract programming company that does not develop any software for resale; Integrated Research which invested more than $A6.3 million in developing software for resale throughout the world in 2007 (IR 2007, p. 42) or; Computershare which invested more than $A43.3 million on technology development in 2007 (Computershare 2007, p. 7) but is a company that only develops software for its own internal use in providing share registry services. While this study is concerned with those Australian owned software firms whose principal activity is to develop software products for resale or licensing to third parties, this still encompasses a large and eclectic group of organizations.

2. From my observations of a large range of industry participants I perceived that many of the principals of Australian software firms are seeking answers to the questions that I was asking and they would probably only be able to offer anecdotal opinions, largely based on information obtained from many sources.
While that information might have helped in adding to my understanding of the industry participant’s thoughts on the problems, it was probable their views would not materially differ from information already available from secondary sources (see Benson et al. 1999, Dennis et al. 2006) or from the views expressed by the advisers whom I had interviewed.

The emerging theory in this study suggested boundaries needed to be placed on the field of Australian software firms being considered and it is likely that multiple fields exist rather than one single identifiable field. Further, the emerging theory suggested, in the software industry, organizational fields would be defined by the vertical industries the various software firms were servicing rather than by professional associations within the software industry.

By this stage of the study I felt the theory that had emerged provided a credible model describing the manner in which the principals of Australian software firms approached the development of their businesses. I had also identified a need to develop a much clearer picture of the organizational fields existing within the Australian software industry and, in order to do this, studies needed to be carried out centred around the software firms servicing particular vertical industries. I therefore chose to conduct a limited set of interviews with principals of Australian software firms servicing two specific vertical industries.

The principals I interviewed came from within the following groups:

**Software for strata title managers**

The first group provides packaged solutions used by managers of strata title properties in Australia. This group was chosen because, in my role as chairman of the advisory board of one of the organizations, I have as an ‘observing participant’, been able to gain an appreciation of how the software firms, providing software to strata title managers, operate. In addition, to the principal of the company that I am involved with, I made contact with the principals of the two largest providers of packaged software to strata title managers in Australia. Both of these principals were
fully aware of my role with one of their competitors and the potential conflicts of interest that might arise from the interviews. Nonetheless both principals were very cooperative and very open in the interviews.

Software for the construction industry

The second group was the principals of Australian software firms which provide packaged software solutions used by the Australian construction industry. Following a presentation by me on my research interests, at a software industry forum, the principal of one of those software firms asked to meet with me with a view to advising him on how best to approach the future expansion of his company. While I declined the offer to act in a consulting role I met with him on a number of occasions, attended a number of his newly constituted advisory board meetings and conducted a semi-structured interview with him. Following on from this series of meetings I then identified two additional software firms providing solutions to organizations operating in the Australian construction industry and arranged to conduct semi-structured interviews with the principals of those organizations.

The principals of the two Australian software firms that were interviewed are detailed in Table 8.
Table 8 Principals of software firms

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>PSA1</td>
<td>Principal and owner of an Australian software company that develops, markets and supports software used by strata title managers. Based in Queensland with clients throughout Australia.</td>
</tr>
<tr>
<td>PSA2</td>
<td>Principal and owner of an Australian software company that develops, markets and supports software used by strata title managers and property managers. Established in 1979. Based in Sydney with offices in Sydney, Melbourne, Brisbane, Perth, Adelaide and Auckland.</td>
</tr>
<tr>
<td>PSA3</td>
<td>Principal and owner of an Australian software company that develops, markets and supports software used by strata title managers. Based in the Blue Mountains with clients throughout Australia.</td>
</tr>
<tr>
<td>PSB1</td>
<td>Principal and owner of an Australian software company that develops, markets and supports software used by construction organizations for project management. Based in the Sydney with clients mainly in NSW. Started selling software in 1982.</td>
</tr>
<tr>
<td>PSB2</td>
<td>Principal and owner of an Australian software company that develops, markets and supports software used by construction organizations for project management. Based in the Sydney with offices in Queensland, Victoria and New Zealand. Clients throughout Australia.</td>
</tr>
<tr>
<td>PSB3</td>
<td>Principal and owner of an Australian software company that develops, markets and supports software used by construction organizations for project management. Based in the Northern Beaches, Sydney. Started selling software in 2004.</td>
</tr>
</tbody>
</table>

2.2.8 Informal Discussions

On many occasions, during the study, I had the opportunity to discuss the development of my ideas with information technology industry participants, lawyers, accountants, investors and others who expressed an interest in my work. These discussions often provided me with additional valuable data points. Also, I contacted a number of people in order to ask a specific question relating to when the principals of Australian software firms seek advice. I have listed, in Table 9, those people with
whom I did not undertake a formal interview but who have been referred to in this thesis.

### Table 9 Informal interview participants

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID1</td>
<td>Partner in international accountancy firm. National director of entrepreneurial services and responsible for the operation of the Australian section of the firm’s international entrepreneur competition.</td>
</tr>
<tr>
<td>ID2</td>
<td>Partner in a small Sydney based legal practice. Practice incorporates documentation of merger and acquisition agreements for small and medium enterprise clients.</td>
</tr>
<tr>
<td>ID3</td>
<td>Senior commercial law partner in major Australian legal practice.</td>
</tr>
<tr>
<td>ID4</td>
<td>Sole practitioner lawyer specialising in assisting the principals of small and medium organizations seeking to raise capital or to sell their businesses.</td>
</tr>
<tr>
<td>ID5</td>
<td>Partner in medium sized accountancy firm that does compliance work for a number of small and medium technology organizations.</td>
</tr>
<tr>
<td>ID6</td>
<td>Managing director of boutique Sydney based investment fund with over forty years experience in the Australian finance industry. Mainly invests in mining ventures but has made a number of technology investments.</td>
</tr>
<tr>
<td>ID7</td>
<td>Managing director of a medium sized wholesale funds manager. Prior to establishing the fund he worked in the funds management department of a major Australian bank.</td>
</tr>
</tbody>
</table>

### 2.3 Chapter summary

In this chapter I described the manner in which I selected the data acquisition methodology that would form the basis of the grounded theory approach being used in this study and the manner in which I analysed that data.

Firstly I described key components of the grounded theory approach and the manner in which I dealt with those components in this thesis. In doing so I acknowledged, because of my role as a practitioner, that I needed to address the issue of bias and
objectivity. I dealt with these issues by developing a checklist against which I checked all aspects of my research, by a continuing process of introspective review and by maintaining a closeness to the studied world.

I then considered the potential data sources which would assist the purpose of the study, the audience I would be addressing with the results of the study and the data sources available to me. Because of my prior and continuing experiences in the Australian software industry, sensemaking and self-ethnography emerged as important sources of data in helping me in understanding the interaction between organization studies and the Australian software industry. Reports commissioned by government on the Australian information technology industry, a limited number of relevant international studies and writings, described as being non-professional, popular and ethnographic in nature, provided valuable secondary data sources. To complement those sources I implemented a program of semi-structured interviews to introduce an additional level of academic rigour to the study and to facilitate the asking of specific questions of industry participants..

I described the process that I used to design and validate the semi-structured interview instrument and noted, as the interviews progressed, because of the willingness of the participants to cooperate and contribute to the study I was able to reduce the number of questions I needed to ask in order to elicit the required information. I then described the manner in which I selected the participants to be interviewed, using a purposeful sampling approach.
3. ANALYSIS

In Chapter Two I described my choice of a grounded theory approach, the manner in which the approach has been implemented, the sources of data used in this study and the analysis methodology. This chapter describes my analysis of the data.

The chapter proceeds in seven parts. The areas dealt with in these sections and their subsections are:

Section 3.1 identification of the central themes relating to the issue of sustainable growth of Australian software firms. Industry reports on the Australian information technology industry and interviews with venture capital managers are analysed.

Section 3.2 availability of capital in Australia, a major theme identified in section 3.1.

Section 3.3 investment readiness of Australian software firms, the other major theme identified in section 3.1.

Section 3.4 views of the advisers to the principals of Australian software firms.

Section 3.5 timing of advice, a theme identified in section 3.4.

Section 3.6 definition of organizational fields encompassing Australian software firms, an issue assuming central importance in this study.

Section 3.7 some sense of the nature of the Australian software industry is identified.
3.1 Stage 1 – Main themes

In this stage my aim was to identify central themes relating to the issue of sustainable growth of Australian software firms. These central themes would then form the basis for further analysis. To this end I examined the published reports on the information technology industry and the semi-structured interviews conducted with Australian venture capital managers.

The reports on the information technology industry were chosen as the first source of data for comparative analysis because, over an extended period, each of the reports critically examined issues affecting the viability of some aspects of the Australian information technology industry. Each report also made specific references to what the authors saw as being strengths and weaknesses of the industry. My objective in this stage was to identify the range of issues and therefore I made no attempt to weigh any relative importance of the issues.

3.1.1 Question 1 – Growth and sustainability

Firstly, I asked: ‘What issues are referred to as most affecting the growth and sustainability of Australian technology organizations?’ I analysed each of the ten reports mentioned in Chapter Two. Table 10 shows all of the significant issues mentioned in the reports.
Table 10: Issues affecting sustainable growth

<table>
<thead>
<tr>
<th>Issues affecting growth and sustainability</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Skills</td>
<td>x</td>
</tr>
<tr>
<td>Technical skills base</td>
<td></td>
</tr>
<tr>
<td>Distance from markets</td>
<td></td>
</tr>
<tr>
<td>Intellectual property protection</td>
<td></td>
</tr>
<tr>
<td>Australian standards differ from world standards</td>
<td></td>
</tr>
<tr>
<td>Size of Australian companies - need for aggregation</td>
<td></td>
</tr>
<tr>
<td>Taxation reform</td>
<td>x x x</td>
</tr>
<tr>
<td>Commercialisation skills</td>
<td>x x x</td>
</tr>
<tr>
<td>Increased profile with government MNCs and customers</td>
<td>x x x</td>
</tr>
<tr>
<td>Government sponsored development programs</td>
<td>x x</td>
</tr>
<tr>
<td>Lack of investor skills to help in commercialization</td>
<td>x x</td>
</tr>
<tr>
<td>City fragmentation inhibits industry cluster formation</td>
<td>x</td>
</tr>
<tr>
<td>Focus on key vertical markets</td>
<td>x x x</td>
</tr>
<tr>
<td>Poor government focus on high technology industries</td>
<td>x</td>
</tr>
<tr>
<td>Very open competitive marketplace.</td>
<td>x x</td>
</tr>
<tr>
<td>Government procurement policies</td>
<td>x x x x x</td>
</tr>
<tr>
<td>Local demand from local customers</td>
<td>x x x x</td>
</tr>
<tr>
<td>Support relationships with the public research base</td>
<td>x x x x</td>
</tr>
<tr>
<td>Domestic market share</td>
<td>x x x x</td>
</tr>
<tr>
<td>Appropriate venture and development capital</td>
<td>x x x x x</td>
</tr>
</tbody>
</table>
3.1.2 Question 2 – Strengths of information technology organizations

Secondly, I asked, ‘What are identified as being the strengths of Australian information technology organizations?’ The same ten reports were analysed and Table 11 was developed on the same basis.

Table 11 Information technology industry strengths

<table>
<thead>
<tr>
<th>Information Technology Industry Strengths</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>English language base</td>
<td></td>
</tr>
<tr>
<td>Government support of research and development</td>
<td></td>
</tr>
<tr>
<td>Sophisticated users of technology</td>
<td></td>
</tr>
<tr>
<td>Very innovative</td>
<td></td>
</tr>
<tr>
<td>Faster to market than overseas competitors</td>
<td></td>
</tr>
<tr>
<td>Local expertise and industry knowledge</td>
<td></td>
</tr>
<tr>
<td>Technological leaders in some vertical markets</td>
<td></td>
</tr>
<tr>
<td>Well educated workforce</td>
<td></td>
</tr>
<tr>
<td>Multicultural workforce</td>
<td></td>
</tr>
<tr>
<td>Strong Unix and Open Source skills</td>
<td></td>
</tr>
<tr>
<td>Lower costs than Europe and USA</td>
<td></td>
</tr>
<tr>
<td>Highly qualified developers</td>
<td></td>
</tr>
<tr>
<td>Long term experience in software field</td>
<td></td>
</tr>
</tbody>
</table>

3.1.3 Question 3 - Venture capital managers’ criteria

I then asked, ‘What criteria are used by Australian venture capital managers in selecting Australian software firms as potential investee organizations?’
The interviews with the five Australian venture capital managers were analysed and Table 12 was developed.

Table 12 Investment criteria

<table>
<thead>
<tr>
<th>Criteria used by venture capital managers for assessing potential investments</th>
<th>Venture capital manager identification Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal business plan</td>
<td>VC1 VC2 VC3 VC4 VC5</td>
</tr>
<tr>
<td>CEO's track record</td>
<td>x x x x</td>
</tr>
<tr>
<td>CEO's presentation skills</td>
<td>x x</td>
</tr>
<tr>
<td>CEO's selling skills</td>
<td>x x</td>
</tr>
<tr>
<td>CEO's numerical skills</td>
<td>x</td>
</tr>
<tr>
<td>Management team</td>
<td>x x x x x</td>
</tr>
<tr>
<td>Products competitive advantage</td>
<td>x x x x</td>
</tr>
<tr>
<td>Market potential</td>
<td>x x x x</td>
</tr>
</tbody>
</table>

3.1.4 Classification of issues

I then grouped each of the items identified from the industry reports into one of the following three classifications.

3.1.4.1 Self evident issues.

Issues included under this classification are important and affect all participants within the industry but they cannot be changed. For example, it is self evident that the Australian domestic market is small in relation to European and American markets.
3.1.4.2 Policy Issues.

Issues included under this classification are important but are issues requiring changes in government policy which will probably only occur as a result of industry wide pressure for change. As evidenced by the various reports cited in this section, many views on appropriate policy directions have been espoused by industry and governments during the last twenty years and, in many cases, the production of these reports has resulted in changes in government support and policy which has affected industry participants.

While changes in policy may significantly affect the ability of the principals of Australian software firms to build sustainable growing businesses and in some cases the issues might be very selective (for example tariff protection might apply only to a particular industry sector), in the main, issues included under this classification have to be dealt with by all industry participants rather than by individual participants. For example: the Federal government decision to levy sales tax on software during the 1980s caused considerable problems for many Australian software firms. Some principals chose to close down or to move domiciles while some chose to develop structures to deal with the changed government policy but it was only through the efforts of industry associations that the government was persuaded to change the policy.

3.1.4.3 Organization Level Issues.

Issues included under this classification are important and are issues that can be dealt with directly by the principals of software firms. For example: if the major issue affecting development of a sustainable growing business is the lack of an appropriate formal business plan, then there are a multitude of consultants capable of assisting the principal in developing a business plan. There are also many government programs that will assist in financing the development of a plan.

The results of this classification are shown in Table 13.
## Table 13 Classification of issues

<table>
<thead>
<tr>
<th>Identified Issues</th>
<th>Self Evident Issues</th>
<th>Policy Issues</th>
<th>Organization Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate venture and development capital</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Domestic market share</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Supportive relationship with public research base</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local demand from lead customers</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Government procurement policies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very open competitive marketplace</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Poor government focus on high technology industries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus on key vertical markets</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>City fragmentation inhibits industry cluster formation</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Lack of investor skills to help in commercialisation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government sponsored development programs</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Increased profile with government MNCs and customers</td>
<td></td>
<td>x</td>
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<td>x</td>
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<tr>
<td>Distance from markets</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Technical skills base</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Skills</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

From the analysis underlying this classification a clear theme of management issues emerged. I also noted the focus on key vertical markets, that is where all the
customers operate in a single industry (for example: the mining industry), is mentioned in five reports and the strength of Australian software firms in addressing specific vertical markets is commented on in eight reports. This suggests that an important function of management might be to focus on developing products for vertical markets where Australian organizations enjoy demonstrated leadership.

In a similar vein the problem of small company size and the perceived need for consolidation suggested the need for management skills to provide the leadership to achieve the combining of organizations providing products in particular key vertical market areas. The importance of marketing and commercialization skills is identified as an issue in the reports as is the issue of a very competitive Australian marketplace. This suggests that marketing skills within an organization will assume considerable importance and the selection and retention of people with these skills will probably require a high level of management skills. All of these pointed to the issue of management capability.

I then considered the report themes in the light of the interviews conducted with Australian venture capital managers. There was no dissention or prevarication from them. All venture capital managers strongly focused on the issue of the management team as being the key element to be considered in selecting potential investee organizations. While the product area, or the potential market size were mentioned as being essential elements to be considered in the decision making process, the issue of management and, particularly, the team elements of the management structure were pervasive.

I classified the lack of appropriate capital as a policy issue. I chose to do this as all the reports strongly infer that lack of capital is due to lack of policy initiatives by government, inattention by the financial markets or other reasons beyond the control of the principals of Australian software firms. However my experiences, my discussions with many people in the Australian financial community and my interviews with the Australian venture capital managers suggest that capital is readily available and, indeed, that Australian investment capital markets are enjoying
unprecedented levels of liquidity. I therefore added ‘the ability of the principals of Australian software firms to obtain capital when capital is available’ as an additional issue to be investigated under the general theme of management skills.

The analysis carried out to this stage highlighted two issues: management and availability of capital.

3.1.5 Management and Capital

In looking at management issues my sense was that there is a difference, while not explicitly stated, in the manner in which venture capital managers and the authors of the various industry reports view management functions in Australian software firms. The venture capital managers are very clear in that they were most interested in investing in Australian software firms where a management team was in place, or in extreme cases where one could be quickly put in place. They were very wary of organizations where a dominant principal controlled, and was involved in, the day to day operations of all aspects of the organization. The venture capital managers strongly favoured organizations where there are clear divisions of responsibility and a level of autonomy for the managers of the various organizational divisions. The venture capital managers’ reasoning was that without a functioning management team their investment would be vulnerable to the loss of a single person and the growth of an organizations would be limited if reliant on one person.

In considering the information technology reports however, while management issues in various guises are mentioned frequently, management issues seemed to be in terms of specific functions rather than of a total management team. For example many of the reports mentioned the need for improved marketing skills or commercialisation skills within Australian software firms but did not make specific references about other functions and their importance in building sustainable growing software firms. This is not to say that the authors of these reports had not considered other issues but the lack of specific references suggested this issue needed to be considered further.
In looking at the issue of availability of capital my sense was that there are two distinct views. The venture capital managers all took the view that sufficient funds were available for suitable candidates but these would only be invested in Australian software firms meeting their criteria. The industry reports all suggested unavailability of funds or, in some cases, the inexperience of the venture capital fund managers in evaluating the potential of Australian software firms, as a major issue affecting the building of sustainable growing businesses.

If principals of Australian software firms seek capital it would seem self evident as the venture capital managers controlled the access to the funds they would develop organizations satisfying the venture capital fund manager’s requirements. This suggested I needed to consider the issues of availability of funds and preparedness to be able to attract investment.

3.2 Availability of capital

There appears to be consensus that availability of capital to Australian information technology organizations is a key requirement for sustainable growth. This is supported by the literature on sustainability and growth of technology companies.

That this is an important issue can be considered from two viewpoints:

1. Financial markets are not making finance available even though the Australian information technology industry consists of many potentially worthy recipients of capital or;
2. finance is available but the potential candidates do not warrant investment.

There is a persistent and continuing view amongst the principals of Australian software firms that despite the clear value of their investment propositions, capital is just not available in Australia. They reference the quality of Australian offerings and how this quality should be recognised by venture capital managers. This view was espoused in the earlier reports discussed but more recent reports increasingly acknowledge that other issues prevent access to funds.
To explore this issue further during the formal interviews or in informal discussions I asked if capital was available to Australian technology organizations. The venture capital managers, as might be expected, all proffered the view that capital is available to suitable candidates. I also consulted with a number of more general funds managers and the views of two of those managers provided some additional insights into the issue.

ID6 commented that there had never been so much money available for investment in Australia but then added:

You have to remember two things: A lot of investors got burnt investing in technology during the 1990s. Today they are still willing to invest in a good product but they want to be sure that there is a business there first. Australia is just a big mine. We know who the customers are and the product is in high demand. We feel comfortable with mining. We don’t feel comfortable with technology.

ID7 concurred with the view that funds were readily available but that the investment environment had changed significantly since the 1990s:

Most of the funds today come from the major superannuation funds and, after some of the debacles of the 1990s, the level of scrutiny imposed upon funds managers has increased dramatically. Everything has to go through an investment committee and they do not make emotional investment decisions.

This view, that development capital is readily available in Australia for appropriate investments, is supported by a number of sources. In their 2005-2006 survey of the Australian Venture Capital and Later Stage Private Equity Markets the Australian Bureau of Statistics reported (ABS5678 2006, p. 4) that of the $A10.9 billion of funds committed to investment vehicles at 30th June 2006 there was $A4.01 billion of committed funds yet to be called down. The survey identified 157 active Venture
Capital and Later Stage Private Equity Market managers in Australia managing 229 investment vehicles and reported that those managers had reviewed 6,688 potential new investments during 2005-2006, conducted further analysis on 724 of those and participated in 201 new investments.

This view of an abundant supply of development capital is echoed in comments on international capital markets. Howard Anderson, a US venture capital manager (and the William Porter Distinguished Lecturer at MIT’s Sloan School of Management) in a commentary on the possible demise of the US venture capital industry (Anderson 2005, p. 43) remarked:

Ten years ago there were 240 member firms in the National Venture Capital Association. Today, that membership has nearly doubled, and our fund size under management has increased eightfold…There’s nowhere for all that money to go: we can’t spend the money we’ve raised.

This suggests availability of capital should not be an issue for the principals of Australian software firms provided they are presenting a suitable investment proposition to the potential investor.

3.3 Investment readiness

As ID6 and ID7, and indeed most of my interview participants, observed it is not sufficient today to just have a good product. To attract investment, an Australian software firm needs to be investment ready. In defining investment readiness Mason and Harrison (2001, p. 664) identified three key elements; the entrepreneur’s attitude towards investment, presentation of the investment proposition and the ‘investability’ of the project. Of these elements they argued that the third element of investability dictates whether funds will be made available.

When looking at assessments of investor readiness, by entrepreneurs and investors in Australia, Douglas and Shepherd (2002) provided insights that assist in identifying the issues the principals of Australian software firms need to address in order to be
suitable applicants for investment. In an exploratory study Douglas and Shepherd compared the perceptions of investor readiness of 13 teams of MBA students competing in a national venture capital competition (JHEC 2007) with the perceptions of the competition judges consisting of venture capitalists, entrepreneurs and chief executives. Douglas and Shepherd examined investor readiness in terms of technology readiness, market readiness and management readiness and found that for all the entrants considered in the study, in all aspects of investor readiness, investors and entrepreneurs significantly differed in their assessment of investor readiness.

Douglas and Shepherd argued that (2002, p. 225): ‘A necessary condition for investor readiness is the concurrent attainment of technology readiness, market readiness and management readiness from the viewpoint of the target investor.’

When considering technology readiness there appears to be an underlying view that the technology being developed in Australia is of world class and if the investors will recognise this, then a viable industry will be developed and many of the high technology trade imbalance problems will be addressed. Dennis et al. in their 2006 review of the industry commented (2006, p. 13):

Australia’s main strengths in the development of software products are long-term experience in the field, compared to many other countries, and the quality of software personnel. Specific software industry strengths identified during the focus groups, included: relatively low costs for software development (compared to US and Europe), strong Unix and open source skills, multicultural workforce and language skills, well educated and discerning domestic market, technological leadership in a number of vertical markets, technological leadership in some software niches, and higher quality finished software products than world norms. There was a strong feeling amongst those consulted that the relative strength of Australian software producers was under-appreciated and under-valued by other industries and by many in government.
Similar sentiments were echoed by many of the participants I met with during the course of the study. PSA2 commented that in making a presentation to an industry association in America he was surprised to find his products were far more advanced than the equivalent American products and, in recent discussions with one of his Australian competitors, he learned that European products were similarly far less sophisticated than the equivalent Australian developed products. ADV5 commented: ‘We are equal to anybody else in the world as far as our ability to develop new and unique products.’

These observations invite the question, ‘if Australian information technology companies are of world class (which suggests that they are both technology and market ready) and there is a reasonable number of well funded early stage investors based in Australia, then why can’t Australian information technology companies raise appropriate levels of development capital and build sustainable growing organizations that will realise the value of their world class efforts?’ Perhaps there is a collective myopia in the industry’s failure to note the issue of principal concern to investors, that of management readiness. This issue of management being unable or unwilling to accept the limitations of their management capabilities as a reason for their lack of success is not a new phenomenon and is not limited to Australian companies. Theodore Levitt observed nearly fifty years ago (1960, p. 46):

> Every major industry was once a growth industry. But some that are now riding a wave of growth enthusiasm are very much in the shadow of decline. Others which are thought of as seasoned growth industries have actually stopped growing. In every case the reason growth is threatened, slowed, or stopped is not because the market is saturated. It is because there has been a failure of management.

Levitt entitled his paper, in the Harvard Business Review, ‘Marketing Myopia’. ‘Myopic’ seems to be an entirely appropriate word to describe the outlook of the Australian information technology industry as the message regularly espoused by researchers, investors and industry observers (Ferris 2000, p. 77, Golis 2002, p. 217,
see Rock 1987, p. 63, Smart 1999, p. 60) has changed little since it was noted in the Review of Venture Capital in Australia and the MIC program (BIE 1987, p. 64):

Venture capital companies generally have similar views on the most important factors in the assessment of business proposals. Those include, in order of importance, the strength of the management team, the growth potential of the business and the existence of a market niche...Similarly the most common factors responsible for rejection of proposals were inadequate management, lack of viability, lack of market niche or future market material.

At this stage an important question needs to be addressed before proceeding further: ‘what is the relationship between a management team, as regularly referred to by members of the investment community, and organizational structure, as regularly referred to by scholars of organizational behaviour?’.

For the investment community and for the authors of the reports referred to above the focus is often on the titles or the skills of people in various positions within an organizations with a presumption that the reader will clearly understand the duties, responsibilities and capabilities inherent in that position. Gollis (2002, p. 143), for example, emphasises the first key task to be ‘to have a management team organized’ and then identifies the ideal management team as including people with ‘skills in selling, finance and administration’ without further definition of what those skills might entail. Nonetheless Golis (2002, pp. 144-149) then describes many aspects of the ideal organization in terms of responsibilities of the management team. For scholars of organizational behaviour there is a need for more precise definition of functionality and interactions of people within an organization if meaningful analysis is to be achieved. As organizational scholars focus on different issues there is also a need for some definitional constraint. Greenwood and Hinings (1987, p.563) for example, in introducing a series of papers on organizational transformations, refer to different foci of authors as including strategic decisions, core beliefs, ideologies and cultures, organizational control and power and suggest that the papers reflect positions of ‘constrained choice’ with respect to analysis of organizational structure.
by each of the authors. The identification of organizational structures consistent with the understandings of the investment community and the authors of the above reports, therefore, assumes considerable importance. To this end, in later chapters (see section 5.3), I review the work of a number of organizational scholars and identify the work of Mintzberg (1980, 1979) as providing a definition of an organizational structure that is consistent with my understanding of the term management team as enunciated by the investment community and the authors of the reports referred to above. In this thesis I have therefore used the terms management team and organizational structure interchangeably.

So the answer to the question of what Australian software firms need to do, so as to be considered as suitable applicants for investment, is they need to be investment ready in terms of having a suitable management team (organizational structure) in place.

As the manner in which the principals of Australian software firms structure their organizations appears to be a key determinant of their organization’s investment readiness this led me to ask the following question which is addressed in the next chapter:

What organizational structure is appropriate for an Australian software firm that wishes to attract capital and what is the predominant organizational structure that has been implemented by the principals of Australian software firms?

### 3.4 Stage 2 – Views of advisers

From analysis carried out in Stage 1 of industry reports and interviews with venture capital managers I identified management and capital as being very important sustainable growth issues.

From the interviews with Australian venture capital managers it seems that in order to secure investment for their organizations the principals of Australian software
firms need to be able to demonstrate to the venture capital managers they have in place an appropriate management team.

From the analysis of the information technology industry reports (see section 3.1) it seems that the availability of capital is a very important issue for principals of Australian software firms who wish to build sustainable growing businesses. However, while particular aspects of management are recognised as being important the need for an appropriate management team to be in place does not seem, to the authors of the reports, to have been considered as a prerequisite in order to attract investment. This difference in emphasis suggested to me an issue might be that the principals of Australian software firms only focus on the importance of a management team when they attempt to raise capital. This led me to ask: ‘What importance do the advisers to the principals of Australian software firms place upon aspects of the management team?’

The semi-structured interviews with advisers to the principals of Australian software firms were chosen as the source of data for comparative analysis in this stage. As previously stated, participants in this section were chosen on the basis of how they could best assist me in gaining an understanding of the issues rather than in providing data as part of a representative sample. As the interviews were conducted over an extended period of some fifteen months while I developed my ideas on the emerging theory, the analysis was conducted in three phases.

3.4.1 Phase 1 – Growth factors and strengths
This phase followed on closely from the work carried out in Stage 1 where I analysed information industry reports and interviews with venture capital managers. In this phase I analysed interviews with the advisers to the principals of Australian software firms using two of the questions from Stage 1, namely: ‘What issues are referred to as most affecting the growth and sustainability of Australian software firms?’ and ‘What are identified as being the strengths of Australian software organizations?’
I chose to undertake the comparative analysis on this data set using these questions again for two reasons, firstly so as to identify any significant issues not covered in Stage 1 and, secondly, in recognition of the age of many of the information technology industry reports used in Stage 1. The software industry has existed for less than fifty years and in that time the technology platforms on which the industry is based have changed many times. Therefore even those reports written relatively recently may not reflect current realities of the industry. For example the Goldsworthy (1997) report, which is often cited in discussions on the Australian information technology industry, was developed at a time when the Internet was largely unknown and Microsoft Windows 95 was significantly changing the way in which personal computers were perceived by software developers. In this manner I aimed to identify any aspects of the issues identified in Stage 1 that had changed as the technology platforms had changed.

The results of the analysis in this phase did not differ markedly from the results of the analysis carried out in Stage 1. No additional issues affecting the growth and sustainability of Australian technology organizations were referred to in the interviews and many of the participants had similar views about the strengths of Australian software firms. Some comment, however, is warranted on three issues that emerged in this phase of the analysis; lack of market focus, business acumen and identifiable successes.

Many of the participants are firmly of the view that a strength of the Australian software industry is that the people involved have very good technology skills and many potentially world class products have been developed. However this was countered with the view that there is a lack of focus and as a consequence, instead of being leaders in a small number of focused vertical markets, Australian software firms tend to be small players in many vertical markets.

Many of the participants made uncomplimentary comments about the business acumen and skills of the principals of Australian software firms. One adviser (ADV1) commented: ‘If we are going to talk about the leadership and the potential
for business success Australian organizations, as I see them, are terribly naïve. They
do not understand world business.’

However while similar views were espoused by many of the participants these views
should be considered in the light of a comment by one venture capital manager
(VC2):

If you allow for the fact that absolutely the best and brightest of Australia’s
technology managers are employed by multinational organizations operating
in Australia and you remove them from the game of local technology (which
is a terrible, terrible thing) then if you included that group I would say that
our management skills are as good as any in the world as is evidenced by the
fact that people like Doug Elix finish up very close to running IBM and I
can cite many more examples. When the local talent base is denuded by all
the people who finish working for multinationals then to a degree you have
got the dross, to a degree, but within that dross there are jewels.

When asked to nominate a list of Australia’s ten best ever software or information
technology success stories, most participants were unable to nominate more than four
organizations. This might reflect the reality of the Australian market or might just be,
as asked by ADV2 (who was one of the few that could nominate more than five
success stories) in response to this question: ‘Does anybody know about that here?
We don’t worship heroes.’

3.4.2 Phase 2 – The importance of management teams

In this phase I asked: ‘What importance do the advisers to the principals of
Australian software firms place upon aspects of the management team and the
technology?’

The analysis in Stage 1 suggested that while the venture capital managers
emphasised the importance of a management team, the authors of the information
technology industry reports placed more emphasis on individual skills than on the
combined skills of a team. In this phase my aim was to get a sense of whether the
advisers to the principals of Australian software firms placed more importance on the individual ability of the principal/s or on the ability of the principal/s to build a team with a range of skills. I analysed each interview in terms of leadership emphasis and entrepreneurial emphasis. As I had seen little evidence of a focus on organizational structure or the importance of a management team in the information technology industry reports, I expected I would identify a range of views on whether the emphasis should be on the building of a team or on an entrepreneurial leader.

As I carried out the comparative analysis and applied my coding scheme (see section 2.1.3.2) I quickly achieved theoretical saturation. As I had selected an eclectic group of participants I continued my analysis so as to include all of the participants, with the expectation that I would find some variance, particularly from those participants with a limited amount of direct industry experience. However I found almost no variation in the analysis. The very strong view from all participants was that a successful Australian software firm had an entrepreneurial leader but very importantly it was the ability of that leader to build a team that made the difference between success and failure or limited growth.

This was not what I had expected to find. As the venture capital managers had stressed the importance of the management team as a strong indicator of success I expected to find that the advisers were not advising the principals of Australian software firms on the importance of the team but were concentrating on the entrepreneurial skills of the individual leaders of the organization. What I did find was that the advisers’ thinking was consistent with the requirements of the venture capital managers. This led me to ask ‘Why, if the advisers recognise the importance of a management team as a key indicator of successful sustainable growth potential, aren’t the principals of Australian software firms being advised accordingly’

3.4.3 Phase 3 – Additional themes or cues

So that I could answer this question I further analysed the advisers interviews. My aim was to identify additional themes that might form the basis of more detailed examination of issues that could help to explain why the principals of Australian
software firms do not see the establishment of an appropriate management team as a critical management task. In my original analysis I had looked for consistently appearing themes and so I looked for cues that might appear only once but would point me to areas that should be investigated in more depth. Comments from three of the interviews provided these cues.

The coordinator of a government sponsored information technology industry group (ADV9), in reflecting on the goals of many of the members of the group, observed: ‘They are the tradesmen of the 21st century.’ He explained, for many of the people he met, the reason for establishing their information technology business was they wanted to be self-employed but they did not want to create a large business. He compared these people to electricians or plumbers with small clienteles that funded the lifestyle they enjoyed without the stresses of being an employee or managing an enterprise.

The coordinator of the small and medium enterprise special interest group of an industry association (ADV5) described the typical attendee at meetings as being: ‘Mainly software developers … who have developed a product they think they can sell out there in the marketplace. They are looking for some kind of advice to find out what assistance is available to help them.’

In reflecting on the nature of the Australian software industry, a long-time information technology industry participant and adviser (ADV2) who formerly headed the Australian subsidiary of an international information technology research consultancy, suggested that many small software firms, comprising fewer than twenty five employees, had been started in the 1970s by former employees of multinational corporations. These firms, he suggested, had operated successfully for many years but now ‘The company founders are getting old…it is all too hard!’ ADV2 suggested that the founders are now seeking to sell their businesses and are finding that potential buyers are not enthusiastic about organizations that are very dependent upon the continuing involvement of the founder.
Following on from this I asked ADV2 about the size of the Australian information technology market, to which he responded:

Nobody knows! There isn’t anybody mapping that properly. If we could map this so we had a real feel for what the market is so we could come back and say this is local whatever…I understand why you ask the question but we really don’t have that data and where are we going to get it? IDC is not keen, Gartner is not keen, and Forrester is not keen…

In providing this response ADV2 acknowledged the work of John Houghton (2003, 1996, 2006) as being consistent but not providing the detail that would enable the development of effective policies to assist Australian industry participants. He felt that multinational corporations accounted for some eighty five percent of the market and attributed the lack of appropriate detail, in part, to this.

The cues provide from this analysis suggested to me two main issues needing further investigation. Firstly, I needed to consider whether the principals of Australian software firms have a desire to grow their organizations. Secondly, the responses of ADV2 supported my emerging view that nobody has a clear picture of the size of the Australian software industry or those organizations that comprise the industry.

### 3.5 Timing of advice

From my initial analysis of the interviews carried out in Stage 2 I was surprised to find that the views of advisers to the principals of Australian software firms were consistent with the espoused requirements of Australian venture capital managers. I asked myself ‘If this is so why, when establishing their organizations, don’t the principals of Australian software firms aim to build the organizations in a manner that would seem to be an important component in achieving sustainable growth?’

One explanation is that the majority of the principals of most Australian owned software firms see themselves as the ‘tradesmen of the 21st century’ and have no desire to sell their organizations or to seek external investment. Therefore they have
no need to meet the requirements of Australian venture capital managers. When considered in the light of the view of VC2, that Australia’s best managers join the multinational corporations, or the comment by ID1, that there is a propensity for Australians to join organizations rather than to build organizations, this description might well describe a large number of the principals of Australian software firms.

Another explanation is that those ‘jewels’, as described by VC2, either build successful organizations without the need for external financial assistance and, therefore, they are not seen by the Australian venture capital managers or they have established management teams meeting the requirements of Australian venture capital managers and, as a result, are successful in raising capital.

Both of these explanations may be valid. However, without discounting the validity of the approach taken by the ‘tradesmen’ and the ‘jewels’ described above, my interest in this study was to understand why the principals of Australian software firms who want, but fail, to build sustainable growing businesses find it difficult to achieve their goals.

The comments of ADV5 and ADV2 drew my attention to another reason why the principals of Australian software firms might not follow the advice of those who advocate the importance of appropriate organizational structures. ADV5 had observed that software developers started to attend information seminars only after they had developed a product and when they realised there may be an expanded market for that product. ADV2 observed that long term participants in the Australian software industry are getting old, which would indicate they would be thinking about selling their businesses. This led me to consider a third explanation. It might be that the principals of many Australian organizations do not consider the issue of appropriate organizational structure until they have a need to seek advice from an experienced adviser or until they attempt to raise capital or until they attempt to sell their businesses.
To explore this issue further I carried out another analysis on the interviews conducted with the Australian venture capital managers and with the advisers to the principals of Australian software firms. In this analysis the question I used for comparison was: ‘At what stage in their organizations’ development do the principals of Australian software firms become aware of the importance of an appropriate organizational structure if they are seeking to build a sustainable growing business?’ While I did gain some additional insights, by this process it was very apparent that this issue had not been thoroughly canvassed in most of the interviews and therefore I needed to obtain additional data.

In this phase I was seeking the answer to a very specific question so I decided to make contact via telephone with some of the people I had interviewed rather than conduct additional formal interviews. During the period of my study, I had also discussed the development of my ideas with many people who had expressed a professional interest in my findings. A number of lawyers and accountants had described clients who could benefit from a better understanding of the issues affecting their ability to build sustainable growing businesses. As the Australian venture capital managers I interviewed had revealed they had often been made aware of potential investment opportunities by lawyers and accountants I chose to also contact, during this phase, a number of lawyers and accountants who might be able to provide insights into this issue.

I asked each of the participants; ‘When do the principals of small information technology organizations first seek advice from external sources on business planning and organizational structure?’

Initially, my intention had been to contact all of the venture capital managers, some of the advisers and at least five lawyers and accountants who dealt with small and medium organizations in the technology area. However it was obvious, after speaking to seven participants, that I had achieved theoretical saturation as the same message was being espoused very strongly and clearly by all of the participants.
All seven participants (VC2, ADV2, ID1, ID2, ID3, ID4 and ID5) were of the view that a major problem for Australian information technology organizations was that the principals did not give enough, if any, thought to appropriate organizational structures until they attempted to raise capital or sell their businesses. Many said this problem was not limited to the information technology sector; it was common to most small and medium Australian businesses. Some added, that technology organizations were often owned by principals who had very little experience outside of their organization which exacerbated the problem.

VC2 was at first confused by my question. He was emphatic that as soon as the principals of a technology company had reached the ‘proof of concept’ stage they should be seeking external assistance in planning for potential outcomes to ensure, when they eventually approached financiers, they had an appropriate organizational structure in place. When I repeated my question, emphasising that I was more interested in finding out when most principals of technology organizations did seek external assistance, he laughed and replied, ‘One minute to midnight, when faced with a cataclysmic event preceding imminent failure or the prospect of great riches but not a moment sooner.’ When asked if he encountered principals of information technology organizations who did seek external assistance at an early stage VC2 responded, ‘serial entrepreneurs, those who have tried (and often failed) in the past, will tend to seek early help but 98.6% of novices will venture blindly into the forest.’ Very similar messages were received from all the participants, often accompanied by stories of recent encounters with clients seeking funds or selling their businesses.

ID2 suggested the principals of small and medium technology organizations seeking to raise funds or to sell their businesses could, in the main, be categorised into one or more of three classes:

1. The ‘bumble along’ class where they had managed to survive, sometimes for many years and sometime very profitably, without much planning or structure until confronted by a liquidity crisis or when presented with an opportunity to realise a large financial gain.
2. The ‘age’ class where they had reached an age when retirement became appealing. ID2 commented that changes in the Australian superannuation laws\textsuperscript{3} in 2007 had resulted in a rush of clients who endeavoured to sell their businesses but failed because the structures were not suitable to allow rapid sales.

3. The ‘house at risk’ class where a spouse demanded security over personal assets be removed. This class also often included divorce settlement arrangements.

ID4 laughed (most participants accompanied their comments with ironic laughter) and commented the problem is that the principals want the financial rewards or the support of a shareholder but they want to continue running the business like their own private company, hiding profits, paying the family and answering to nobody. They don’t understand why new shareholders or managers should have a say in how the business is organized.

ID3 observed it was a shame that many of the firms he saw had operated profitably for many years but if the principals had been willing to seek advice and assistance they could have increased those profits (and consequently the value of the business) significantly. ID3 gave the example of a company he had seen that day which had sales of more than $A20 million and an operating profit of $A5 million, but did not have a Chief Financial Officer.

In addition to the specific question relating to timing of advice I also asked a number of participants whether they thought the same situation existed in America. VC2 was of the opinion there is more of a ‘grow a big company’ ethos in America which manifests itself in earlier planning by most entrepreneurs. He commented specifically on the Silicon Valley area where he has had many years of direct involvement, ‘Silicon Valley is very different because there are a lot of serial

\textsuperscript{3} A onetime opportunity was provided by the Australian government to allow tax advantaged personal contributions into superannuation (pension) funds of up to $A1 million per person prior to 30\textsuperscript{th} June 2007
entrepreneurs. They not only tend to get it right the next time but they serve as role models to the novices.’ ADV2 echoed these sentiments, saying, ‘Look at typical Silicon Valley organizations. They know the ground rules, they know the VCs. They know how to go forward.’

3.6 Organizational fields

In concert with my acquisition and analysis of field data I had been seeking to increase my level of theoretical sensitivity (see Glaser and Strauss 1967, p46) by studying the organizational literature so as to allow me to effectively formulate theory as it emerged from the data. These efforts led me to the view that institutional theory could provide a solid framework for my work.

I was very influenced by the writings of Richard Scott. His commentary on the importance of organizational fields is particularly germane here (2001, p. 207):

> Another contribution of institutional analysis is its endorsement and exploitation of a new level of analysis. To an increasing extent, sociologists, political scientists, economists and management scholars have come to recognize the importance of organizational fields…The definition of field is, to a large extent, coterminous with the application of a distinctive complex of institutional rules. Because such rules define, constrain and empower much of the activity within the field, analysts are wise to be cautious in generalizing across fields.

As I conducted my field research I was regularly referred to software firms that did not seem to have connections with any of the recognised industry associations. At seminars conducted by government agencies I was, in discussion with principals of software firms, surprised to find many principals were unaware of the Australian Information Industry Association or the Australian Computer Society. At a major Australian information technology exhibition (CeBIT) I met informally with many

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4 In section 5.2 I define organizational fields and describe in detail the development of my view of organizational fields encompassing the Australian software industry.
principals of Australian software firms who were exhibiting their organization’s products. In doing so I found many of the principals were very aware of their competitors but they had little or no knowledge of software industry associations or of software firms outside of their chosen vertical markets. Therefore to suggest that all Australian software firms belong to a single organizational field, as described by Scott and Meyer (1994, p. 207) where the participants interact frequently and fatefully, would be unwise.

In the light of the above observations and Scott’s advice on the danger of generalizing across fields, I asked of myself (a question that I should acknowledge had been asked of me by my doctoral supervisor at an early stage of my candidature), ‘Is there an organizational field that can be described as comprising Australian owned software firms and, if so, how can I identify the participants in that field?’

The answer to this question, emerging from my work, was that the Australian software industry might consist of multiple organizational fields and therefore the identification of organizational fields in the Australian software industry was assuming considerable importance. The observations of ADV2, on the lack of available data on the Australian information technology industry, supported the view I had been developing that it would be difficult to obtain appropriate data on Australian software firms from within the industry or from secondary sources that would enable me to identify organizational fields. What emerged from this data was if I was to develop a credible body of theory I needed to identify one or more organizational fields that could be studied in the context of this thesis and it was unlikely within the time and resource constraints that I would be able to do so from primary data obtained from a program of field research.

This, and my readings on organization theory, led me to the conclusion, as will be discussed in more detail in later chapters, that I should adopt a method for identifying an organizational field as described by Paul DiMaggio (1991) using data based upon my personal experiences, my sense of the Australian software industry and from secondary sources when available.
3.7 The nature of the Australian software industry

Before commencing the collection of field data I had anticipated conducting interviews with the principals of a representative sample of Australian software firms. As I conducted interviews with Australian venture capital managers and advisers to the principals of Australian software firms, reviewed secondary data sources, attended industry seminars as an observing participant and reflected upon my experiences in the software industry I realized I needed to rethink this strategy and to alter my research design accordingly.

What had emerged from the data by this stage was that the definition of the field encompassing Australian software firms was problematic. I encountered difficulties in identifying specific secondary data sources that provided some definition of an organizational field but I had expected, as I met with interview participants, to obtain better definition. Not only did I find this was not so but ADV2, who I expected to be the best source of this advice, expressed the view that nobody had a clear picture of the industry and he hoped my research might assist in providing that picture. What I did receive from many of the participants were references to specific software firms, many of which I had not heard of previously. I also subscribed to a weekly industry newsletter prepared by ADV2 which provided articles on the activities of Australian information technology organizations. Via the internet I was able to obtain some preliminary information about those organizations. While many of the organizations could be better described as service organizations or software package distributors rather than providers of software packages they had developed and owned, I was able develop the following sense of the nature of the Australian software industry.

The first picture I developed was there are many small organizations that have been in existence for some time (five or more years) that seem to be operating in a sustainable manner, servicing a small loyal cohort of clients but not growing dramatically. The principals of these organizations might, as described by ADV9, be the ‘tradesmen of the 21st century’.
The second picture I developed was that most of these organizations did not seem to have direct connections with the industry associations connected with the information technology industry or with many of the industry advisers. Most of the organizations seemed to have some connection with Microsoft via the various accreditation programs run by Microsoft in Australia but not with the Australian Computer Society or The Australian Information Industry Association. The picture developed was that many of these organizations were connected via the industry they served. In many cases, having identified a specific Australian owned software firm, I was able to identify other software firms, both Australian and internationally owned, servicing the same industry sector. The main source of information was the list of exhibitors at industry trade shows.

These two pictures of the Australian software industry suggested the industry consists of many diverse groups and rather than one field comprising multiple organizations it is more likely the industry consists of multiple overlapping organizational fields each comprising a small number of software firms centred on specific industry sectors (This is dealt with in some detail in Section 5.2).

Therefore I chose to only interview the principals of Australian software firms providing software in two vertical markets. My reasoning, in this delimitation, was (as noted in section 2.2.7.3), in the context of a grounded theory approach, I did not think a more extensive study would materially assist me further in my thesis. Therefore the analysis of the interviews, with the principals of software firms, was carried out with a view to cross checking my thinking on the key issues, that had already been identified in the study, with the expectation that a more detailed and comprehensive study would need to be carried out after the completion of this work.

I conducted interviews with the principals of three firms providing software for managers of strata title properties and also with the principals of three firms providing software used in the construction industry. I was mainly interested in identifying where the principals and employees of these organizations ‘frequently and fatefully meet’ and what their relationships were with the Australian software
industry as a whole. I was also interested in exploring whether these organizations fitted with the model that had been developing from the data whereby the principals of these organizations did not concern themselves very much with organizational structure issues until they were faced with the need or desire to attract financial support or to sell their businesses.

I carried out two comparative analyses on the interview data. I also followed up some of the participants, by telephone, in order to clarify some of the points made in the interviews particularly in respect to the relationship of the principals and their employees with other software firms. In the case of the strata title software providers I was able, as an observing participant, to meet with the three principals on many occasions at trade shows, in their offices and at social functions. As the chairman of the advisory board of one of the software firms, I have been able to observe the firm in detail over a four year period and have been provided with full access to the firms’s records.

3.7.1 Frequent and fateful meetings

I used the following question as the basis for comparative analysis of the interview data and in the follow up telephone questions with selected participants: ‘Which trade and industry functions do the principals and employees of Australian software firms attend?’ All the software firms attended trade shows as exhibitors only when that trade show was specifically aimed at their prospective clients. On some occasions the principals or their employees attended industry shows to obtain information on developments in software and hardware but in doing so they saw themselves as attending as members of the public rather than as industry participants. For the suppliers of strata title management software, attendance at industry shows where they meet with their competitors has become an important event to the extent that PSA3 rang me to tell me that PSA1’s software firm had not exhibited at the Institute of Strata Title Management’s annual conference but PSA1 had attended the conference. PSA3 added that he, PSA1 and PSA2 had met on a number of occasions at the trade show.
There was some evidence that, as the principals of Australian software firms considered the future of their organizations, they attended industry seminars on business development or business finance where they met with principals of software firms dealing with other vertical market clients. Many of the principals also indicated that their technical staff attended Microsoft seminars and training courses.

3.7.2 Organizational Structures

In the interviews with the principals of the software firms the main thrust of the questions was to enable me to develop an understanding of the goals of the principals and the organizational structures they had developed. From these interviews I was able to develop a picture of each of the organizations in the context of the model had emerging from my data by this stage.

PSA1 had formed his software firm in 1990 after having lost most of his assets in property development activities. He fell into body corporate management and his only original goal was survival. At the time of interview he was 58 and was looking for external investors, as he hoped to be paid out in the next five years. In recent years he has employed a general manager and has restructured the organization into a number of divisions.

PSA2 spent five years working in sales roles with technology organizations in England and America before returning to Australia in 1969 to run the Asia Pacific office of an American technology company. In 1979, seeking to work for himself, he became the exclusive distributor of a micro computer which he used as a platform for building software products in property and strata management. His original goal had been survival but today he is comfortable with what he described as an annuity business. As he is extremely conservative about control he has chosen to grow slowly and has no external shareholders.

PSA3 was in his early 40s and has a business degree in computing science. He started his software firm after a friend asked him to help automate his property register. PSA3 is sometimes awed at his success and still considers himself as
programmer who got lucky. In recent years he has made two attempts at recruiting a partner who could build the organization structure he thinks he needs and to relieve him of the administrative duties. Both attempts have failed as the new partners have not lived up to PSA3’s expectations.

PSB1 started his software firm in 1982 after careers in the military and in the construction industry. His original goal was to build a product that addressed his needs in the construction industry. He would now like to have an external partner so he could concentrate on being the research and development director and realise some rewards from his hard work. He has attempted to grow his sales in the past by recruiting a sales director but: ‘I have had an IBM salesman of the year working for me but he was not successful’. He has five programmers working for him and a part time bookkeeper, but no sales people.

PSB2 started his software business in 2001, after 20 years as a partner in an international accountancy firm where he worked with entrepreneurially driven organizations. His goal was to establish a company delivering solutions to the construction industry and to be in a position to sell his business within five to ten years. While he has found the task more difficult than he originally envisaged, he has an organizational structure in place that will ensure continued operation with or without his involvement.

PSB3 spent thirty years as a builder before starting his software firm in 2006. He developed a product to suit his needs as a small builder and, by word of mouth marketing, has acquired more than 500 clients that generate annual revenues of more than $A550,000. When he started his software firm (consisting of himself, his wife and a builder who trains new clients) his only goal was to get out of the building industry. Today he feels quite important as his clients look to him for advice and, while he knows there is a much larger market available to him, his view is, ‘Do I want to run a bigger business? I’ve been involved in some pretty big businesses and this is a really nice little business. There is no pressure whatsoever.’
It seems the principals of the software firms interviewed in this section might represent a microcosm of the Australian software industry.

Each of the organizations owned by the principals who have been interviewed in this stage are sustainable but none of them are enjoying the level of growth expected in the software industry. Only PSB2 established his business with a clear intention in mind and attempted to establish an organizational structure that would assist him in achieving his goals. PSB1 and PSA1 have reached an age where they would like to realise some of the perceived value in their organizations and therefore have attempted to take steps to alter their organizations in order to fit potential purchasers’ expectations. PSA3 has made some attempts to grow his business by introducing additional structure to the organization but, to date, has not been very successful in doing so. PSA2 and PSB3 both appeared very relaxed and comfortable with the organizations that they have created. Neither has any intention of selling their organization in the near future and both are very proud of what they have achieved. PSB3 very much fits the profile of a ‘tradesman of the 21st century’. PSA2, having built a software firm employing more than forty staff servicing more than 2,400 clients and operating profitably for some 25 years, might well be described as one of the ‘jewels’ of the Australian software industry.

The common thread binding these diverse organizations is not their size or their organizational structures nor that their principals consider themselves as members of the organizational field of software firms but that they operate in organizational fields defined by the vertical markets in which they operate.

3.8 Chapter summary

In this chapter I described the manner in which I analysed the data in a manner that formed the basis of the grounded theory approach being used in this study.

Central to the grounded theory approach is the use of the constant comparative method of analysis. I implemented the use of this method by asking a series of questions which I tested against the various data sources. At each stage of this
process I reviewed the results of the analysis. In some cases this resulted in a change in aspects of the research design or a need to conduct additional interviews.

From this analysis several clear themes were identified from which the theory emerged as described in subsequent chapters. The following themes or cues emerged as key issues in the development of the theory.

1. The availability of capital was highlighted as the key issue affecting the ability of the principals of Australian software firms to build sustainable growing businesses. Anecdotal and empirical evidence suggests capital is available to organizations which are investment ready.

2. Venture capital managers were emphatic in order to attract capital, Australian software firms need to be investment ready and the implementation of an appropriate management structure is a key component of investment readiness.

3. The views of the advisers to the principals of Australian software firms coincided with the views of the venture capital managers, which suggested the timing of receipt of advice on appropriate organizational structures is a key issue.

4. It may be that many of the principals of Australian software firms have no desire to grow their organizations and are content to operate sustainable profitable organizations without attempting to raise the capital that would support growth.

5. While there is a dearth of reliable data on the Australian software industry, anecdotal evidence suggests there may be many successful software firms operating in the Australian market that have little or no visibility with the various industry associations or with the many industry advisers.

6. The Australian software industry may consist of multiple organizational fields encompassing a small number of organizations focuses on a specific vertical market rather than a single all-encompassing entity.

The manner in which these key themes contribute to the emerging theory is described in the remaining chapters of this thesis.
4. THEORETICAL SENSITIVITY

In Chapters Two and Three I described the sources and analyses of data. In concert with the collection and analysis of the data I was also building my knowledge of the available and developing work under the rubric of organization studies. In the context of a grounded theory approach I recognized there was a need to balance the data I had obtained, from my experiences in the software industry and from the field, with the work of organizational theorists who have significantly contributed to many areas that are germane to this study. While I brought to this study many years of practitioner experience in the software industry I was a newcomer to the field of organization studies and had to increase my theoretical sensitivity so I could marry the analysis with existing and emerging theory.

In my preliminary readings of the literature on organization studies I was excited to see many areas in the theory which I could relate to my experiences in, and my knowledge of, the development of the information technology industry. However, I was somewhat disappointed in being unable to find many direct references to the information technology industry in the organization studies literature. Those I did find tended to focus on issues relating to the development of technology, to information technology implementation issues within corporations and to organizational issues in major international information technology organizations. They did not deal with the issues in which I was interested, organizational issues that could be related to the operation of Australian software firms. In order to begin the process of filling this gap and to accelerate the development of my theoretical sensitivity, I reviewed the development of organizational theory in the context of my understanding of the development of the Australian information technology industry. In this manner I hoped, just as parts of the theory covering the Australian software industry were emerging from my various data sources, so too would parts of the theory emerge from my increasing understanding of the development of organizational theory in the context of the Australian software industry.
In this chapter I describe the journey I took in developing my theoretical sensitivity in the area of organization studies, in the context of the information technology industry as a whole and the Australian software industry in particular, to the point where I made the decision to ground my work in institutional theory.

This chapter proceeds in six parts.

Section 4.1 deals with my need to build my theoretical sensitivity in the field of organizations studies.

Section 4.2 deals with the growing awareness of organizational issues within the information technology industry and sets the scene for considering whether an organizational studies approach is an appropriate manner in which to consider the development of the information technology industry (and specifically the Australian software industry) in the 21st century.

Section 4.3 comments on the expanding array of choices available to a scholar, considering an organizational studies approach, and the choice of the work of Richard Scott (2003) as the framework upon which the rest of this chapter is built.

Section 4.4 deals with Scott’s three basic perspectives of the development of organizational theory, organizations as Rational Systems, Natural Systems and Open Systems and relates each of these perspectives to the development of the information technology industry.

Section 4.5 deals with the manner in which Scott combines the perspectives as described in section 4.4 and suggests that an Open-Natural Systems model, with an emphasis on institutional theory, seems to most closely match the development of organizational structures within the information technology industry in recent times.

Section 4.6 focuses on the development of institutional theory. I relate the work in this area to my knowledge of the development of the Australian software industry.
4.1 The development of theoretical sensitivity

Perhaps as a young graduate in 1975, having embraced an education grounded in positivist ideals (see Schön 1991 pp. 21-69) I would have posed a series of research questions, developed appropriate survey instruments, analysed the results using the available statistical tools and then interpreted those results. However today, while still retaining strong positivist tendencies, I feel far less certain of the validity of posing questions before I have obtained the answers to many exploratory questions. In this vein I followed the advice of Schön (1991, p. 41) who suggested:

> When ends are fixed and clear, then the decision to act can present itself as an instrumental problem. But when ends are confused and conflicting, there is as yet no “problem” to solve. A conflict of ends cannot be resolved by the use of techniques derived from applied research. It is rather through the non-technical process of framing the problematic situation that we may organize and clarify both the ends to be achieved and the possible means of achieving them.

Therefore, my approach to the development of specific research questions has been to frame the problematic situation by posing a series of questions and seeking answers to those questions from the literature, from field research, from discussions with my peers and by retrospective reflection. The first step in this process took place before I commenced my candidature in that the overall approach to this study was framed by my choice of school in which I was to undertake my doctoral studies.

Prior to my acceptance into the doctoral program, at the University of Western Sydney, I considered carefully the means by which I could best achieve my aims of developing a better understanding of the reasons why the principals of Australian software firms find it difficult to build sustainable growing businesses. From my experiences in the software industry I formed a view that the issues were not necessarily technology related and, while access to finance is an important issue, my belief was that a lack of focus on the importance of building an appropriate organizational structure lay at the heart of the problem. This view then provided the initial framework upon which I could start my attempts to build a better
understanding of the issues. I identified the Organization Studies group within the University of Western Sydney as an appropriate environment in which to conduct research in my area of interest. After being accepted into their doctoral program I sought to develop an understanding of those areas of organizational studies that would best assist me in building my understanding of the issues.

To this end the advice of Glaser and Strauss, on the issue of theoretical sensitivity in the context of a grounded theory approach and my prior experience in the field of organizational studies, warrants comment. Glaser and Strauss posit that (1967, p. 47):

The sociologist should be sufficiently theoretically sensitive so that he can conceptualise and formulate a theory as it emerges from the data. Once started, theoretical sensitivity is forever in continual development. It is developed as over many years the sociologist thinks in terms of theoretical terms about what he knows, and as he queries many different theories on such questions as ‘What does the theory do? How is it conceived? What is its general position? What kind of model does it use?’ Theoretical sensitivity of a sociologist has two other characteristics. First, it involves his personal and temperamental bent. Second, it involves the sociologist’s ability to have theoretical insight into his area of research, combined with an ability to make something of his insights.

What I bring to this area of study is a personal and temperamental bent based on many years of experience in the software industry but what I don’t bring is many years of development of theoretical sensitivity in the field of organizational studies. While I have read widely on issues pertaining to the management of organizations, my learning has probably (until the commencement of my candidature) been more influenced by Jack Welch than by Joseph Schumpeter. I may well have been one of the managers that Rousseau (2006, p. 257) had in mind when she wrote:

My great disappointment, however, has been that research findings don’t appear to have transferred well to the workplace. Instead of a scientific understanding of human behaviour and organizations, managers, including those with MBAs, continue to rely largely on personal experience, to the
exclusion of more systematic knowledge. Alternatively, managers follow bad advice from business books or consultants based on weak evidence. Because Jack Welch or McKinsey says it, that doesn’t make it true.

I took the view, while Glaser and Strauss’s advice is framed in the understanding of a sociologist with a deep knowledge of the theory who undertakes a study involving collection of data in a new field of interest, my work is framed in the understanding of a practitioner with a wealth of data in a particular area of interest who embarks on the development of theoretical sensitivity in the area of organizational studies.

It is within this framework that I posed the following question in the process of a running theoretical discussion:

Is there a body of theory within the rubric of organizational studies that may provide insights into the manner in which the principals of Australian software firms have developed their organizations?

In developing an answer to this question I relied very much on making sense of the theoretical work on organizational structures in the context of my experiences in the software industry combined with Australian and international literature pertaining to the development of the information technology industry. As the literature on the software industry is limited, and the information technology industry (particularly until the latter parts of the 20th century) was dominated by the computer hardware organizations, I chose to carry out this initial review of the theory in the context of the information technology industry as a whole while bringing to account particular references to the software industry where appropriate information was available.

4.2 Organizational Structures and Technology Organizations

While there are many examples, particularly in the 1980s of information technology organizations achieving considerable success by having the right product at the right time (Microsoft being one of the most visible: see Wallace and Erickson 1993), increasingly organizational structure is being recognised as a key determinant of the potential success of a firm. Examination of many of the great technology success
stories in recent years often indicates the importance of the technology but also indicates the key role of effective organizational structure. In Europe Gerard Fairtlough (1994), a serial entrepreneur, stressed the importance of organizational structure in Celltech which enabled him to build one of Europe’s most successful biotechnology development firms. In America Tom Siebel built an organization in the highly competitive Customer Resource Management marketplace and achieved sales of more than $US2 billion per annum in less than eight years by creating an extremely focused and efficient organization. During an era when many of the American technology successes seem to have occurred in organizations with little structure Siebel placed considerable emphasis on organizational structure. He observed the reasons for the success of Siebel Systems (Fryer 2001, p.122) as being that ‘we practice a conscious form of organizational behaviourism’.

Many of the studies prepared over the last twenty five years for the Australian government dealing with the development of the Australian information technology industry, refer to issues of management ineffectiveness as major impediments affecting the industry (see BIE 1987, Dennis et al. 2006, Espie 1983, Goldsworthy 1997, Karpin 1995, Marceau et al. 1997). Experienced Australian and international technology investors echo these sentiments (see Ferris 2000, Golis 2002, Rock 1987). In particular these sources refer to the importance of an experienced management team being in place as a precursor to investment or sustainable growth.

These examples of international success based upon effective organizational structure and the references to the issues of Australian management ineffectiveness strengthened my view that the issue of sustainable growth of Australian software firms should be considered under the rubric of organization theory.

4.3 Organization Theory in an Information Technology Context

From 1900 until the 1950s, despite two major wars, the patterns of organization were very constant. Until the 1950s Max Weber’s work on bureaucracies (Weber as translated by, Gerth and Mills 1946) provided a sound starting point for analysis of
many growing businesses. Without convenient document duplication facilities\(^5\), sophisticated communication systems\(^6\) and computerisation\(^7\) to grow a business of any size required a very well defined and documented hierarchy. The environment for organizations and society as a whole began to change markedly in the 1950s. As Richard Florida (2002) observed, somebody born in the early 1900s would have found the social world of the 1950s very similar to his own. An office worker in 1950 would still be wearing a suit to work, working 8 to 5, be immersed in the same bureaucracy and probably expect to work for the same company for life. The principals in an organization would still expect to be able to organise operations as they best saw fit, so as to maximise returns for shareholders.

The 1970s worker would, however, already be seeing dramatic changes and by 2000 he or she could be working part-time or 24/7, wearing business casual or jeans on dress down Friday and would be expecting to change jobs on a regular basis. He or she might not even work in an office but be a tele-commuter. At the same time changes in community attitudes would lead them to expect to have a say, at any level of the hierarchy and the effects of the external world, special interest groups, government and the media would need to be continuously and carefully taken into account so as to maximise returns for the much wider world of stakeholders.

To explain these many emerging organizational forms much research work has been carried out and today a plethora of choice is available to a researcher attempting to consider the use of organization theory in the study of a particular industry as observed by Marsden and Townley (1999, p. 412):

> Although we tend to speak of the generic ‘organization theory’, just as there is no one organizational practice so there is an assortment of theories that draw attention to some things and shadow others. ‘The zoological garden of organizational theorists is crowded with a bewildering variety of

\(^5\) The first Xerox photocopier shipped on 1\(^{st}\) March 1960 (Gross 1996)
\(^6\) Subscriber Trunk Dialling began in New Jersey in 1951 (AT&T 2003)
\(^7\) IBM shipped its first commercial computer, the IBM702 computer in 1952 (Young 1998)
specimens,’ says Perrow (1980:259), ‘we are not even looking at the same beast’. Organization is a crystal viewed through a kaleidoscope of theories.

The reason for the many theories is that there are so different aspects to organizations. In developing a dimensional method of classification Pugh, Hickson, Hinings, Macdonald, Turner and Lupton (1963, p. 298) conceptualised six elements of organizational structure (specialization, standardization, formalization, centralization, configuration and flexibility). In the continuum of an organization’s existence each one of these structural elements might vary substantially and be influenced by the past performance of any of the elements. As Pugh et al note even a comparatively crude analysis will result in a very large number of theoretically possible organizational profiles. As technology has freed organizations from many of the restraints of the past the rate of change of structural elements is increasing and in concert so are the number of distinct profiles that might promote the development of new theoretical insights. Consider, for example, whether current theories deal with the single person organization selling millions of dollars worth of goods per annum from home using e-Bay and FedEx.

Fortunately, while there is potentially a multitude of organizational profiles, there are strong themes running through the various schools of organizational theory that help to narrow the choice of a starting point. The seminal work of Richard Scott (2003) on organizations provided me with a sound starting point.

4.4 Perspectives of Organizational Research

Scott (2003, p. 31) identifies three broad perspectives that have been used in the study of modern organizations. While, as acknowledged by Scott, many other schemas have been proposed by Burrell and Morgan (2001), Astley and Van de Ven (1983) and others, his classification is sufficiently broad and comprehensive to provide a sound starting point for this work.

He stresses the importance of understanding the perspectives in two senses (Scott 2003, p. 31):
On the one hand, they are historical products – systems of ideas and practice that developed and held sway in specific times and circumstances. To completely divorce them from their context would be a mistake, since much of their meaning is historically situated. But at the same time, the perspectives selected are not just of historical interest. Each has shown great resilience and has been invented and reinvented over time so that each has persisted as an identifiable, analytical model.

Just as the development of organizational theory has developed within a context that has changed dramatically in a very short period the information technology industry, worldwide and in Australia, has, in a very short time, evolved through a number of significant stages. These changes have had a major impact on the way in which software organizations have developed. When identifying an appropriate theoretical platform to be used in analysing the organizational structure of Australian software firms it is important to view the development of the industry in its historical and technological context.

Scott identifies three basic perspectives of organizational research, Organizations as Rational Systems, Organizations as Natural Systems and Organizations as Open Systems:

4.4.1 Organizations as Rational Systems

This perspective views organizations as being designed to attain specific goals and focuses on the efficient achievement of those goals. Scott offers the following definition of this perspective of organizations (Scott 2003, p. 27):

Organizations are collectivities oriented to the pursuit of relatively specific goals and exhibiting relatively highly formalized social structures

This is not to say that the goals themselves need to be rational for as Scott (2003, p. 33) observes: ‘...it is perfectly possible to pursue irrational or foolish goals by rational means’. Indeed one only has to look back to the end of the 20th century when
supposedly experienced boards of directors of many dot.com organizations based their business strategies on giving away software and services (seemingly in contradiction to established profit focussed practices) and the supposedly rational venture capitalists encouraged them to build organizational structures to achieve these goals (Cassidy 2002, p. 237).

Rational Systems theorists stress goal specificity and formalization as key features of organizational practice. Early pioneering information technology organizations exhibited these characteristics. In particular, IBM was renowned for its adherence to formal planning processes and for its development and communication of clear corporate goals (see Mills and Friesen 1996, p. 57). IBM dominated the information technology industry until the 1970s and many other industry participants tended to follow IBM’s lead, in a manner that institutional theorists would characterise as mimetic isomorphism (see section 4.6.3.2) The work of administrative management theorists Henri Fayol (see Scott 2003, p. 41) and others provides a sound basis for evaluating these organizations.

If organizations in the information technology industry had continued to develop as IBM had until the 1970s, when it was seen as the embodiment of corporate success (see Watson 1963), then the work of the Rational Theorists would continue to provide a sound theoretical basis for developing an understanding of the industry. However, just as other industries have developed in many different directions and reduced the relevance of the work of the Rational Theorists so has the information technology industry changed dramatically and, as will be seen, there is little in the work of the Rational Theorists to assist in developing an understanding of the organizational characteristics of today’s information technology organizations.

One area of the information technology industry that might lend itself to analysis using the work of the Rational Systems theorists is software development. As software has increased in importance, the difficulties in controlling complex development projects has became more apparent and many attempts have been made to systemise development methodologies. Object Oriented Programming (Neal,
Weistroffer and Coppins 2005, p. 71), the establishment of the Generally Accepted Software Engineering Practices (Morgan 2005, p. 129) and many other schemes have been espoused as the means by which a formal structure could be utilised to ensure timely and efficient development of projects by teams of programmers. Many of these methodologies showed considerable similarities to Frederick Taylor’s Scientific Management approach as systems analysts attempted to break down projects into discrete elements that could be developed by any programmer within an organization. The many documented failures of major software development projects (see Charette 1995, Charette 2005, Smith 2007) suggest that while projects usually have very clearly defined goals and much planning is undertaken in an attempt to promote the successful implementation of the projects, other factors need to be considered. Therefore the work of the Rational Systems theorists needs to be used with caution in this area of the information technology industry.

4.4.2 Organizations as Natural Systems

Scott defined organizations as Natural Systems (2003, p. 28) in the following manner:

> Organizations are collectivities whose participants are pursuing multiple interests, both disparate and common, but who recognise the value of perpetuating the organization as an important resource. The informal structure of relations that develops among participants is more influential in guiding the behaviour of participants than is the formal structure.

The significant difference between the organizational structures of the information technology organizations formed during the 1960s and those formed during the 1970s and 1980s, suggesting that a Natural Systems approach might be appropriate, was the transition from the very rigid formal structures embodied by IBM and its followers to a mixture of formal and informal structures embraced by emerging information technology participants during this time.

During the 1970s and the early 1980s the widespread use of computers was still largely confined to major industrial and commercial organizations and the provision
of computer technology continued to be largely controlled by the computer hardware organizations. For most participants in the information technology industry, during this period, the main employment opportunities continued to be with the computer hardware organizations and therefore, while the importance of the technologists (particularly the software developers) increased, the primacy of the computer hardware organizations in the information technology industry continued. However, within the computer hardware organizations different structures developed in a manner consistent with Scott’s observation of one of the strong characteristics of the Natural Systems perspective (2003, p. 59):

One of the most important insights of the Natural System perspective is that the social structure of an organization does not consist of the formal structure plus the idiosyncratic beliefs and behaviours of individual participants but rather a formal structure and an informal structure.

During the 1970s and early 1980s, the rigid formal structures associated with the IBM management style began to change. While these changes may have reflected the changes in society occurring at that time, it seems that other forces within the organizations were having a strong effect on the their structure. These differences were starkly demonstrated by the differences between the dominant force in the information technology industry at that time, IBM, and one of the most famous emerging new entrants to the industry, Apple Computer.

Frank Rose observed, when looking at the culture of Apple Computer (1989, p. 38),:

People at Apple focused their attention inward – on their leaders, on their myth, on their technology… what really drove them wasn’t the marketplace but technology. The world outside couldn’t compete with the ideas of their own engineers.

This inward focus on the organizations people and technology was very different from the prevailing culture at IBM where (Rose 1989, p. 38) the dominant culture was:
Service to the customer, conformity to the norm, loyalty to the organization, and a rigorously Protestant belief in the spirituality of sales and the morality of profit.

For many of the emerging information technology organizations initial sales to early adopters sustained the organizations but in time their founders acknowledged, often begrudgingly, the need for formal sales programs. For some this resulted in the appointment of a new sales oriented chief executive which often resulted in the creation of multiple internal organizational structures. At a time when IBM still espoused a strict adherence to uniform corporate culture, epitomised by strict dress code of dark suits and white shirts well into the 1990s (see Gerstner 2002, p. 182), Steve Jobs stepped aside in favour of professional management. Jobs presented the new President at Apple Computer, John Sculley, a man trained in the formal structures of Pepsi Cola, with the challenge of building a formal sales oriented organizational structure while Jobs insisted on flying a pirate flag and entitling people ‘Software Wizards’ so as to stress the individuality and independence of the Macintosh team. (Rose 1989, p. 114).

This strange mix of formal management structures having to endure maverick internal organizations seems to have developed during the 1970s and endured through the 1980s but to have largely disappeared as the industry has matured. There is little, if any, information in the literature to explain this phenomenon. However, my observations of the Australian information technology industry suggest that while the sales and administration managers at that time had come up through the ranks of the major hardware vendors, with little or no knowledge of the intricacies of the emerging technologies, the advances in software and hardware were being made by developers who in many cases had only just finished high school or university and had not been exposed to the prevailing cultures of an IBM influenced information technology industry.

My own experiences illustrate this dichotomy. In 1976 I was appointed, straight from university, to manage the application software group at a computer hardware
company, based on my computer science major, a course that had not existed before 1970. At the same time my fellow managers in sales and administration were at least ten years older than me and had mostly worked for IBM and similar hardware organizations. While my fellow managers were experienced and successful salesmen they had very few technical skills and were reliant upon my team to develop solutions for the customers. During the next ten years I undertook sales and management training programs and so when I, and my peers, established organizations during the 1980s I had the benefit of the sales and management training which I was able to combine with my early technical training.

In the 1970s there seemed to be a clear division between a management and sales class with limited technical skills and a technical class with limited management skills whereas by the 1980s some of those with technical skills had developed management skills. Today it would be almost impossible to obtain a management position within the information technology industry unless you had a highly developed appreciation of the technology issues to complement your management and sales credentials.

This characteristic of the Natural Systems perspective, where the focus is on the organization as a collective of participants pursuing multiple interests but with the continuing recognition of the primacy of the organization as a whole seems to be very applicable to the information technology industry during the 1970s and the early 1980s when the computer hardware organizations dominated. During this period the nature of information technology organizations was, in the main, generalist organizations providing solutions comprising hardware, software, consulting and continuing support to customers operating in many disparate industry segments. It was usual to have the situation, as described above, where employees with very differing skill sets and levels of experience needed to work together in an environment as posited by an early Natural Systems theorists, Chester Barnard (1968, p. 6):
The survival of an organization depends upon the maintenance of equilibrium of complex character in a continuously fluctuating environment of physical, biological, and social materials, elements and forces, which calls for readjustment of processes internal to the organization.

The maintenance of equilibrium proved to be very difficult for computer hardware organizations. Software started to dominate the buying decision and the younger technologists were not prepared to embrace the culture espoused by IBM and its followers. By the 21st century the information technology industry had evolved to an environment wherein hardware had become a commodity item and software, consulting and continuing support services were provided by many separate organizations specialising in servicing customers in particular industry segments.

So the work of the Natural Systems theorists seems to provide a basis for understanding the development of organizations within the information technology industry during the 1970s and early 1980s when many of the organizations within the industry were, in many ways, self contained. However as the information technology industry developed after the introduction of the personal computer in the early 1980s, the nature of the industry changed significantly. Separate software, consulting and support organizations emerged. Customers in particular vertical market segments were no longer prepared to accept generalist solutions. They looked to multiple organizations from within the information technology industry to provide solutions tailored to their specific needs. Hardware had become a commodity and computer hardware organizations had to change dramatically to survive. In this emerging, much more open environment, the work of the Natural Systems theorists does not adequately provide a basis for understanding the development of the information technology industry where people within the organizations need to cooperate with, and coexist with, many different competitors and allies within the industry.

4.4.3 Organizations as Open Systems

The third perspective of Scott’s schema of organizations views organizations as Open Systems defined in the following manner (2003, p. 29):
Organizations are congeries of independent flows and activities linking shifting conditions of participants embedded in wider material-resource and institutional environments.

Whereas the Rational Systems and Natural Systems perspectives have a focus on the internal structure of organizations, both formal and informal, the Open Systems perspective is concerned more with how interdependent components of organizations interact with each other and with their environment. This perspective can, in many parts, be considered to be a reflection of the changes in society as a whole, and the information technology industry in particular, where it is difficult for individuals in organizations to act in isolation as they become increasingly involved with many disparate interest groups outside of their own organizations.

The 1980s heralded a dramatic change in the information technology industry. The introduction of the IBM PC gave legitimacy to the personal computer industry, independent software organizations began to emerge and, most importantly, the nexus between the end user customer and the major hardware organizations was broken. By the end of the 20th century computer hardware had become a commodity and there was a myriad of independent suppliers of software, consultancy and continuing support available to service the needs of end user customers of all sizes. In this environment Scott’s definition of organizations as Open Systems well describes the manner in which the information technology industry operates.

An important concept in relation to the Open Systems schema, as espoused by Scott (2003, p. 89), is the that Open Systems are capable of self maintenance on the basis of throughput of resources from the environment. It is this characteristic of modern information technology organizations that most differentiates their mode of organization from the modes adopted prior to the mid 1980s.

In the early stages of development of the information technology industry the computer hardware organizations jealously and zealously guarded their control over their customers. In today’s environment the idea that an external company could be
considered to be controlling its customers would be questioned. However during this early period those people with the technical skills in computing were, in the main, very young or were working for the computer hardware organizations. It was very unusual for an industrial or commercial organization to have anybody with any seniority who had an understanding of information technology. In that environment directors or managers were often relieved to be able to hand total responsibility for implementation and management of computing facilities to a single organization and when that organization was IBM, a company revered for the manner in which it looked after its customers (or in the case of IBM’s followers, which acted like IBM), the decision was made even easier.

The computer hardware organizations of this era also took the view that an important part of maintaining a relationship with their end user customers was that they should prevent the introduction of third party products into a customer site. In this highly structured environment there was very little openness. The prevailing attitude was to limit the throughput of resources from outside of the confines of the individual computer hardware organizations.

The closed situation described above began to change in the late 1970s. A very important change in the industry, to be discussed in more detail in later chapters, was the unbundling of software and hardware by IBM on 23rd June 1969. This change in policy resulted in the establishment of third party suppliers of software and, in some cases, hardware. However the factor that probably most heralded the change in environment was that, by the mid 1980s, there was a cohort of information technology specialists who had enough seniority within organizations to be able to influence decision making with respect to computerization within their organizations. My peers, who had undertaken undergraduate courses in computer related subjects during the early 1970s, had by this time been in the workforce for ten to fifteen years and were entering the management ranks. No longer were organizations totally reliant on their suppliers for advice.
A third factor that led to a much more open environment was the introduction of personal computers, and very importantly, the introduction of IBM compatible computers by Compaq in January 1983 (Cringely 1993, p. 172). Within a very short time it was possible to buy hardware and software from many different organizations. While it is outside of the scope of this thesis to cover this issue in more detail it is interesting to note that the attempts to maintain a closed environment with continuing control of their customers by Digital Equipment Corporation, Data General, Prime Computer, and to a large extent IBM, probably was a major factor in the demise of each of these organizations.

Today’s information technology environment is very open. The choice of the core hardware platform has little effect on the choice of other hardware peripherals and most organizations use a variety of suppliers to provide core software solutions. Most organizations also have to share data with other organizations, with different software and hardware systems, and this sharing of the data is very reliant upon the adoption of open interface standards throughout the world. The information technology industry is reliant on both the easy throughput of resources from the environment and in promoting and aiding this throughput. A by-product of this openness is that today’s information technology organizations tend to be far more vertically specialized with a homogeneous workforce that is required to work with employees of other information technology organizations in order to deliver effective customer solutions.

4.5 Combining the perspectives

The short review of Scott’s three perspectives provides some guidance on the path to be taken in selecting a framework for use in this study but leaves many questions unanswered. The work of the Rational theorists might have some limited applicability in looking at how information technology industry organizations deal with the management of complex development projects. The work of the Natural Systems theorists might provide a strong basis for developing an understanding of how organizational structures develop in larger information technology industry organizations where many formal and informal structures persist. The work of the
Open Systems theorists seems to be particularly relevant in today’s environment because of the focus on how interactions with the external environment affect the development of organizational structures. However, it would be difficult to focus on one of the perspectives, to the exclusion of the other two, as components of all three, in differing degrees, continue to be applicable to many of today’s information technology industry organizations. This need to incorporate components from the different perspectives is well recognised by Scott (2003, p. 101) as he comments that, to remain credible, modern theories of organization must take into account the openness of organizations to their environment, and that aspects of the Rational and Natural perspectives have continued to flourish by moving into the halls of Open Systems

In recognition of this observation and particularly, in recognition of the continuing relevance of the work of the Natural and Open theorists, Scott describes a further classification of a combination of the Natural Systems and Open Systems perspectives into the Open-Natural Systems Model. It is this model that seems to most closely provide a basis for developing an understanding of how organizational structures have formed within the information technology industry in recent times.

4.5.1 Open-Natural Systems Models

Within the Open-Natural Systems model the emphasis is placed upon the effect of the environment on organizational structure and the concept of organizations as Rational Systems is strongly challenged as theorists seek to explain the emergence of new organizational forms. In reviewing the work of the Tavistock Institute of Human Relations, Scott (2003, P. 116) refers to an observation by Trist which epitomises the issue at the core of the work of the Open-Natural Systems theorists (Trist 1981, p. 50):

In our research projects at the time, we and our organizational clients were baffled by the extent to which the wider social environment was moving in on their more immediate concerns, upsetting plans, preventing the achievement of operational goals, and causing additional stress and severe internal conflict.
I have been a witness to such stress and conflict inducing effects throughout my career in the information technology industry both within my own organizations and through my observations of the industry as a whole. These have often arisen when alternative goals have been pursued by groups within an organization to the detriment of managements’ agreed commercially accepted goals for the organization. Superficially many would argue this is indicative of a failure of management if it were not for the many success stories reflecting the way in which these groups have benefited from their interaction with the wider social environment. At the worker-developer level anecdotal and documented stories abound of ‘skunk works’ developers who secretly work on projects not endorsed or approved by management but which turn out to be the basis for the future success of the organization. Often, the genesis of a project lies in the way in which the developers interact informally with their peers in external (and often competitor) organizations. While many efforts do not produce positive results for the organization, and in many cases have resulted in the failure of the organization, there are many widely reported success stories in Silicon Valley that have resulted in management encouragement or at least tolerance of this behaviour. Indeed, many organizations have attempted to institutionalise this behaviour as shown by the establishment of the Palo Alto Research Centre by Xerox Corporation (see Hiltzik 2000). Even within IBM, the embodiment of a rational organization where every decision was based on a very careful, rational, well thought out plan designed to meet the corporation’s goals, the development of the IBM PC was only possible because (Cringely 1993, p. 126) ‘the IBM Personal Computer that eventually came to market in late 1981 came from a renegade independent business unit in Boca Raton, Florida’.

At the founder/manager level there are also many examples of non-rational decision making based on a personal crusade by a very strong manager. Possibly this is no better illustrated than by the comparison by Wilson (1997, p. 11) of another

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8 Skunk Works is a trademark of Lockheed Martin and was originally derived from the Li’L Abner cartoon. It is used generally to refer to an often secret experimental development effort in the computer or aerospace field. (Rich and Janos 1994)
information technology industry corporation, Hewlett Packard Corporation, with Oracle Corporation. Hewlett Packard is famed for the rationality of its decision making by its founders Bill Hewlett and David Packard, whereas Oracle founder Larry Ellison could be considered to be famed for the irrationality of his decision making:

Bill Hewlett and David Packard, who grew up during the Great Depression, founded the Hewlett-Packard Company with certain basic values in mind. They believed their company should provide opportunity and security to employees, contribute to the betterment of society, build first rate products, satisfy customers, and make money. Their way of business eventually become known as the HP Way. 'We thought that if we could get everybody to agree on what our objectives were and to understand what we were trying to do, then we could turn them loose, and they would move in a common direction’ David Packard wrote.

Larry Ellison’s vision was narrower. The Oracle Way, to the extent that such a thing existed, was simply to win. How that goal was achieved was secondary. As a former Oracle board member put it, Ellison established no 'magnetic north‘ – no common direction, no sense of how things would or would not be done.

Continuing with the themes embraced by the Tavistock researchers, in which they sought to explain the development of organizations in terms of their need to survive in specific social and economic environments, Scott suggests three different approaches to analysing organizations that have developed at the ecological level of analysis; Organizational Ecology, Resource Dependency and Institutional theory. A review of the literature that deals with these three divisions of Open-Natural Systems approaches indicates they all have relevance in helping to understand the development of information technology industry organizations.

Organizational ecology theorists, adapting the well established Darwinian framework to the analysis of organizations, take a natural selection view that survival of organizations is predicated on the optimization of fit between organizational forms
and environmental characteristics. This approach has been used to explain the growth of Silicon Valley as a centre of information technology industry excellence and dominance and as a means of examining how other regions attempt to follow the Californian lead as observed by Brown and Duguid (2000, p. 37):

An ecological perspective also addresses the burning question of replication… Politicians and business groups are seeking to ‘bootstrap’ new high-tech clusters in their region so they can compete with the established ones and propel themselves from the periphery to the centre of the knowledge economy.

An organizational ecology approach also lends itself to analysis of the birth and death of Silicon Valley firms where the flow of proprietary knowledge (which is often positioned as the lifeblood of the information technology firms in Silicon Valley) is very much related to the movement of employees between organizations. In addressing the problem of employee retention and the potential leaking of proprietary knowledge between organizations, Brown and Duguid observe that while these flows might result in the death of some organizations, these flows are important for the birth of new organizations and the growth of the region (2000, p. 37):

What is good for the ecosystem as a whole is not necessarily good for individual species or firms. Indeed, some of these may have to die for the region as a whole to survive.

Resource dependency theorists focus their attention on an organization and its exchange partners and take the view that the survival of an organization is dependent on the successful selection and interaction with suppliers and consumers. This approach lends itself to the analysis of information technology organizations where the management of scarce resources is a continuing theme. An area in the entrepreneurial literature utilising a resource dependency approach that has received attention is that of strategic alliances. As Eisenhardt and Schoonhoven have observed (1996, p. 138):
Alliances form when firms are in vulnerable strategic positions for which they need additional resources that alliances can provide to compete effectively, or when firms are in strong social positions such that they have the resources necessary to know, attract, and engage partners.

In a similar vein, the management of scarce people resources and capital resources lend themselves to analysis of information technology organizations utilising a resource dependency framework.

So organizational ecology and resource dependency models both take account of the environment in which organizations operate and provide bases upon which many aspects of the organizational modes of information technology organizations might be examined. However both models leave unanswered important questions about why owners, managers and employees choose to develop organizations along certain lines. Why, for example, did employees of Intuit stay with the company when it was not able to pay salaries (Taylor and Schroeder 2003, p. 36). An organizational ecology model would suggest, in a weakened state, the organization should die in the face of Microsoft, a much fitter rival. A resource dependency model would suggest, in a market where the employees’ skills were in high demand, Intuit’s rivals would quickly acquire Intuit’s most valuable resource, its people. Institutional theory with its focus on the manner in which the institutional environment more strongly influences the development of organizational structures than does market pressure would seem to provide guidance to those unanswered questions. As Scott asserts (2003, p. 119):

Institutional theory emphasises that organizations are open systems – strongly influenced by their environments – but that it is not only competitive and efficiency based forces that are at work. Socially constructed belief and rule systems exercise enormous control over organizations – both how they are structured and how they carry out their work. And, since belief systems and norms vary over time and place, institutional concepts provide a promising framework within which to conduct comparative and historical studies of organizations.
This seems to get to the heart of the issues, I have been exploring, in that the manner in which the principals of Australian software firms have developed their organizations often seem to be based upon seemingly irrational premises. This led me to the view, after reviewing the development of organizational theory in the context of the information technology industry, that institutional theory, with its focus on the importance of socially constructed belief and rule systems, might best provide a platform for my work.

### 4.6 Institutional Theory and Australian software firms

In today’s post-industrial society increased productivity and economic growth in much of the world is increasingly reliant upon the capacity of nations to improve the quality of human capital. This translates into greater emphasis on the value of intangible assets when compared with tangible assets (David and Foray 2002, p. 10). This is very apparent in the information technology industry where the giants of the industry are now software organizations whereas less than twenty years ago the information technology industry was dominated by computer hardware organizations. This change in emphasis has also been accompanied by change in organizational power within information technology organizations.

In the new ‘Knowledge Economy’, characterising post-industrial society, financiers may well be able to locate a computer manufacturing plant in a developing country where they are able to source easily replaceable low cost labour but will, probably, find it very difficult to replace a key software developer or a development team that does not agree with the financier’s strategic plans. Florida (2003, p. 68) identifies software developers as belonging to the Super-Creative Core of the ‘Creative Class’ whose distinguishing characteristic is that its members engage in work whose function is to ‘create meaningful new forms’. Florida (2003, p. 77) considers that the basic values of the members of the Creative Class are individuality where the members attempt to create individualistic identities that reflect their creativity, meritocracy where members define themselves in terms of creative merit rather than their position in a financially delineated status order and diversity and openness. In
the knowledge economy the values of individuality, meritocracy and diversity are of considerable importance to those software developer members of the Super-Creative Core of the Creative Class. Moreover, where members are an increasingly scarce and mobile resource (see Agarwal and Ferratt 2001, Florida 2005, West and Bogumil 2001), it is probable these values will have an increasingly strong influence on organizational structures of software organizations.

Therefore, institutional theory with its emphasis on the influence of socially constructed belief and rule systems appears to have applicability in this study. To explore this premise further I reviewed the development of institutional theory in the context of my knowledge of, and experiences in, the Australian software industry.

The development of the institutional school generally is accepted to have commenced with Philip Selznick’s studies of the Tennessee Valley Authority in the 1950s but the antecedents of this work and the work of those who followed owe a great debt to the work of the German philosophers of the early 20th century and indeed to the work of Kant in the 18th century (see Kant and Abbott 1909). The work of Max Weber also provides a foundation upon which institutional theory can be considered to have developed. In *Economy and Society* Weber developed ideas that continue to be relevant in understanding the development of modern organizations and his view that (Weber, Roth and Wittich 1978, p. xxxiv):

...men act as they do because of belief in authority, enforcement by staffs, a calculus of self-interest, and a good dose of habit

continues to be a fundamental platform of institutional theory.

Much of the work in studying organizations from an institutional perspective has emerged since the 1950s. Many scholars have contributed to this work but in addressing the applicability of institutional theory, in the context of the Australian software industry, I have specifically referred to the work of Selznick, Meyer, Rowan, DiMaggio and Powell. Selznick because of his foundational work in this
Philip Selznick in *Leadership in Administration* (1984) provided the foundations for much of the work in the institutional study of organizations based upon his studies of the inner workings of the Tennessee Valley Authority (1966) and Soviet politics (1952). In pondering the issue of how to make organizations more efficient Selznick (1984, p. 3) observed that:

> The logic of efficiency applies most clearly to subordinate units…The logic of efficiency loses force, however, as we approach the top of the pyramid. Problems at this level are more resistant to the ordinary approach of management experts.

This, I would suggest, is a central issue that very much affects Australian software firm practice. In an industry where there has always been a wealth of research and advice available to principals on how best to structure and manage their organizations one would expect that most, if not all, Australian software firms would be managed in a very efficient manner. That this is not so clearly emerged from information technology industry reports, from my own observations and from my field research conducted with Australian venture capital managers and advisers to the principals of Australian software firms.

The development of an organization’s distinctive competencies, or incompetencies, by a process of infusion of values from many internal and external sources and the consequent evolution into a social organism is Selznick’s essential focus of analysis. Managements’ role in this process is much more than simple goal setting and supervision. Selznick observes that as organizations become more institutionalised the role of institutional leadership (as opposed to organizational leadership) in maintaining institutional integrity within the organization is essential (1984, p. 139):
The integrity of an enterprise goes beyond efficiency, beyond organization forms and procedures, even beyond group cohesion. Integrity combines organization and policy. It is the unity that emerges when a particular orientation becomes so firmly a part of group life that it colours and directs a wide variety of attitudes, decisions, and forms of organization, and does so at many levels of experience. The building of integrity is part of what we have called the 'institutional embodiment of purpose’ and its protection is a major function of leadership.

This view of managements’ role is an important issue in this study for two reasons. Firstly, despite a wealth of advice available to the principals of Australian software firms on how to optimally structure and manage their organizations, there is little evidence that this advice is being acted upon. Secondly, many of the current principals of Australian software firms were the founders of those organizations and they continue to strongly influence the development of those organizations in a more overt manner than would an executive appointed by, and responsible to, a board of directors. This pattern of behaviour is consistent with Selznick’s institutional perspective of organizations in which he sees the role and the mission of the organization transcending a simple goal-oriented rational disciplined view of organizational development.

If the advice of experts in the field is not a major influence on how the principals of Australian software firms approach the development of structure and management of those organizations, then what factors do influence these principals? Two foundational works, in what has been described as the new institutionalism, provided me with a framework upon which I could consolidate my observations and research in building my understanding of the factors influencing the principals of Australian software firms.

Meyer and Rowan (1977) argue that in seeking to achieve legitimacy, organizations adopt rationalized procedures that are often independent of what might be considered efficient procedures. The rationalized procedures are accepted as social reality and become deeply ingrained within the organization. Whereas a procedure may have
started life as an individual’s new way of approaching a problem, in time, procedures become impersonalized and assume rule like status. Hence new entrants in an industry adopt and perpetuate the ‘myths’ of the industry in order to achieve legitimacy.

DiMaggio and Powell (1983) extended this work by considering the manner in which a diverse set of organizations in an industry tend, in time, to adopt similar practices and procedures. As organizational fields develop and age, the participants within them tend to develop many similarities in a manner that DiMaggio and Powell describe as institutional isomorphism. They identify the mechanisms by which institutional isomorphic change can occur.

As the information technology industry has developed there have been many examples of new entrants striving to achieve legitimacy by adopting the practices of the incumbents. This was well illustrated by the manner in which computer hardware organizations in the 1960s modelled many of their practices on the dominant company in the information technology field, IBM, which by 1965 controlled 65% of the available market. The dominant hardware organizations of this era were often disparagingly referred to as ‘IBM and the seven dwarfs’ because of the manner in which Burroughs, Sperry Rand, Control Data, Honeywell, General Electric, RCA and NCR followed and modelled many of their practices on IBM in a manner that eventually led to the demise of all the dwarfs and the radical restructuring of IBM as a computer hardware organization (Dvorak 2008). Until the mid 1970s the information technology industry may well have been described as an organizational field comprising in the main ‘IBM and the seven dwarfs’. As mini computers and then personal computers became available and software became more important, new entrants to the industry found following IBM’s lead no longer worked. New role models (and new myths) emerged. Consequently the definition of a single organizational field encompassing the whole information technology industry, and (as will be seen in later chapters) even the definition of an organizational field encompassing the Australian software industry, has become problematic. The work
of Meyer and Rowan and DiMaggio and Powell provided a basis upon which I could review the development of the Australian software industry.

4.6.2 Meyer and Rowan

Meyer and Rowan (1977) assert that formal organizational structures dramatically reflect the myths of their institutional environments rather than the demands of their work environments. In dispelling the view that organizations function according to formal blueprints in a prescriptive manner Meyer and Rowan (1977, p. 343) theorise that:

Formal structures are not only creatures of their relational networks in the social organization. In modern societies, the elements of rationalized formal structure are deeply ingrained in, and reflect, widespread understandings of social reality. ...elements of formal structure are manifestations of powerful institutional rules which function as highly rationalised myths that are binding on particular organizations.

They argue that organizations are structured by phenomena in their environments and tend to become isomorphic with other organizations in the same environment. In explaining this they offer that isomorphism can occur as organizations become matched with their environments by technical and exchange dependencies but emphasise, their view, that organizational structure reflects socially constructed reality which emerges initially from the myths. Myths over time become codified into rules.

Meyer and Rowan note three specific processes that generate rationalized myths of organizational structure which I examine in the context of the Australian software industry.

4.6.2.1 The elaboration of complex relational networks.

As it has become easier to communicate on a much wider scale, so has it become easier to form larger and more complex networks of relationships domestically and
internationally. A product of this increase is, as observed by Meyer and Rowan (1977, p. 347):

As the relational networks in societies become dense and interconnected, increasing numbers of rationalized myths arise…These myths may originate from narrow contexts and be applied in different ones.

Much of the development of the Australian software industry commenced in the 1970s. This coincided with the rapid expansion and economical availability of international air travel and reliable international communication facilities. For industries that had developed prior to this period the interaction between international organizations was very limited and, even within subsidiaries of multinational organizations operating in different countries, different modes of operation developed in consort with local practices and environments (see Lasserre 2003, p. 10). For Australian software firms, however, the founders and employees were able to travel widely and to develop practices based upon international observations.

At the same time globalisation of information technology organizations (particularly American headquartered) meant Australian software company staff were becoming exposed to, and building, formal and informal networks on an international scale. As software organizations were not encumbered by the structures of the past it is arguable they embraced global practices at a much faster rate than older traditional industries. In my software firm, for example, during the 1980s, even though all sales administration and financial functions were based in Sydney, the core software development team was based in Lancashire in England because that is where the key software developer wanted to live. Modern communications and relatively low cost international travel enabled the effective utilization of human resources in a manner that probably would have not been possible even ten years before. During this time it was also usual for our senior development people to attend information technology conferences in America on a regular basis so as to ensure our projects were based on current information technology industry thinking. The principals of many other Australian owned software firms adopted similar strategies and so the Australian
software industry was very well informed about international practices and strong relationships were formed with similar organizations in many countries.

The by-product of this increasing globalization of the software industry was, as suggested by Meyer and Rowan, the adoption of world’s best practice by many Australian organizations following the lead of their international equivalents. The downside was, unfortunately, that it also, at times, led to the adoption of practices that may have been suitable in another country because of scale factors or industrial patterns but may have not been appropriate in particular Australian industrial sectors. As described below this effect is well illustrated by the widespread attempt to enforce ISO 9000 registration in Australia based upon its selective implementation in Britain.

4.6.2.2 The degree of collective organization of the environment.

Meyer and Rowan (1977, p. 347) observed that:

The myths generated by particular organizational practices and diffused through relational networks have legitimacy based upon the supposition that they are rationally effective. But many myths have official legitimacy based upon legal mandates.

An example of this was the upsurge in interest in implementing quality standards within Australian industry that influenced organizational structures of some Australian software firms during the 1990s. Following the lead of British industry many Australian governments specified compliance with the international quality standard, ISO 9000, to be mandatory in all procurement contracts. Those in smaller organizations perceived there was no choice but to comply. A considerable amount of effort was expended gaining accreditation to the appropriate standards. However American headquartered organizations generally chose not to seek registration, possibly because the cost would have been prohibitive but more probably because of a lack of American government pressure. By the late 1990s it was clear while accreditation had been mandated the reality was there was no enforcement. By 2000
most Australian software firms had discontinued registration. Indeed a 1998 survey showed Australian firms led the world in discontinued registrations of ISO 9000 (Seddon 1998, p. 16). Thus the combination of policies derived from experiences garnered in Britain under very different circumstances with a government mandated, but poorly enforced implementation requirement, created a myth resulting in the principals of some Australian software firms significantly changing their organizational practices.

4.6.2.3 Leadership efforts of local organizations.

Meyer and Rowan refer to the active role organizations can play in shaping the contexts within which they operate and there is little doubt that within the information technology industry IBM and Microsoft have been very successful in institutionalizing their goals at the highest level. In the context of this study this process of generating rationalized myths needs to be viewed, not from the perspective of Australian software firms having the power to change industry institutional environments but from the perspective of software firms whose adoption of organizational practices is moulded by the more powerful organizations within the industry as a whole.

Meyer and Rowan (1977, p. 348) refer to two ways in which leadership can mould institutional structure that will be well recognized by the principals of Australian software firms:

Firstly, powerful organizations force their immediate relational networks to adapt their structures and relationships. Since the start of development of Australian software firm in the 1970s the organizational structures of software firms have been heavily influenced by the requirements of the major information technology organizations. For many years a strong relationship with IBM was essential because IBM was very influential in guiding a customer in the choice of a software provider. To be favoured by IBM, a software firm had to submit business plans and organizational charts to be considered for IBM accreditation. The organizational
practices of many software firms were sometimes more strongly influenced by IBM requirements than by the thinking of the principals of the software firms.

Secondly, powerful organizations attempt to build their goals and procedures directly into society as institutional rules. There is, perhaps, no better example of this than Microsoft. When IBM decided to use Microsoft to implement the operating system for the original IBM PC (Young 1998, p. 225) it established the basis upon which first DOS and then Windows would become *de facto* industry standards. Today the approach of creating product portfolios that become industry standards in mass markets is an important component of Microsoft’s strategy (Cusumano and Selby 1998, p. 10). Today any software company substantially limits its potential market if it does not develop products and services based upon Microsoft products and, as a consequence, conform to Microsoft’s requirements.

4.6.3 DiMaggio and Powell

DiMaggio and Powell (1983) seek to explain why there is a strong tendency for organizations to adopt similar forms and practices. They noted in various industries (for example college publishing, hospitals and the radio industry) one or more dominant organizational forms emerged over time. They suggested via structuration of organizational fields (see Barley and Tolbert 1997, Giddens 1984), once a field becomes well established there is an inexorable push towards homogenization of organizations within that field. By structuration they refer to the balanced effects of societal rules (which as suggested by Meyer and Rowan are often rationalised institutional myths) and the effect of human agency (the capacity of individuals to act independently) that act in concert at a macro and micro level in the development of organizational structures. The importance of this work in the context of the study of Australian software firms is the recognition that the unit of analysis should be at the organizational field level which they describe as (1983, p. 148):

> ...those organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies and other organizations that produce similar services or products.
In looking at the factors influencing the way in which organizations develop within organizational fields, DiMaggio and Powell identify three mechanisms through which isomorphic change occurs; coercive isomorphism, mimetic isomorphism and normative isomorphism, which I examine in the context of the Australian software industry.

4.6.3.1 Coercive isomorphism

Coercive isomorphism, as explained by DiMaggio and Powell (1983, p. 150):

...results from both formal and informal pressures exerted on organizations by other organizations upon which they are dependent and by cultural expectations in society within which organizations function. Such pressures may be felt as force, as persuasion, or as invitations to join in collusions.

For Australian software firms wishing to enjoy the rewards of selling to government, or in operating in partnership with multinational information technology organizations, there are considerable pressures to adapt organizational practices to comply with the requirements of these partners.

A common refrain echoed by many Australian software firms is that Australian purchasers of software often choose to acquire products from overseas suppliers despite the availability of equivalent or better locally developed products. Dennis, Houghton et al comment (2006, p. 18):

Anecdotally it is reported that other Australian SMEs and local government buy Australian products but large entities, public and private, are more reluctant to do so. One focus group’s comment on the banking and finance sector illustrates this: ‘They almost inevitably ignore Australian products and buy imported products that need extensive modification’. A further, more disturbing comment about a state government was ‘we sell x infrastructure software to governments all around the world, but our own
Consequently some principals attempt to structure their firms in a manner that legitimises them in the eyes of potential purchasers of their products even though the organizational structures may not be the most appropriate or most desired. While coercive pressure, to adopt particular practices and structures, can take many forms, two forms of pressure that will be well recognised by the principals of Australian software firms result when software firms attempt to form strategic partnerships with multinational organizations or when they attempt to sell to government.

The establishment of alliances with major multinational organizations has been seen as, and promoted as, a means by which Australian software firms can successfully market their products and services domestically to organizations seeking the comfort and legitimacy of dealing with a major, viable organization. The Australian Information Industry Association actively encourages the development of partnerships through the CollabIT program (McAdam 2007) with the view that:

...information technology SMEs should aim to work with other aligned or complementary businesses in order that together they can overcome limitations, generate new ideas and ways of doing business and ultimately expand their market reach and penetration.

These views have been strongly endorsed by government and until 2002 (Dougan and Rankine 2003, p. 1) the Partnership for Development program and its successor, the Strategic Partnership for Industry Development program required multinational information technology organizations to undertake specific contracted industry development activities to assist their Australian information technology industry counterparts (DCITA 2000, p. 88). As a result of these suggestions and initiatives, many Australian software firms perceived the appropriate way to gain entry to major organizations or government was to establish partnership arrangements with multinational information technology organizations and these multinational information technology organizations (at least until 2002) actively attempted to
establish partnerships in order to honour their commitments to the federal government.

Australian software firms found they were required to make significant changes to their organizational practices in order to be able to satisfy the multinationals’ minimum requirements for partnership. Consider for example multinational EDS Corporation’s (EDS 2007) requirements of potential partners which include (AIIA 2002, p. 5):

1. A well developed product or service that is suited to the needs of the international market;
2. Well developed management capabilities that will enable the business entity to market and support its products or service
3. A business planning model that is complemented by the priorities and strengths of EDS

These requirements are typical (see Dougan and Rankine 2003) and while some feel that they meet these requirements, the reality is that the principals of even medium sized (by Australian standards) Australian software firms need to make significant changes to their organization if they are to comply with the requirements of EDS, an employer more than 6,000 people in Australia alone.

In dealing with state and federal government in Australia software firms can choose to sell directly without the assistance of more substantial partners. In recent times there have been many attempts by government, at all levels, to assist Australian software firms in their efforts to gain entry to the substantial government market for information technology products. Today it is far easier for Australian software firms to sell to government than it has been in the past. This has been achieved through the use of pre-qualification Panel Contracts and genuine efforts of government to make it easier for software firms to sell to them (see Hoff 2005, NSWPIT 2007). However software firms wanting to sell to government are dealing with very large organizations whose officers have a fiduciary responsibility to protect government’s
interests and thus Australian software firms need to comply with some minimum requirements. These are well illustrated in the NSW government’s standard contract for procurement of information technology products (NSWPIT 2003) which must be entered into by any software firm wishing to sell to the NSW government. The forty page contract is not onerous or difficult to interpret by the standards of past contracts but still places strict requirements on the supplier. For a large information technology company used to dealing with government contracts it is probably seen as fair and reasonable but for an Australian software firm used to dealing with smaller non government businesses compliance may require many changes in organizational practices.

Dougan and Rankine (2003) observed that, in the face of these coercive pressures, the principals of Australian software firms documented structures and practices in submissions to multinationals and government but that attempts to implement those structures and practices were mainly ceremonial.

The other source of coercive isomorphism, one would expect to see, would emanate from those organizations and individuals providing finance to Australian software firms. The results of my analysis (as described in the previous chapter) suggests the availability of capital is a major issue affecting the ability of the principals of Australian software firms to build sustainable growing businesses. Therefore, logically, one would expect coercive pressures to develop organizational structures satisfying the financiers’ requirements would strongly influence the type of organizational structures adopted by the principals of an Australian software firms. This is an important issue dealt with in later chapters of this thesis.

4.6.3.2 Mimetic isomorphism resulting from standard responses to uncertainty

DiMaggio and Powell introduce mimetic isomorphism (1983, p. 151) as occurring: ‘When organizational technologies are poorly understood, when goals are ambiguous, or when the environment creates symbolic uncertainty.’ This describes the environment in which the founders of Australian software firms found themselves during the 1970s and might well, for many principals of Australian
software firms, describe an environment persisting today. The response, DiMaggio and Powell say, is that (1983, p. 151) ‘organizations may model themselves on other organizations’

The concept of mimetic isomorphism (in a negative sense) might also, because of the limited number of appropriate role models in Australia, explain why the principals of Australian software firms have not developed organizational structures that support sustainable growth.

In the early days of the Australian software industry there were no existing organizations upon which a founder could model new organizational practices. The information technology industry in Australia, at that time, was dominated by the subsidiaries of multinational corporations, run by mid level managers, whose main focus was on the sale of imported computer hardware and software. The organizational practices of the multinationals provided no guidance to the founder of an independent Australian firm ultimately responsible for the success of the firm where the focus was on development and sales of software alone. The background of the founders of Australian software firms was another limiting factor. As there were no professional accreditation requirements for somebody starting a software firm it was, and still is, possible for somebody to learn how to write a computer program from a self help book, such as Visual Basic 2005 for Dummies (Sempf 2005), and from there to form a software firm.

One might have expected the founders of Australian software firms, during the 1970s and 1980s, (because of the lack of industry role models) to have based organizational structures on those organizations they had worked for or on the structures adopted by their clients. My observations and my field research suggest this did not happen in most cases. For many entrants to the Australian software industry the establishment of their own organization occurred at a very early stage in their career, before they reached positions where they could have gained insights into organizational structure issues. As the clients of the early Australian software firms were, in the main, large
industrial and commercial organizations, little relevant guidance would have been obtained from clients on how best to organize an Australian software firm.

As computerization increased during the 1970s and 1980s some of the principals of Australian software firms (myself included) looked to the American market for role models on how to organize their firms. While some guidance was provided by this process, the scale and market differences limited the value of comparisons between Australian and American software organizations and therefore, it may be that we copied inappropriate practices for our market.

Nonetheless for most Australian software firms during this period, the rapid growth of the market and the very high margins available from the licensing of software meant despite the absence of role models, organizational structures were developed that enabled survival and, in many cases, prosperity.

One would have expected, after some forty years of development, those Australian software firms which had survived and prospered would provide role models for new entrants into the industry whose principals had the goal of building sustainable growing software firms. This is a central issue that will be explored in more depth in later chapters of this thesis but a general reason why this has not happened is those software firms which have succeeded in Australia are usually very small, lack local visibility and, in many cases, the original founder of the successful organizations continues to have a dominant role in the organization. For many aspiring founders of Australian software firms the perceived model of a successful organization, they might attempt to mimic, is an organization driven by a highly visible, very entrepreneurial, founder rather than a well structured organization designed to facilitate sustainable growth.

4.6.3.3 Normative isomorphism stems primarily from professionalism

DiMaggio and Powell (1983, p. 147) posit, in the second half of the 20th century, the state and the professional organizations had become the great rationalisers of professions which most affected the structuration of organizational fields. This is
reflected in the interest shown by many researchers in the applicability of institutional theory in the study of government and professional organizations. At first glance a study of the software industry would seem to fit into this environment as reference to the various industry associations reveals a focus on promoting the professional qualities of the industry (see for example: ACS 2001). I argue, however, to consider the Australian software industry from a professionalization viewpoint would be misleading. My observations suggest, for the Australian software industry, normative isomorphism stems primarily from involvement in the trade associations of the main customers. As this is a central premise of this thesis, and is dealt with in some detail in later chapters, the following brief discussion deals principally with the role of professionalism in the Australia software industry in the context of two important aspects of professionalization, as sources of isomorphism, referred to by DiMaggio and Powell (1983, p. 152):

One is the resting of formal education and legitimation in a cognitive base produced by university specialists; the second is the growth and elaboration of professional networks that span organizations and across which new models diffuse rapidly.

The first issue, that the various schools of information technology throughout the world have increased the quality and breadth of learning available to students wishing to pursue a computer oriented career, is not in question. The question that remains unanswered is for what profession are various schools preparing their students, if any. The answer of course is not one profession in particular because the skills learned can be used in many professions and activities.

The industry associations in Australia and throughout the world have, with little success (see Ensmenger 2001 for a detailed discussion on the debate in the USA), tried to tie the concept of a degree from a recognised school of information technology with professional accreditation as a computing professional. The problem arises because, for example, if you want to act as a lawyer then you will need to be accredited by your state law society which will require you to have a recognised degree in law. If, however, you want to develop a software program to be used by the
legal profession the law society does not require you to be accredited by them, it does not require you to have a recognised degree in information technology and it does not require you to be accredited by the Australian Computer Society. The law society, in having you develop software for them, will only be interested in outcomes since, ultimately, the legal professionals will be responsible for the data, entered into and, obtained from the software. A similar analogy can be applied to almost all organizations employing or retaining software developers. After some forty years of development of the software industry it is still possible that reading Visual Basic 2005 for Dummies is the only training and accreditation required in becoming a software professional. It is therefore unlikely that structuration of organizational fields encompassing the software industry will be caused, in the foreseeable future, by formal education pressures.

The second issue, that of the growth and elaboration of professional networks spanning organizations, has at its heart the same problem as discussed above. As there are very few perceived benefits, in terms of employment or accreditation, accruing from membership of a professional grouping of software programmers there has been little evidence in Australia, or the rest of the world, of a growth in membership of professional associations purporting to represent them. This is not to say that software programmers do not belong to professional or industry associations. Indeed my experiences and observations suggest that many software developers and the principals of software firms actively attempt to join professional or industry associations. The associations they seek to join, however, are those related to their main work activities. For example, those involved in providing computer solutions to the legal profession would probably be members of the New South Wales Society for Computers and the Law or the New South Wales Law Society’s Legal Technology Committee (see Argy 2008) and those who provide software to the health industry would probably belong to the Medical Industry Software Association (see MSIA 2007). In the software firm I founded, whose main clients were engineering organizations, employees were encouraged to join the Australian Institution of Engineers because it was the professional body of choice of our clients. All the suppliers of strata title management software actively participate in the various state
strata title managers’ industry associations. Therefore, as will be dealt with in more detail in later chapters, I argue normative isomorphism in the Australian software industry is likely to be the result of structuration pressures from membership of various industry associations relating to client activities rather than membership of software or information technology industry associations.

4.6.4 Institutional Entrepreneurship

The work of Selznick, and those who have followed after him, in the development of institutional theory seems to provide a solid theoretical base for developing an understanding of the mechanisms affecting the formation of organizational structures within the context of Australian software firms.

However, the work of the aforementioned theorists might be considered to be lacking in one essential area, namely the issue of agency and interest. Much of the work, as developed by these theorists, is premised on models that defocus self interest in deference to organizations that owe their development to the institutional forces of rationalized myths developed within relational networks and the forces of isomorphic change that mould the development of changing organizational structure. As the 21st century approached it became harder to rationalise the absence of interest and agency within an all encompassing institutional framework unless one’s attention was limited to those organizational fields where the effect of self interest was also limited. Clearly, in those major information technology firms where the founders still play a dominating role (Microsoft and Oracle being obvious examples) agency and self interest are dominating factors affecting organizational structure. Paul DiMaggio sought to clarify the role of interest and agency in institutional theory and to identify those organizations for which institutional theory provided a good fit in his paper (DiMaggio 1988, p. 4) on ‘Interest and Agency in Institutional Theory’.

The critical issue to be looked at when considering the formation of software firms in Australia is that, almost invariably, they were formed during the last forty years in an industry sector that, until then, did not exist. Unlike participants in highly structured organizational fields of, for example, law, health and accountancy the founders of
software firms had little in the way of organizational models to reference. It is, therefore, relevant to look at this field from the viewpoint of creation of a new field of enterprises rather than from a viewpoint of new entrants to an existing field or changes in organizational models of existing participants within a field.

In recent times the increasing importance of new technologies as a key element of economic growth has seen an increasing interest in institutional entrepreneurship. In the context of the creation of a new field of enterprises, by founders who are not embedded in an institutional field, much of the literature in this area suggests that the founders will be predisposed to institutional change. Barley and Tolbert (1997, p. 102) posit that ‘Changes in technology…increase the odds that actors will realize that they can (or must) modify an institution’. Dorado (2005, p. 388), in examining three orientations (past, present and future) of agency, suggests “an orientation towards the future enables the imaginative generation of possible future trajectories of action defined by actors’ hopes, fears and desires’. Hardy and Maguire (2008, p. 210) observe that ‘Most studies have found institutional entrepreneurs to be highly influential in shaping their institutional fields, contributing to a range of outcomes that include the creation of new formal institutions, industries, organizational forms, practices and identities’. These characteristics of institutional entrepreneurs would seemingly describe a founder of an Australian software firm yet my research (refer to section 2.2.7) does not suggest any predisposition to change amongst the majority of the founders of Australian software firms. This leads me to ask if, in the context of this study, the founders of Australian software firms can be considered in the context of the literature on institutional entrepreneurship.

The creation of new institutions, DiMaggio (1988, p. 14) explains:

...is expensive and requires high levels of both interest and resources. New institutions arise when organized actors with sufficient resources (institutional entrepreneurs) see in them an opportunity to realize interests that they value highly. The creation of new legitimate organizational forms…requires an institutionalization project.
For most Australian software firms it might well be considered that their founders all embarked upon an *institutionalization* project. In this context where self interest would be expected to dominate it is relevant to review the two kinds of interest which DiMaggio (1988, p. 8) considers to be fundamental to institutional theory.

Firstly the preference of individuals for relatively routine and predictable environments results in behaviour that tends to create and sustain institutions. Studies of personality types of software engineers (Capretz 2003) indicate a strong bias towards introversion (a depth of knowledge approach reflecting on concepts and ideas) rather than extroversion (a breadth of knowledge approach with quick action). This suggests new founders of Australian software firms who might be expected to have a software engineering background may have a stronger preference for stable and predictable environments than would be expected in general of entrepreneurs establishing new organizations. While the Schumpeterian (1947, p. 151) view which identifies the defining characteristic of entrepreneurship as:

> ...simply the doing of new things or the doing of things that are already being done in a new way

would seem to encompass most of the founders of Australian software firms, it is arguable that many of the founders of Australian software firms might be described as small business owners rather than as entrepreneurs. Carland et al suggest a distinction should be drawn between entrepreneurs and small business owners and proposes the following distinguishing definitions (1984, p. 358):

A small business owner is an individual who establishes and manages a business for the principal purpose of furthering personal goals. The business must be the primary source of income and will consume the majority of one’s time and resources. The owner perceives the business as an extension of his or her personality, intricately bound with family needs and desires.

An entrepreneur is an individual who establishes and manages a business for the principal purposes of profit and growth. The entrepreneur is
characterized principally by innovative behaviour and will employ strategic
management practices in the business.

Secondly, the quest for survival results in accession to the demands of other more
powerful actors. As has previously been discussed this need for survival for
Australian software firms manifests itself in three highly influential external forms,
the conformity requirements of major information technology partners (Microsoft in
particular), the requirements of government as the major purchaser of software and
the requirements of financiers who dictate if capital is to be made available.

For the principals of many smaller Australian software firms there are compelling
commercial reasons for them to be seen as conforming to industry standards and
norms. It is not unusual for them to incorporate their firm and to produce a company
mission statement, an organization chart and other documentation suggesting a more
mature organization as they seek to establish legitimacy within the industry because,
as Meyer and Rowan observe (1977, p. 349):

By designing a formal structure that adheres to the prescriptions of myths in
the institutional environment, an organization demonstrates that it is acting
on collectively valued purposes in a proper and adequate manner.

Preference for stability and a quest for survival have a considerable bearing on the
central issue of this thesis. These interests are central to the task of developing
theory to explain why the principals of Australian software firms cannot build
sustainable growing businesses. Firstly, as suggested above (and by some of the
participants in my field research) the principals of Australian software firms, in the
main, have no great desire to build growing software businesses. Secondly some
principals of Australian software firms implement (or seem to implement) particular
organizational practices only in attempting to legitimize their organizations in the
eyes of their potential clients or financiers but in reality they are not committed to
these institutionalization projects. Both of these issues are dealt with more
extensively in later chapters.
4.7 Chapter Summary

In this chapter I have described the journey I have taken in developing a level of theoretical sensitivity to assist me in marrying the results of the analysis of my collected data with existing and emerging theory so as to enable me to develop a robust body of theory adequately describing the workings of the Australian software industry. In this journey I reviewed organizational theory, in the context of Richard Scott’s (2003) work, firstly in terms of three perspectives of organizational structure, Rational, Natural and Open, and then in terms of a combination of the Natural and Open perspectives. This review led me to the determination, based upon my experiences in, and observations of, the Australian information technology industry, that the work of the institutional theorists provides a sound platform for developing a body of theory.

I then utilized aspects of the work of a number of institutional theorists to consider the forces that influence the organizational structures as implemented by the principals of Australian software firms. This led me to the view that an important issue that must be dealt with in this study is the identification of one or more organizational fields encompassing all or part of the Australian software industry. This also led me to the view that the influence of the trade associations, favoured by the clients of the various Australian software firms, might be important in developing an understanding of the nature of organizational fields in the Australian software industry.

Finally I considered the importance of agency and interest in developing an understanding of the workings of the Australian software industry because of the continuing strong involvement of the founders of Australian software firms in an industry that has existed for little more than forty years. This work has suggested that I should be cognisant that it may be that some, or even many, of the principals of Australian software firms have little desire to build growing software firms or that principals of Australian software firms may undertake institutionalization projects so as to establish legitimacy in the eye of potential clients but that they are not committed to these projects.
The work in this chapter, and the preceding chapter, where I described the methodology adopted for collection and analysis of data, provided me with the platform upon which, using a grounded theory approach, I develop a body of theory that helps to explain why the principals of Australian software firms have difficulty in building sustainable growing businesses.

In subsequent chapters I describe the process by which the theory emerges from the data upon a framework constructed from the work of institutional theorists.
5. ORGANIZATIONAL STRUCTURES

In Chapter Three I considered the views of various interest groups on why the principals of Australian software firms have difficulty in building sustainable growing businesses.

Two clear themes emerged. Firstly the lack of availability of capital is seen as been the major issue inhibiting the ability of the principals of Australian software firms to build sustainable growing businesses. Secondly, while some industry participants think there is a lack of supply of capital in Australia, there is substantial evidence that capital is available. However, to receive it Australian software firms need to be investment ready.

In considering the issue of investment readiness interviews with venture capital managers and advisers to the principals of Australian software firms revealed a consensus that inappropriate organizational structures were the main reason why Australian software firms were perceived as not being investment ready.

This then led me to ask:

What organizational structure is appropriate for an Australian software firm whose principals wish to attract capital? What is the predominant organizational structure that has been implemented by the principals of Australian software firms?

In this chapter I seek to answer these questions by identifying the predominant organizational structures implemented by the principals of Australian software firms and the organizational structures considered, by venture capital managers and advisers, to be appropriate for investment ready organizations.
This chapter proceeds in three parts:

Section 5.1 describes the use of classification schemes as a starting point for the analysis of organizational structures. It identifies the need to define organizational fields encompassing the Australian software industry, organizational structures preferred by Australian investors and the organizational structures most often implemented by the principals of Australian software firms.

Section 5.2 deals with defining organizational fields encompassing the Australian software industry. The approach used is grounded in the work of Paul DiMaggio in which he constructed an organizational field encompassing art museums in America.

Section 5.3 deals with the identification of the organizational structures preferred by Australian investors and the organizational structure most often implemented by the principals of Australian software firms.

5.1 Classification Schemes and Organizational fields

In delineating the different structures that exist within an industry grouping, in an institutional context, organizational researchers have a long tradition of using classification schemes as a starting point for their analysis (see Brock, Powell and Hinings 1999, Gray and Rankine 2007, Kikulis, Slack and Hinings 1992, Meyer, Tsui and Hinings 1993).

Max Weber during the early parts of the 20th century argued social, economic and historical research can never be fully inductive or descriptive as the research should be approached with a conceptual apparatus which he identified as an ‘ideal type’. An ideal type does not define the best or perfect construct but can be seen as providing a defined template to be used as a reference base for historical or comparative studies of organizational patterns (Weber 1946). Burns and Stalker (1966) identified mechanistic and organic structures in their study of Scottish electronic firms and Mintzberg (1980) described a typology of five basic configurations of organizational structuring. The nomenclature used for these, and other classification schemes,
includes structures, ideal types, configurations, archetypes and gestals. Whilst subtle distinctions are drawn by scholars between these classification schemes, in this thesis, I have conflated these terms to denote organizational configurations in the sense proposed by Meyer, Tsui and Hinings (1993, p. 1175):

We use the term “organizational configuration” to denote any multidimensional constellation of conceptually distinct characteristics that commonly occur together. Numerous dimensions of environments, industries, technologies, strategies, structures, cultures, ideologies, groups, members, processes, practices, beliefs and outcomes have been said to cluster into configurations, archetypes, or gestals.

In identifying organizational structures of relevance in the context of the Australian software industry I was also conscious of the need to clearly define the range of organizations which can be accurately described by these organizational structures, as have many researchers who have preceded me. Mintzberg (1979, p. 240) advises:

...we shall never understand the complex reality of organizations if we persist in studying them from a distance, in large samples with gross, cross-sectional measures. We learn how birds fly by studying them one at a time, not by scanning flocks of them on radar screens.

Woodward (1965, p. 247), in reporting on her studies of manufacturing firms in South Essex, observed ‘...that the same principles can produce different results in different circumstances.’ and while this may appear self evident, her more detailed explanation concluded that:

...the central problem in the development of a comprehensive theory of organisation is to determine the conditions under which behaviour in organizations becomes standardized and predictable

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9 In general I have used the terms organizational structure and organizational configuration interchangeably but have also used the terminology of specific authors (for example: ideal type, archetype, gestalt, structure) when referring to their works.
These observations led me to the view in studying organizations I needed to place limits on the variability of the field being studied. This then suggested, in developing a view of the organizational structures developed by the founders of Australian software firms or the structures investors would prefer to see in Australian software firms, two tasks needed to be undertaken:

1. An organizational field encompassing all or part of the Australian software industry needed to be identified and defined.
2. Organizational structures implemented by the principals of Australian software firms and the organizational structures investors prefer to see in Australian software firms, encompassed by those fields, needed to be identified.

In the ensuing work I describe the process by which I first delineate the organizational fields encompassing Australian software firms and then identify classifications describing organizational structures within those fields.

5.2 Organizational fields

Greenwood and Hinings (1993, p. 1058) posit the search for archetypes should start within an industrial sphere or industrial sector. They comment that there is an increasing body of knowledge and research moving, away from attempting to produce theory generalisable across a broad class of organizations, in the direction of institution-specific classifications. In analysing organizations they suggest two levels are pertinent (1993, p. 1059):

The first is the institutional sector, where the research task is to discover which organizational forms are legitimated. These legitimated forms are the archetype templates and will be few in number. The second level is that of an individual organization where the research task is to examine the extent to which these organizations do or do not approximate their sector’s archetype or archetypes.
DiMaggio (1991, p. 267) stresses the importance of boundary defining concepts of industry, sector, population domain and field as constructs central to the explanation of interorganizational competition, influence, coordination and flows of innovation. He further focuses attention on the importance of the identification of organizational fields because (DiMaggio 1991, p. 267):

First, institutional theory focuses on the process of mutual influence among organizations. Field boundaries, as they are perceived by participants, affect how organizations select models for emulation, where they focus information gathering energy, which organizations they compare themselves with, and where they recruit personnel. Second, institutional theory pays particular attention to organizations like government agencies and trade associations that stand outside an industry per se, but within a sector or field, and influence or constrain the goods or service producing organizations within it.

and adds (1991, p. 267):

The related emergence of a collective definition of a set of organizations as an ‘industry,’ of formal and informal networks linking such organizations, and of organizations committed to supporting, policing, or setting policy towards the ‘industry’ – what Powell and I refer to as the ‘structuration’ of organizational fields – is a crucial step in the institutionalization of organizational forms.

A cursory glance at those organizations considered to be members of the Australian software industry suggests they belong to a single industry and field. However, it is more likely, because of the diversity of the activities of the many participants, that the Australian software industry consists of a network of multiple distinct or overlapping organizational fields. Therefore the next step in this study was to consider whether it is possible to clearly identify one or more organizational fields encompassing Australian software firms.

DiMaggio and Powell define an organizational field as follows (1983, p. 148):
By *organizational field* we mean those organizations that, in the aggregate constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services and products.

and Scott and Meyer added a cognitive dimension to this description in defining an organizational field as (1994, p. 207):

> …the existence of a community of organizations that partake of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside of the field.

These definitions, while providing some guidance in identifying an organizational field, leave unanswered the question of the steps one should take in order to delineate an organizational field. This is a question that is of considerable importance if one is to follow Greenwood and Hinings’ advice to identify the (few in number) archetypes from within a limited institutional sector. This endeavour was problematic in that, unlike the legal, and accountancy professions, there are no overarching professional or industry bodies delineating software organizations and, in an industry that did not exist before 1960, there is a dearth of longitudinal data which is available to assist in the exploration of this issue.

The delineation of organizational fields is further complicated by DiMaggio and Powell’s observations (1983, p. 148):

> The structure of an organizational field cannot be determined *a priori* but must be defined on the basis of empirical investigation. Fields only exist to the extent that they are institutionally defined. The process of institutional definition, or “structuration,” consists of four parts: an increase in the extent of interaction among organizations in the field; the emergence of sharply defined interorganizational structures of domination and pattern of coalition; an increase in the information load with which organizations in a field must
contend; and the development of a mutual awareness among participants in a set of organizations that they are involved in a common enterprise.

As there is little evidence to suggest even exploratory work has been carried out in identifying organizational fields within the Australian software industry, I took the view that I should utilise available data to first place some boundaries on the organizational fields to be studied and to then, in an iterative fashion, refine the definitions as data was collected during the study.

My approach in delineating one or more appropriate software industry organizational fields to be examined was to follow DiMaggio’s approach of examining the industry in terms of the four parts that lead to the structuration of organizational fields utilizing data obtained via the process of sensemaking, self-ethnography and field research and, where available, to complement these with data from secondary sources.

Guidance on how this process could be carried out was provided by DiMaggio in his study of the development of an organizational field of American art museums from 1920 to 1940. In his study DiMaggio used historical records from two major influential organizations to develop an understanding of how models of organization developed in the field of art museums (DiMaggio 1991).

The work of DiMaggio in his study of art museums differs from this study in that the influence of the growth of professionalism in the art museums was seen as an important part of the institutional development of the organizational field whereas professionalism seems to play a much smaller part in the development of organizational fields in Australian software firms. The advancement of professionalism as a goal for the information technology industry is a theme that occurs regularly within the publications of the various Australian information technology industry bodies (see ACS 2001, ACS 2005, Argy and Joynson 2007). However, within the smaller software firms, preliminary observations suggest the rapid development of computer technology and the influence of customers operating
in specific vertical markets have been the major influencers on the development of organizational fields encompassing Australian software firms.

Another aspect of DiMaggio’s work warrants attention in developing a means of identifying and defining an organizational field encompassing Australian software firms. In the conclusion to his study on art museums he observed while studies of the institutionalisation of organizational forms have tended to focus on diffusion at the local level using organizations or geographic areas as units of analysis, his study revealed (1991, p. 286):

The diffusion of museums was guided and shaped by the emergence of field wide structures at the national level, outside of particular museums, and that this professionally constructed environment was the site of much organizing by actors who wished to change the museum’s structure and mission

The importance of this observation by DiMaggio is that preliminary observations and analysis suggest while there appears to be, in Australia, one or more organizational fields encompassing small software firms, they are not bounded by geographic constraints. Even though there have been attempts by government and industry associations to aggregate software organizations into industry groupings (for example: The Western Sydney ICT Cluster (WSITC 2008)) there is little evidence of location and, as a corollary, other local software industry participants, having a significant impact on the structuration of organizational fields of Australian software firms. However the influences of customer segments and multinational information technology organizations have been significant.

5.2.1 Historical and Institutional Context

In constructing an organizational field of art museums, DiMaggio based his work on archival research covering the period 1920 to 1940. In reviewing DiMaggio’s notes on his sources one is cognisant of the differences in availability of data for art museums and for the software industry. At the time of the writing of his paper art museums’ historical records stretched for more than hundred years and many learned papers had been written covering the genre. Importantly, for his research prior to the
1950s, a considerable amount of communication relating to the museums was in the form of letters, minutes and record of interviews retained by museums, universities and corporations. This focus on written communication probably reflects the, then, high cost of long distance telephony and limitations on travel. In the period during which the software industry developed, telephony costs reduced to a level where even international communications were dominated by undocumented telephone calls and the ease and low cost of travel meant many other less formal meetings were held where written records were not been kept. It was not until the 1990s, with the introduction of e-mail, that communications again began to be regularly retained in archives.

It is also apparent that very little has been written on the history of the development of the software industry in Australia. At a time when many of the pioneers are still actively involved in the industry there appears to have been little thought about documenting events still perceived to be current. Only in very recent times, when pioneers have gathered, has it been suggested it might be a time to consider leaving records for future generations. Indeed, it is only in recent years that the pioneers of the Australian computer hardware industry, which predated the software industry by some twenty years, have started to document their industry’s history (Deane 2006). This suggests the comprehensive documentation of the history of the software industry may still be some years off. This is not true of the American information technology industry where, for example, the Institute of Electrical and Electronics Engineers (IEEE) has published the *Annals of the History of Computing Journal* (Grier 2007) since 1979 and the *Silicon Valley Oral History Project* is being conducted under the auspices of Stanford University (SBOH 2007). To provide a framework upon which I could situate the Australian software industry in its institutional context I first reviewed the history of the industry using my recollections of the industry, conversations with industry veterans and (when available) secondary data sources.
5.2.2 The Australian software industry

As has been discussed previously the influence of, firstly, the major computer hardware vendors and then the major software vendors has been significant in the manner in which today’s software industry has developed. In reaching an understanding of the institutional forces that have influenced the development of organizational structures within the Australian software industry it is appropriate to review the historical development of the industry and, to a large extent, to do so from an American viewpoint because:

1. The information technology industry in its short life of some fifty years is characterised by the emergence of disruptive technologies (Christensen and Overdorff 2000, p. 72), innovations that often in the near term appear to offer worse product performance than those technologies offered by the major incumbents but in the longer term change the industry. For software developers the basic tools of computer languages have developed but have shown an amazing resilience over time (see Mitchell 2006, Peterson 2006). At the same time operating environments have undergone many changes and have had significant effects on the development of the software industry and the institutional forces that have shaped organizational structures within the industry. Initially changes in operating environments were driven by computer hardware vendors (IBM’s changed pricing strategy, minicomputers and workstations, and then personal computers) but in later years they have been software environment driven (Microsoft DOS, Windows 95, The World Wide Web and Mosaic/Netscape/Internet Explorer). The changes in environment, both software and hardware, originated almost exclusively from and have continued to be dominated by American corporations.

2. The information technology industry has embraced globalisation from its inception. Most major information technology vendors based in America have been quick to establish subsidiaries or distributors in Australia. (IBM incorporated its Australian subsidiary in 1932 (IBM 2008), SUN Microsystems was established in California in 1982 and appointed an Australian distributor in the same year (SUN 2008)). Consequently new product innovations are
invariably available in Australia within a very short time of those products being made available in America. For Australian software vendors this has meant they have had to adapt to the changing environment in concert with their international competitors and so the development of the Australian software industry has in many ways mirrored the development of the American software industry.

For Australian software firms the effect of emerging disruptive technologies and globalization in information technology markets has been twofold.

Firstly, as most of the major hardware and software initiatives over the last fifty years have occurred in America (and usually within the major information industry clusters centred on Boston and Silicon Valley) the employees of Australian software firms have not been privy to many changes occurring in the industry until information has entered the public domain. As Porter has observed, participation in a cluster offers many advantages, of which local engagement is very important (1998, p. 88):

The social glue that binds clusters together also facilitates access to important resources and information. Tapping into competitively valuable assets within a cluster requires personal relationships, face-to-face contact, a sense of common interest, and 'insider' status.

It is this lack of 'insider' status that is a major determining factor for Australian software firms in the face of the history of emerging disruptive technologies. As Moore (1999) and Hoch (2000) have observed, early entry and leadership in a market usually leads to market domination for software organizations. To gain early entry to a market requires the ability to be ready when the market emerges. By being 'outsiders' it takes longer to see the trends and it is easy to dismiss emerging disruptive technologies, because of their initial performance weaknesses, if one has little knowledge of future development plans.
The effect of being ‘outsiders’, for example, was felt when the IBM PC was introduced in 1981. Many founders and managers of Australian software firms (myself included) considered the PC to be unsuitable for ‘real’ computing applications and chose to develop software for the emerging, and then more powerful, Unix workstations (SUN Microsystems, Apollo, ICL Perq, IBM RS/6000). In America AutoCAD, MapInfo, Intuit and others fully embraced the IBM PC as the development platform of choice. History has vindicated the choice of the American software organizations. It is not that the Australian software developers were, and are, unaware of the advantages of being ‘insiders’. Indeed the advantages of closeness to multinational vendors has been stressed by government and others as a means of achieving international success. As a result many Australian software vendors have attempted to align themselves with the major international vendors (see Dougan and Rankine 2003). The influence of American information technology vendors on Australian software firms is a significant factor to be taken into account when looking at the institutional pressures affecting the development of organizational structures of Australian software firms.

Secondly, an issue that has affected the manner in which Australian software firms have developed is the lack of barriers to entry for international software vendors to the Australian market. Except for a short time in 1989, when a sales tax was levied on software in Australia, international software vendors have had few or no barriers to entry into the Australian market (Bennett 1994, p. 63). Shipping costs are negligible or non-existent for downloaded software, operating systems are internationally consistent and, if users accept some minor spelling inconsistencies, documentation does not need to be changed. For many software applications the only local customization needed is to allow for different date formats and Goods and Services Tax. For vendors who already deal with European markets even these local variants have usually been catered for. For international vendors this means they can amortise their software development costs over large domestic markets and then only have to fund sales and support costs in the Australian market. For Australian software firms this means local domicile and knowledge count for little if they attempt to compete in an application market against a large foreign based competitor.
Therefore, for the most part, Australian software firms have been forced to focus on products in niche markets.

Thus the development of an understanding of the development of the international, and, in particular, the American software industry is an important ingredient in the development of an understanding of the institutional context of the Australian software industry.

The key events marking the development of the international and Australian software industry were:

5.2.2.1 Independent programming services

Hoch and others (2000, p. 25) mark the establishment of The Computer Usage Organization, Inc. (CUC) in February 1955 by Elmer Kubie (1994) as the first independent software development organization. Kubie and his colleague John Sheldon had been consultants with IBM’s Technical Computing Bureau in New York where they developed software for IBM’s customers. Until the establishment of CUC, client specific software had been developed by the hardware manufacturers or by the customer’s in-house development staff (Haigh 2002, p. 6). During the 1950s training in computer programming was almost the exclusive domain of hardware manufacturers (Head 2001, p. 60). At this time employment by one of the computer hardware organizations, particularly IBM, was seen by many as a secure and much sought after long term employment opportunity. Many organizations, having gained access to new computer facilities, found it was very difficult to employ or to train enough competent staff to implement organization specific computer applications and therefore they were very reliant on their hardware supplier. Kubie and Sheldon perceived there was an opportunity to establish an organization to provide software development services to these organizations. The establishment of CUC marked the commencement of a period of rapid growth for independent consultancies specialising in developing computer solutions for end user customers. Computer Science Corporation and EDS (USA), Sema (France) and Logica (United Kingdom) were formed during this period and were the forerunners of today’s professional
service organizations that include EDS, IBM Global Services CSC, Accenture, Cap Gemini and Tata Consultancy Services (Smith 2007, p. 116). The demand for services being provided by these organizations grew rapidly through the 1950s and 1960s in line with the rapidly expanding deployment of computers throughout industry and by 1967 it was estimated (Hoch 2000, p. 261) there were more than 2,800 independent software service firms in America.

A similar pattern can be seen in the development of the Australian software industry. Kingsmiths, established in 1961, is credited with being Australia’s first independent software development organization (ACS 2001) and during the next ten years several other similar organizations were formed, usually by former employees of the computer hardware organizations who often maintained very close contact with former colleagues and employers (Ferranti 1994). Other computer services organizations developed, with the backing of the computer hardware organizations, international consultancies or customer associations. Computer Power Ltd, for example, was established in 1968 as a spin-off from Control Data Corporation’s Australian subsidiary (Bennett 1994, p. 61), and Computer Sciences of Australia (now CSC, a fully owned subsidiary of CSC Corporation) was established by the AMP Society and CSC Corporation in 1970 (CSC 2007). Many of these organizations developed into significant professional service organizations in Australia in ensuing years.

The 1960s and 1970s were also times when a number of general purpose service bureaus were established by the hardware vendors, specialist providers and organizations seeking to amortise some of their investment in expensive computing facilities (for example: IBM Data Centre, Control Data, ICL, CSA, Compunet and Ampol Computing Services). These service bureaus enabled smaller organizations to gain access to expensive computing facilities which encouraged the establishment of independent software organizations.
However the growth of independent firms offering software packages as distinct from professional services firms offering, effectively, contract programming services during this period was limited by a number of factors:

1. Until 1969 the hardware manufacturers gave software away with the hardware. This made it very difficult for independent suppliers to compete unless they were able to develop unique products for potential customers. Even when benefits were clearly demonstrable, selling products to customers who were attuned to receiving software for free was difficult.

2. During this period IBM dominated the market for sales of computer systems. By the end of the 1960s there were 80,000 computers installed in the USA and 50,000 in the rest of the world, of which approximately 5,000 were installed in Australia (Bennett 1994). Seventy percent of these computers had been sold by IBM (Greenwood and Jovanovic 1999, p. 117). At the heart of IBM’s ethos (Watson 1963, p. ix) was the principle that success relied on ‘giving the best organization service of any organization in the world’. For an aspiring independent developer of software, attempting to convince very loyal customers of this dominant supplier that the independent software developer had a better product was a very hard task even without the ever present cost advantage enjoyed by IBM.

3. At the heart of IBM’s marketing and sales strategy was the concept of ownership of the customer. Thomas J. Watson observed, while IBM was often not the technology leader, IBM knew how to put the story before the customer and knew (1987, p. 25) ‘how to hang onto the customer once we had them’. IBM zealously guarded this ownership of the customer and any software organization that did not keep the IBM salesman fully informed of their involvement in an IBM customer site would very quickly find further work with that customer was not forthcoming.

In 1969 the environment for independent software suppliers changed dramatically. In a landmark decision IBM, decided to price software and hardware separately. This paved the way for the development of a software products industry. In ensuing years
the emergence of minicomputers, then the personal computer, lessened the dominating effect of IBM further fuelling the growth of an independent software products industry.

5.2.2.2 Computer User Groups – SHARE and IBM in the 1950s and 1960s

In defining organizational fields Scott and Meyer referred to the meeting of organizational participants (1994, p. 207):

...that partake of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside of the field

and DiMaggio (1991, p. 269) stresses the influence of professionalizing occupations on interorganizational relations and its role in the establishment of organizational fields.

In the early days of the information technology industry participants in the new field of software development belonged to many different industry groupings and professions. Programmer training was usually provided by the computer hardware organizations and the only glue binding the programmers together was a common interest in solving emerging problems using a rapidly evolving technology (Smith 1984, p.114).

With no overarching professional body to facilitate communications between programmers employed by diverse and often competing organizations, SHARE\(^\text{10}\), the computer industry’s first user group, was formed in 1956 (Mapstone and Bernstein 1980) to encourage cooperation between users of IBM computers.

\(^{10}\) SHARE is not an acronym but accepted practice by its members has been to always use full capitalisation (Armer 1980)
While the initial focus of SHARE was to provide a forum where programmers could share techniques and find answers to common problems of equal importance, as observed by Akera (2001, p. 711), SHARE was a platform that:

...gave a group of early programmers a forum for establishing their work as a new field of knowledge, a body of practice, and a nascent profession. SHARE appealed to voluntarism to justify what was, in effect, a collaboration among some highly competitive American corporations. Its organizers made decisions that reveal the broader entanglements among esoteric knowledge, institutional loyalties and professionalization strategies, all within the larger context of a technology driven cold war economy.

Initially IBM’s Thomas J. Watson, Senior did not favour any kind of user group but his attitude changed when he was shown the cost of programming could be kept down which would in turn encourage IBM computer sales. IBM then actively supported SHARE. (Mapstone and Bernstein 1980, p. 365).

As often happened during the early days of the information technology industry, after IBM legitimized a new initiative the rest of the industry was quick to follow. IBM’s actions almost mandated the establishment of user groups by other computer hardware companies. In many cases, they provided resources to encourage the establishment of user groups. For example, DECUS (Digital Equipment Computer Users Society) was formed in 1961 and while it was legally part of, and funded by Digital Equipment Corporation, its staff were not allowed to be members of DECUS.

In ensuing years user groups continued to play an important role in the development of the software industry, often providing the forum where the employees of software organizations ‘frequently and fatefully’ met.

5.2.2.3 Software Products

Well into the 1970s the majority of the world’s installed computers were supplied by IBM (Hoch 2000, p. 31). Consequently, during this period, most independent software vendors developed software to run on IBM computers. When IBM, on 23rd
June 1969, commenced pricing software separately, loyal IBM customers were provided with a, previously absent, financial reason to evaluate alternatives to IBM software products. Informatics, UCC Computing, Management Sciences America and other independent software organizations developed products to compete with IBM products (Haigh 2002, p. 11, Postley 1998, p. 49). This change in policy by IBM was so pivotal that for many observers 23rd June 1969 marks the true beginning of the software industry as observed by Hoch et al (2000, p. 31):

Now customers across industries were forced to recognise that software actually cost money. Later, historians would call this date ‘The birth of the software industry’. While it was not the actual birth of the software industry (we believe CUC was the beginning), it was the launching point for many software product firms.

The ‘unbundling’ of software and hardware, (as IBM’s pricing separation initiative was termed. see Grad 2002) also coincided with a period of rapid growth for the computer industry at a pace that has continued almost unabated since that time.

In Australia the main effect of the unbundling of software and hardware was that it offered users more choice from international developers of software.

By 1974 total new installations still only accounted for 2,420 computers, 983 of these were government computers and many replaced superseded models (Bennett 1994). The focus in software development was on faster processing of manual operations rather than the development of systems. This provided impetus for the growth of independent software organizations providing contract programming services in Australia. The small market, however, did not justify the expenditure of resources to develop software products that could be sold to multiple customers.

In 1965 Gordon Moore, the co-founder of Intel, famously predicted the number of transistors per integrated circuit would double every twenty four months while the cost per circuit remained constant (Moore 1965, p. 2). While Moore limited his prediction to ten years, history has shown that Moore’s Law continues to hold true.
today (Jovanovic and Rousseau 2002, p. 347). The corollary to this law was that the cost of computers dropped rapidly as their capacity increased. This meant the number of organizations installing computers increased rapidly. The 1970s also saw the introduction of 32 bit minicomputers by many manufacturers with Digital Equipment Corporation, Prime Computer and Data General (each with their own proprietary operating systems) being the main vendors (Bell 1984, p. 17). The 1956 Consent Decree (Maney 2003, p. 423) between IBM and the American Department of Justice allowed Ahmdahl, Fujitsu, Hitachi, Mitsubishi and NEC to sell ‘IBM Plug Compatible’ computers increasing the availability of mainframe computers. The effect of these many new entrants into the computer hardware market was to greatly expand the potential customer base for independent software vendors.

In Australia the emergence of minicomputers had the strongest effect on the growth of product developing software organizations. In the IBM and the IBM compatible mainframe market international software organizations continued to dominate as the domestic market for local software organizations was still small and development costs for potential clients (major organizations with extensive requirements) were very high. However the market for software to suit the needs of smaller, less complex, corporations grew rapidly. The smaller corporations usually could not afford large in-house development teams or systems developed for them specifically. As a result many software organizations emerged and developed industry specific programs or general tools that could be acquired independently of a hardware supplier. As each minicomputer supplier had its own proprietary operating system and software licences were very expensive and profitable, the software organizations usually developed products for only one hardware brand.

Customers who acquired minicomputers were usually more flexible than those customers who continued to buy IBM equipment. They were more likely to choose a system because of the availability of software to suit their requirements. As a result strong relationships developed between the multinational minicomputer suppliers and software organizations. The multinationals developed extensive partnership arrangements, which included provision of deeply discounted in-house development
machines and aggressive joint marketing programs. In turn they expected (and often received) a strong level of loyalty from the software organizations. During this period the issue of ownership of the customer started to blur. For those customers of IBM there was little confusion but for the customers of the minicomputer vendors the issue was far from clear. The minicomputer multinational’s sales force, well versed in the IBM concept of absolute customer ownership, attempted to maintain control at the client site. However awareness grew when things went wrong it was usually a software issue and the customer was far more reliant on the software organization. In Australia independent software firms, Mincom (mining), CEANET (engineering), Clegg Driscoll (accountancy) on Prime Computers, Earth Computer Sciences (mining) on Digital Equipment Corporation computers, and Easinet (Geographic Information Systems) and MOCOM (Stock Exchange Back Office) on Data General computers, established viable businesses. While none of the minicomputer vendors and few of the software firms have independently survived, during the late 1970s and early 1980s, these partnerships enjoyed considerable levels of success and commensurate publicity.

5.2.2.4 User Groups and Special Interest Groups during the 1970s and 1980s

During the 1970s and 1980s the computer hardware organizations continued to sponsor or encourage user groups. In Australia these groups continued to be forums where software developers, management and sales staff from the software products organizations met regularly, albeit only with employees of software organizations who developed their products on the same computer hardware platforms. They attended the user groups so as to exchange-non proprietary information on how to better use the hardware organizations’ products and to meet customers of the hardware organizations who might be potential purchasers of their products.

Several other user groups, special interest groups and industry associations were formed during this period. The Australian Computer Society (ACS) formed a special interest group in 1973, the Software Industry Committee (ACS-SIC), to provide a forum, independent of hardware vendors, for members of the ACS interested in aspects of the software industry. As well as representing the views of the software
industry to government the meetings facilitated by ACS-SIC aimed to address issues of interest to the whole software industry community, regardless of computer hardware allegiances and to legitimise the concept of a software professional. (Reed 1994, pp. 89-104).

The ACS, it seems, aimed to be the nucleus of the professional body in Australia to represent all Australian information technology professionals on a par with the Institution of Engineers, the Law Society and the Institute of Chartered Accountants. This objective, of professionalism, continues to be a cornerstone of the ACS today but, as in America (Ensmenger 2001), competing interests from disparate special interest groups, lack of support from employers and lack of interest from industry participants has meant neither the ACS or any other organization is seen to be the focus of representation for the Australian information technology industry. What happened was that from time to time special interest groups formed to facilitate the flow of technical information between industry participants but not with the intention of furthering the concept of an information technology professional. These special interest groups and industry associations include, or have included, the Australian Institute of Systems Analysts, The Australian Computer Science Conference, the Australian Database Development Association, The Software Industry Association, the Australian Software Houses Association, the Software and Services Industry Federation, the Australian Software Metrics Association, the Software Quality Association, the Australian Information Industry Association and many other industry specific subgroups.

5.2.2.5 Personal Computer Software Products

While the growth in computer installations, during the 1970s, drove the establishment of new independent software vendors it was the emergence of personal computers in the 1980s that defined the software products market which was to experience rapid growth over the next three decades.

In 1976 Steve Jobs and Steve Wozniak built their first Apple Computer (Rose 1989, p. 34). This provided initial definition for the personal computer market. In 1981
IBM (Cringely 1993, p. 126) introduced its ubiquitous IBM PC which truly defined and legitimised the market for personal computers. The development of the personal computer could also be considered to be another pivotal event in the development of the software industry for, while the Apple computer and the IBM PC dramatically lowered the hardware price entry point, it was software that drove the exponential growth in sales of personal computers. In 1979 Software Arts introduced VisiCalc at the National Computer Conference in New York (Bricklin and Frankston 1984, p. 1) and from that date on the balance of power in the computer industry changed. As industry veteran Joe E. Rogers commented, when reflecting on his career in the information technology industry (Rogers 2004, p. 61):

> Until VisiCalc, Apple had been little more than a game machine…and a computer for individuals to write programs on. VisiCalc turned Apple into a functional, useful computer desired by many.

More importantly, VisiCalc provided a reason why the business world would buy a personal computer.

> VisiCalc was a compelling application – an application so important that it, alone justified the computer purchase. Such an application was the last element required to turn the microprocessor from a hobbyist’s toy into a business machine. (Cringely 1993, p. 64):

The importance of software in the growth of the personal computer market was further demonstrated when Lotus 1-2-3 became the software product that drove IBM PC sales and also, many would argue, precipitated the establishment of the IBM PC compatible personal computer market. Until the release of Lotus 1-2-3 most software developers produced versions of their programs to run on the many variants of personal computers that were becoming available. Lotus took a different approach. Lotus only released Lotus 1-2-3 on the IBM PC and they took advantage of many IBM PC specific features so as to optimise the performance of their spreadsheet. The IBM PC was probably going to be successful, because it carried with it the legitimising imprimatur of IBM, but significant sales still required a
compelling application to create IBM PC-specific demand. Lotus 1-2-3 was released on 26\textsuperscript{th} January 1983. ‘In the first 3 months that 1-2-3 was on the market, IBM PC sales tripled. Big Blue had found its compelling application’ (Cringely 1993, p. 157).

As demand for Lotus 1-2-3 accelerated and the IBM PC became the standard, other manufacturers of personal computers found unless they could demonstrate Lotus 1-2-3, and other software available on IBM PCs, would run on their computers, sales would fall. By reverse engineering the IBM PC BIOS Compaq was able to produce a personal computer that was 100\% compatible with the IBM PC. COMPAQ then became one of the leading manufacturers of personal computers because it produced computers offering better price performance than IBM and, most importantly, because Lotus 1-2-3 and other products ran on them without modification. Whereas purchasers of mainframe computers and minicomputers acquired the computers with the expectation that software vendors and in-house development teams would produce appropriate software now customers purchased software and then, and only then, purchased personal computers if the software would run on the computer. The balance of power had changed. Computers became commodity items and software had become the key issue.

So during the 1970s and 1980s the number of computers installed grew rapidly. Mainframes continued as the backbone computers of large organizations, minicomputers provided affordable computing facilities at department or smaller organization level and personal computers proliferated throughout organizations of all sizes. In line with this growth was a corresponding growth in the number of independent software organizations. Two distinct software market segments developed. These two segments, the enterprise solutions segment and the mass market packaged software segment, were the foundations upon which today’s software industry has been built.

5.2.2.6  \textit{Enterprise Solutions}

In 1972 Dieter Hopp and four other former IBM (Germany) employees formed SAP with a vision to develop standard business software that could be used by many
organizations (Meissner 2000, p. 8). This concept differed from the software developed to then in three regards. Firstly, it marked the transition from batch processing where data was entered and processed some time after the transactions had occurred to real-time processing where data was entered as transactions occurred allowing an up to date view of the organization’s performance. Secondly, the same software could be used by all customers, negating the need for specific development for each customer as had been the practice during the 1960s. Thirdly, and most importantly, the software was designed to mirror business processes logically via linked databases and optimization software.

During the late 1970s and the 1980s SAP, Oracle Corporation (originally formed as a developer of relational database software) Peoplesoft and J.D.Edwards (now both owned by Oracle Corporation), Baan Software (formerly Dutch owned but now owned by U.S. based Infor Global Solutions) and other major software organizations (Symonds and Ellison 2003, p. 4) were formed offering competing and complementary products in the enterprise solutions market. The growth of this market was driven by the growing availability of powerful mid range computer systems and by the perceived need of acquirers of software to increase productivity in line with their competitors who had already introduced systems.

5.2.2.7 Mass Market Packaged Software

In 1981 IBM released its version of the personal computer, the IBM PC. While this was a significant event in defining the future directions of the computer hardware industry it was even more significant in defining the future directions of the software industry. The future successes of two entrepreneurs, Bill Gates and Mitch Kapor, were inextricably tied to the success of the IBM PC. The manner in which they achieved their successes in the software industry set the scene for the mass marketed packaged software segment of the industry from the 1980s onward.

There is little doubt that Bill Gates is very intelligent and he has very well developed and utilised entrepreneurial skills. Perhaps, however, if IBM had decided not to risk the success of their personal computer on a twenty five year old Harvard University
‘drop-out’ (albeit with a very successful program language business) or they had licensed QDOS directly from Seattle Computer Products or if Gary Kildall from Digital Research had been more accommodating when IBM considered licensing his CP/M operating system or Apple Computer had seen itself as a developer of operating systems or IBM had promoted the USCD p-system operating system (see Cringely 1993, Cusumano and Selby 1998, Hoch 2000, Smith 2007, Young 1998) then few people outside of the software industry would be aware of Bill Gates today.

But IBM did take the risk. IBM licensed MS-DOS from Microsoft (IBM called their version PC-DOS) and Microsoft’s annual sales went from $US 8 million in 1980 to $US 1.2 billion in 1990 (Cusumano and Selby 1998, p. 3). It wasn’t that Microsoft had developed the best operating system (indeed they hadn’t developed MS-DOS, they had purchased it from Seattle Computer Products for $50,000) or they had the best sales and marketing team (in 1981 Microsoft only had 130 employees who were mostly involved in software development) or that Microsoft received huge royalties from IBM (IBM negotiated a fixed licence fee of $US 400,000 for the use of PC-DOS from Microsoft but did not prevent Microsoft from licensing MS–DOS to other PC manufacturers). No, the reason Microsoft achieved the successes it has, is that by shipping PC-DOS with every PC, IBM effectively established Microsoft’s operating system as the de facto standard for non Apple personal computers. When Compaq reverse engineered the IBM PC BIOS in 1982, Microsoft was able to license MS-DOS to the IBM PC clone manufacturers on far better commercial terms, and Microsoft’s future successes were assured.

Mitch Kapor took $US 300,000 of the $US 600,000 he had earned by selling a VisiCalc graphing package, plus $US 3 million dollars of venture capital funding and formed Lotus Development Corporation. Some of the funds financed the development of the IBM PC specific spreadsheet program Lotus 1-2-3 but the bulk of the funds were spent on marketing. As Cringely succinctly describes it, this bold strategy was singularly successful (1993, p. 156):
Kapor and his team of consultants from McKinsey & Co. decided to avoid competitors entirely by selling 1-2-3 directly to large corporations. They ignored computer stores and computer publications, advertising instead in *Time* and *Newsweek*. They spent more than $1 million on mass market advertising for the January 1983-rollout. Their bold objective was to sell up to $4 million worth of 1-2-3 in the first year. As the sellers of a financial planning package, it must have been embarrassing when they outstripped that first year goal by 1,700 percent. In the first three months 1-2-3 was on the market, IBM PC sales tripled. IBM had found its compelling application and Mitch Kapor had found his gold mine.

The key characteristics of a new segment of the software industry, the mass marketed package software segment, had been defined.

Enterprise solutions products, developed by independent software development organizations, were, and continue to be, marketed to carefully selected potential targets by teams of industry specialists. They attract licensing fees ranging from thousands to millions of dollars and usually require substantial and often extended vendor or third party implementation support. Acquisition of enterprise solutions products by a customer usually follows on from a protracted detailed evaluation of competing products. The keys to success in this market are carefully targeted sales campaigns by a direct sales force, continued product development to address growing customer requirements and substantial after-sales support.

The mass marketed package software market, as developed during the 1980s, has taken a very different approach. Licensing fees for the products are usually in the hundreds of dollars and therefore targeted campaigns utilising a direct sales force are financially unsustainable, as is any pre- or post-installation support from the vendor. The key to success in the mass marketed package software market is market domination. The reason for this is sometimes termed the ‘Law of Increasing Returns’ as explained by Stanford economist Brian Arthur (1989, p. 116):
When two or more increasing-return technologies ‘compete’ then, for a ‘market’ of potential adopters, insignificant events may by chance give one of them an initial advantage in adoptions. This technology may then improve more than others, so it may appeal to a wider proportion of potential adopters. It may therefore become further adopted and further improved. Thus a technology that by chance gains an early lead in adoption may eventually ‘corner the market’ of potential adopters, with other technologies becoming locked out.

For Microsoft the ‘insignificant event’ was that IBM chose PC-DOS to be the operating system for its IBM PC.

For Lotus the ‘insignificant event’ was that Kapor decided to make Lotus 1-2-3 available only on the IBM PC (thereby gaining the support of IBM) and his decision to utilise the bulk of his financial resources in a mass marketing campaign. By taking that approach Lotus 1-2-3 was to unseat VisiCalc as the preferred spreadsheet program and to quickly to assume market domination.

For the vendors of mass marketed package software products, market domination became the mantra. Marketing expert Geoffrey Moore, the author of the widely read book on technology marketing ‘Crossing the Chasm’, reinforced the message by advising vendors (Moore 1999, p. 44):

To dominate a segment typically means winning 40 percent or more of its new business over the past year to eighteen months. At that level of success assuming your closest competitor is well behind you word of mouth starts spreading the message that you are the market leader. Once that happens, you can expect your share of the following twelve months’ sales to increase well beyond 50 percent.

This message was not lost on the vendors of enterprise software. Market domination has become the mantra of the software industry as a whole. In the enterprise software market, Oracle and SAP have gradually consumed their rivals as they strive for
market domination (Smith 2007, pp.125-127) and in the mass marketed package software market Intuit (personal finance), Autodesk (computer drafting) and Microsoft (word processing, spreadsheet and e-mail) have achieved very dominant market leadership positions in their chosen segments.

The emergence of dominant vendors in both segments of the software industry has had very important ramifications for Australian software vendors.

The barriers to entry to the Australian software market are minimal for American or European owned software organizations. As the development costs for their software products are amortised over their own domestic markets the cost of establishing a presence in Australia is only the cost of accommodation, sales staff and marketing expenditure. For potential acquirers of software, who operate in international markets, it makes sense to standardise on software to be used in all locations in which they operate. For international organizations with subsidiaries in Australia this invariably means the decision on most software acquisitions will be made in the head offices in Europe or America. For Australian owned organizations operating in global markets this often means the software acquisition decision will be influenced by the availability of support in the countries where they have operations or the need for compatibility with their international trading partners.

The cost advantage enjoyed by internationally based software organizations, combined with the global support requirements of their potential customers and the law of increasing returns, has resulted in a few software organizations dominating their market segments in Australia and internationally. These multinational software organizations include Microsoft (operating systems, office applications), Oracle (database), SAP (enterprise accounting), and IBM (diversified computing solutions). Today multinational software vendors account for 51% of the total sales of software in the Australian market (McKinsey 2002, p. 8). For Australian software firms this means there is little to be achieved by attempting to compete in markets dominated by major multinational software vendors and consequently the main opportunities for Australian software firms have arisen in vertical niche markets.
The forces that have shaped the worldwide markets of enterprise solutions and mass marketed packaged software has resulted in an Australian marketplace dominated by very small locally owned software firms, with only a few of them having achieved significant local or international successes.

Houghton (2003, p. 15) reported ‘In 2001, more than 95% of all specialists information technology businesses operating in Australia employed less than 20 people’ and a review of the major Australian owned software firms indicates that very few of them report sales of more than $50 million per annum.

Table 14 Australian Software Revenues

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Description</th>
<th>Total Revenues $A,000</th>
<th>Australian Revenues $A,000</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Owned</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mincom</td>
<td>Private</td>
<td>Mining Industry</td>
<td>$165.0</td>
<td>$91.3</td>
<td>Kompass</td>
</tr>
<tr>
<td>IBA Health</td>
<td>ASX</td>
<td>Health Industry</td>
<td>$59.2</td>
<td>$37.7</td>
<td>AR</td>
</tr>
<tr>
<td>MYOB</td>
<td>ASX</td>
<td>Accounting</td>
<td>$192.3</td>
<td>$145.3</td>
<td>AR</td>
</tr>
<tr>
<td>Adacel</td>
<td>ASX</td>
<td>Aeronautics</td>
<td>$52.9</td>
<td>$0.8</td>
<td>AR</td>
</tr>
<tr>
<td>Technology One</td>
<td>ASX</td>
<td>Accounting</td>
<td>$66.5</td>
<td>$63.1</td>
<td>AR</td>
</tr>
<tr>
<td>Integrated Research</td>
<td>ASX</td>
<td>Performance</td>
<td>$34.5</td>
<td>$6.1</td>
<td>AR</td>
</tr>
<tr>
<td>Mutilnationals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM</td>
<td>NYSE</td>
<td>Diversified</td>
<td>$102,364.9</td>
<td>$3,345.2</td>
<td>Kompass/AR</td>
</tr>
<tr>
<td>Microsoft</td>
<td>NASDAQ</td>
<td>PC Software</td>
<td>$40,725.8</td>
<td>$170.9</td>
<td>Kompass/AR</td>
</tr>
<tr>
<td>Oracle</td>
<td>NYSE</td>
<td>Database</td>
<td>$16,105.8</td>
<td>$220.4</td>
<td>Kompass/AR</td>
</tr>
<tr>
<td>SAP</td>
<td>NASDAQ</td>
<td>Enterprise</td>
<td>$15,513.3</td>
<td>$194.8</td>
<td>Kompass/AR</td>
</tr>
</tbody>
</table>

(source: Annual reports and Kompass (2007))

The stark reality of the differences in revenues between multinational software vendors and some of the largest Australian headquartered software firms (as detailed in Table 14) reveals the enormity of the challenge confronting any founder of an Australian organization with aspirations to compete in global markets. This is not to say Australian organizations should not compete in global markets or Australian software firms are not capable of developing excellent products. What it does suggest is that successful Australian software firms will be those that identify niche markets.
in which they can be competitive. As reported to the Australian Department of Communications Information Technology and the Arts by McKinsey and Company in 2002, the important implications for participants in the Australian software industry are (McKinsey 2002, p. 12):

Globally oriented specialists are likely to play an increasingly important role in the industry. These specialists who maintain focus on a specific function or end-user segment, particularly in software, are likely to be successful, particularly if they focus on ‘white space’ where multinational corporations are not, as yet, well entrenched. Increasingly, they will need to be global or at least regional to survive.

Local firms, particularly generalists, will struggle to compete against multinationals operating in Australia who have substantial scale in individual products or services and local distribution. To succeed, local firms will need to differentiate their offer and will probably need to pursue export markets to achieve sufficient scale.

Multinational corporations are likely to increase their share of domestic information technology demand.

The implications in terms of research impact and the identification of appropriate organizational fields is that the focus should be on Australian software firms operating in specific vertical market segments, rather than on the Australian software industry as a whole.

5.2.2.8 The Internet and the World Wide Web

In 1991 Tim Berners-Lee developed his concept of the World Wide Web (www) which rapidly changed an extensive military and academic network of computers, conceived and initially implemented during the 1960s (see Hafner and Lyon 1996), into a pervasive influence on how the world communicates.
For software organizations this marked the start of a new era in computing. Whereas they had previously developed software to run on a client’s computer now they could develop software to run on any computer because the client could use the www to access the software from any location. For many, this suggested the software developed by the independent vendors during the 1980s would rapidly be superseded by a new generation of products developed specifically for the www. Investors flocked to pour money into the new ‘dot.com’ organizations as each new Initial Public Offering (IPO) defied all previous rational rules of organization valuation. During this period of ‘irrational exuberance’ as Alan Greenspan, Chairman of the U.S. Federal Reserve termed this period, (Cassidy 2002, p. 13) Amazon.com, E-Bay, Yahoo, Google and others emerged and established dominant market leadership in their chosen segments. If one were to characterise these organizations as software organizations then it might be argued that they represent the face of today’s software industry. However the reality is that these firms do not generate their revenue by developing and selling software, rather they generate revenue by delivering advertising or sales of merchandise. Indeed many of these organizations rely on other vendor’s products (for example: Oracle’s database software) to manage the transactions being processed through their websites.

For many of the independent software developers formed during the 1980s the www opened up opportunities to be able to sell their software to an expanded potential customer base. By ‘web enabling’ their products they were able to maintain their market domination established many years before. This is well illustrated in that the organizations dominating their market segments today, Oracle, SAP, Microsoft, Intuit and Autodesk, all established dominance before the emergence of the www. The effect of the www for these organizations has been to enable them to expand their international reach, to offer customers new support and licensing approaches and to increase their global dominance.

The emergence of the www has had important ramifications for Australian software vendors. While it provides a more flexible means of communicating with, and selling
to, international customers it also makes it easier for international software organizations to compete within Australia.

### 5.2.2.9 User Groups and Special Interest Groups in the 21st Century

Whereas, during the 1970s and 1980s many industry associations and special industry groups were formed in an attempt to provide a forum for software developers in general, today there is little evidence of the continuing existence of those generalist forums. In place of the generalist forums a multitude of special purpose forums have emerged. The Australian Computer Society, for example, during the 1970s and 1980s, had three active special interest groups covering data communications, hardware technology and software (Bennett 1994, p. 204). In 2007 the Australian Computer Society website listed 51 special interest groups of which 23 are directly software related (ACS 2007). The Australian Computer Society, the Australian Information Industry Association, government departments (for example: the NSW Department of State and Regional Development and the Federal Department of Communications, Information Technology and the Arts) and many other commercial and not for profit organizations schedule information meetings, training courses and conferences addressing specific issues of interest to participants in the software industry. At many industry specific trade shows and conferences, seminars on the use of information technology within that industry sector are scheduled and many conferences have associated display areas where software organizations can exhibit their products.

While a plethora of opportunities exists for the participants in the Australian software industry to interact more ‘frequently and fatefully’ with one another than with actors outside of the field by attendance at the many software industry related forums, there is little evidence today of a single forum that could be considered to generally attract participants in an organizational field encompassing the software industry. However if one is to look at the software industry in terms of specific vertical market segments then there is a much clearer picture of where the participants in the Australian software industry interact more ‘frequently and fatefully’ with one another. The participants gravitate towards industry specific special interest groups or to industry
specific conferences where they expect to find concentrations of potential customers. In many cases, in addition to attending these events, the participants are able to demonstrate their products and to make presentations on their products to other attendees. It is also usual for the software organizations to provide financial support to the organizers of the events in return for acknowledgement of their contributions. For example, the Medical Software Industry Association (MSIA 2007) has more than 50 members, most of which are Australian owned software firms, providing vertical market solutions to the health industry. The Australian Association of Practice Managers held its annual conference in Hobart during October 2007 and the list of exhibitors at that conference (AAPM 2007) included many of the members of the Medical Software Industry Association. CeBit Australia holds Australia’s largest business technology exhibition in Sydney each year. Part of the exhibition centre is dedicated to e-Health (CeBit 2007) and many of the exhibitors are members of Medical Software Industry Association. The employees of members of the Medical Software Industry Association attend these conferences and exhibitions on a regular basis, even if their organization is not an exhibitor, so as to be able to evaluate competitive products and to establish relationships with potential clients. Membership of specific industry associations by competing organizations, exhibition at industry specific conferences and trade shows and attendance by non exhibitors’ employees is very typical of how participants in the Australian software industry ‘frequently and fatefully’ now meet and interact.

5.2.2.10  The Australian software industry in the 21st century

In less than fifty years, software has developed in line with the development of computer hardware from what, in 1970, was essentially a component of the computer hardware industry, and has usurped hardware as the driving force in the world’s information technology industries. For Australian independent software firms the manner in which the world’s (and particularly the American) software industry has grown is significant in that the years in which the international industry has developed have also coincided with a period during which improved communication and travel facilities have enabled the creation of a truly global marketplace for software. Consequently development of Australian software firms has not only
occurred in parallel with the development of international software organizations but
the development has also been strongly influenced by the very early entry of
many of the international software organizations into the Australian marketplace.
The establishment of a field, or multiple fields, of Australian software firms has been
influenced by local conditions but also needs to be considered in the context of the
development of international software organizations that have a significant
Australian presence.

The picture emerging of Australian software firms in the 21st century is that of small
organizations, mostly with sales of less than $50 million per annum, developing
software for industry specific vertical markets. These organizations’ employees
attend many different industry gatherings but are most likely to meet regularly at
industry gatherings associated with the vertical market segments being targeted by
their respective software organizations. Australian software firms work in an
Australian total market environment dominated by very large European and
American owned multinational information technology organizations. The
availability of flexible low cost international communications facilities, low cost
international travel and the rapid proliferation of the www increasingly enables easy
access to international markets for Australian software firms but at the same time
increases the ease of entry of competing, and usually very well resourced,
international software organizations into the Australian market.

5.2.3 Structuration

In describing the establishment of an organizational field of American art museums,
DiMaggio stressed the central role of professionalization on interorganizational roles.
In this context DiMaggio refers to the contradictory tendency of successful
institutionalization projects to legitimise both the establishment of new
organizational forms and new organizational actors whose interests diverge from
those of the groups controlling the organizations. In studying these developments
DiMaggio traced the development of art museums from their initial establishment in
educational institutions, where the main mission was to collect and conserve artefacts
under the direction and control of trustees, through expansion (of numbers of art
museums) by the establishment of municipally supported museums (starting in the 1920s) where control was more in the hands of the staff to the modern organizational form where the mission has changed to that of education and exhibition under the control of a professional elite (DiMaggio 1991, pp. 269-272).

There are broad parallels between the development of the organizational fields in American art museums and those in the Australian software industry.

During the early days of the information technology industry in the 1950s and 1960s the development of independent software organizations was very much controlled by the requirements of the computer hardware organizations, with IBM being a dominant force. During this period the participants in the software industry tended to ‘frequently and fatefully’ meet in environments closely associated with a single computer hardware organization. Participants in the software industry usually received their training from the computer hardware organizations. In many cases an independent software organization operated out of offices provided by a computer hardware organization and their employees were active in the user group forums pertaining to that hardware organization. Because of the closeness of the independent software firms to the computer hardware organizations the organizational structures of the software firms were strongly influenced by the computer hardware organizations.

As the industry developed, in the 1970s and 1980s, the software organizations were able to operate more independently of the computer hardware organizations in that they developed software products that might be chosen by a customer before the customer chose the computer hardware platforms. Nonetheless, during the 1970s and 1980s because of the proprietary operating environments, many software organizations focussed their products on a limited number of computer hardware platforms so as to minimise development costs and to maximise marketing efforts by working closely with the computer hardware organizations’ sales forces. During this period participants in the software industry continued to ‘frequently and fatefully’ meet in environments closely related to a particular hardware organization (for
example: DECUS and Primus), but at the same time a number of cross-industry special interest groups (for example: the Australian Computer Society’s ACS–SIC) were formed providing a forum for all participants in the software industry to meet independently of the computer hardware organizations. The strong ties between the independent software organizations and the computer hardware organizations continued to be reflected in the organizational practices of the software firms but the influence was lessening.

The introduction of the personal computer and the resultant domination of the operating environment by Microsoft coupled with the emergence of the www significantly reduced the power of the computer hardware organizations after the 1980s. Today the role of hardware user groups has almost entirely disappeared and the hoped for establishment of a class of widely acknowledged software professionals uniting under the imprimatur of the Australian Computer Society has not happened. Participants in the Australian software industry do regularly congregate at various conferences, training courses and meetings under the auspices of the Australian Computer Society, other industry associations, government departments and commercial organizations but it could not be claimed that any particular grouping of participants ‘frequently and fatefully’ meet at those gatherings. Where the participants, and particularly the controlling founders or managers of the software firms do ‘frequently and fatefully’ meet today is at the places where the industry groups of their clients meet (see AAPM 2007, EDUCAUSE 2007, MSIA 2007, VALA 2008).

So, just as DiMaggio has argued the development of the organizational field in art museums reflects the change in effective control of the art museums from the trustees to the professional elite, I argue development of the organizational fields encompassing the Australian software industry reflects the change in effective control at the customer site from the computer hardware organizations to the computer software organizations. The organizational structures that emerged in art museums are the result of a successful institutionalization project that has legitimized the modern form in a manner reflecting the interpretive scheme of the elite managers
who have been able to wrest control from the trustees by legitimizing the role of professional control as a requirement for appointment. The modern organizational structures of Australian software firms are a reflection of the interpretive schemes of the principals of software organizations, who have been able to wrest control of clients from the computer hardware organizations by legitimizing the dominance of software organizations in client specific vertical markets.

The corollary to this argument is the reason there continues to be an unresolved debate on why the founders or managers of Australian software firms experience difficulties in building sustainable growing businesses may well be that the unit of analysis is too broad. In trying to resolve the debate in the context of the Australian software industry, comparisons necessarily need to be made between, for example, SAP and Technology One, where the disparity in sales and market reach might suggest that Technology One has not achieved great success. However if the unit of analysis was at an organizational field level encompassing software organizations providing local government financial solutions (see Di Marco 2006, p. 4) then one would probably conclude that Technology One is very successful.

To illustrate this argument consider how the structuration of an organizational field consisting of software organizations providing solutions to customers in a vertical market segment of an industry may have developed in the context of DiMaggio and Powell’s four elements of the structuration process (DiMaggio and Powell 1983).

5.2.3.1 An increase in the extent of interaction among organizations in the field

During the 1950s and 1960s a computer hardware organization would have targeted the largest potential customers in a vertical market segment with solutions that mechanised existing, mainly accounting, manual processes. With the development of more powerful computers and increased demand for market segment specific solution, the hardware organization would have introduced a preferred contract programming organization to the customer to develop organization specific applications. The hardware organization would have then marketed its products to other large organizations within the vertical market segment. If the contract
programming organization had been successful in the first site then the computer hardware organization would have introduced the contract programming organization to the new customer. Interaction would be with hardware organizations and their customers.

During the 1970s and 1980s, with the lowering of entry costs, mid range organizations in the vertical market segment would seek computer solutions. With the unbundling of software and hardware and the expansion of available hardware platforms, software organizations that developed expertise in the vertical market segment would develop software products that could be licensed to multiple organizations and would market these products in joint arrangements with a computer hardware organization. This would result in a number of similar products being available in the vertical market segment from separate software organizations each with a specific computer hardware organization allegiance. Interaction would still be mainly at the hardware organization level but the software organization participants would meet at computer industry trade shows and at software industry special interest groups.

Since the 1990s the nexus between hardware and software has been broken and all organizations within the vertical market segment would have acquired some form of computerisation. In consort with the expanding market, the number of software solutions being offered to customers in the vertical market segment would have grown considerably. Software organizations with products that addressed the requirements of the vertical market segment would develop their own targeted sales strategies which would include attendance at vertical market specific trade shows and conferences. Interaction between the software organization participants would occur at customer sites when customers acquired more than one software product from different software organizations, at trade shows and at vertical market specific industry association meetings. As a group, software organization participants would rarely meet and interact at general software industry functions.
5.2.3.2 The emergence of sharply defined interorganizational structures of domination and pattern of coalition

During the 1950s and 1960s the coalitions would have been clearly delineated by the relationships with the computer hardware organizations. While a software organization might have been acknowledged as having achieved some success with one or more organizations in a vertical market segment it would still be identified as, for example, an IBM only contract programming organization.

During the 1970s and 1980s software organizations would be identified as having products that addressed specific vertical market segments but they would still also be strongly identified as being in coalition with specific computer hardware organizations. While some potential customers in a vertical market segment might make a computerisation decision on the basis of the software first, many would still choose the hardware and then evaluate the choice of software from the software organizations that provided solutions on that hardware platform.

Since the 1990s potential customers in vertical market segments have made decisions on computerisation solutions on the basis of the software choice alone. As the number of potential customers has expanded so has the number of solutions being offered in any vertical market segment. Consequently solutions being offered to customers in a vertical market segment might often involve a joint offering from one or more software organizations. In any vertical market segment today one would expect to find software organizations of different sizes, some offering total solutions and many offering components of a total solution.

5.2.3.3 An increase in the information load with which organizations in a field must contend

During the 1950s and 1960s computer systems had little capacity and almost all processing was carried out in batch mode. Computers were not networked together. The software developed during this period mostly involved computerisation of manual processes. There was little choice in programming languages, with COBOL being used for most commercial applications, FORTRAN for technical and scientific applications and Assembler for some additional functionality requirements. Each
computer hardware organization had its own proprietary operating system and, until the late 1960s, a different one for each machine. For most software organizations, dedicated to one computer hardware organization, the main complexity involved interpreting and dealing with the customers’ changing requirements.

During the 1970s and 1980s the capacity of computer systems increased significantly and processing changed to input via interactive terminals attached to a central computer. COBOL and FORTRAN continued to be the main programming languages and a number of database systems appeared. Remote access to the central computer was possible via dialup or dedicated telephone lines and some networking of computers for transfer of data was possible. Software applications increased in complexity as customers looked for additional productivity gains by re-engineering business practices to take advantage of computerization. In many cases re-engineering involved interaction between multiple businesses and departments. Software organizations, during this period, experienced increased levels of complexity in two areas. Firstly, as they attempted to build standard software products they had to build in the ability to deal with differing client requirements in one product, whereas in the contract programming environment they had only to address the requirements of a single client. Secondly, in an online environment, there was a need to deal with the interaction of multiple users attempting to access and change data simultaneously. These increases in complexity required a more rigorous approach to design, testing and delivery of software and far more interaction and coordination between those members of the various software organizations staff involved in the development of the software products.

Since the 1990s the capacity of computer systems has increased dramatically as has the diversity of the software and interaction options available. Many different languages and software tools are now used for development of systems and online real-time databases which are at the core of most systems. Access to systems is readily available, via many different devices ranging from networked personal computers to mobile phones, and access via the www occurs from any location worldwide at any time. The growth in e-commerce has meant that systems need to interact
with many different external systems and thus security of data has become a major issue. The increasing need to deal on a business to consumer level, often in cross-border environments, has resulted in higher levels of complexity and the need to deal with differing legislative requirements. Many customer sites utilise products from different software organizations and in many cases these different products need to interact. These increasing levels of complexity now usually require interaction and coordination between the employees of multiple software organizations involved in providing solutions for a customer.

5.2.3.4 Development of a mutual awareness among participants in a set of organizations that they are involved in a common enterprise.

During the 1950s and the 1960s there was a very clear understanding in software organizations about who ‘owned’ the customer. The continued viability of the software organization was very dependent on maintaining good relationships with a particular computer hardware organization. The same could not be said of the hardware organizations which, in general, considered the software organizations to be subservient and subject to their whims. There was little or no mutuality of awareness between the computer hardware organizations and the emerging software organizations.

During the 1970s and the 1980s, as the software organizations assumed more powerful positions, the computer hardware organizations grudgingly accepted the importance of the software organizations in helping in the sales process and so a more cooperative attitude developed. During this period, as there was little need for joint marketing or joint implementation by software organizations at a customer site, there was little awareness that software organizations were involved in a common enterprise. However as the participants in software organizations competed against each other, in conjunction with their respective computer hardware organization allegiances, there was a growing level of awareness of each other between software organizations operating in specific vertical market segments.
Since the 1990s the growth in complexity of systems and the growth in the number of software organizations in each vertical market segment has resulted in a heightened level of awareness between organizations operating in particular vertical market segments. In consort with this awareness and the growing complexity of systems there has been a growth in the awareness that productivity can be increased by some levels of cooperation, even between direct competitors. It is not unusual today to see joint proposals being submitted by competitors and for industry groups being formed to aid in solving common industry problems.

5.2.4 Organizational fields

It therefore appears that rather than a single organizational field encompassing all Australian software firms, there are many organizational fields in the Australian software industry and each field is principally delimited by a specific vertical market. As can be seen from the summary in Table 15 this represents a major shift from the environment in the 1950s and 1960s, where organizational fields were delimited by allegiances to specific hardware organizations, to the current environment where organizational fields are delimited by allegiances to customers. This change also reflects a difference in the driving forces leading to establishment of organizational fields between software organizations and organizational fields encountered in the professions. While much of the work in looking at the structuration of organizational fields focuses on the influence of the professionalism, I argue that for Australian software firms the issue of ‘ownership’ of the customer has been the dominating influence. This view very much reflects Hoffman’s view that (1999, p. 352) ‘A field is not formed around common technologies or common industries, but around issues that bring together various field constituents with disparate purpose’. This is an important point of clarification for the Australian software industry. Many of the studies referred to in this thesis have started from the premise that the centrality of the industry is either software or hardware whereas I argue that to understand the industry there is a need to look at the industry from the centrality of the customer. As Hoffman (1999, p. 352) observes, in looking at firms in the American chemical industry, just because firms occupy an organizational field through which they influence one another it would be incorrect to assume that they
share the same beliefs and attitudes. In an analogous manner, just because firms in the Australian software industry share a commonality in the use of computer technology it would be incorrect to assume that their beliefs and attitudes are shaped more by the industry as a whole than by their customers.

This view of ‘ownership’ and centrality of the customer as a driving force in the establishment of organizational fields resonates with the concept of institutional logics which is increasingly been recognized for its contribution to institutional theory. Thornton and Ocasio (1999, p. 804) link individual agency, cognition, socially constructed institutional practices and rule structures in defining institutional logics as

the socially constructed, historical pattern of material practices, assumptions, value beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality.

Thornton and Ocasio (2008, p. 103) reinforce this definition in recognising that

Perhaps the core assumption of the institutional logics approach is that the interests, identities, values, and assumptions of individuals and organizations are embedded within prevailing institutional logics. Decisions and outcomes are as a result of the interplay between individual agency and institutional structure.

It is the agency effects in promoting the concept of ‘ownership’ of the customer that permeate throughout the changes in the Australian software industry since the 1950s. During the 1950s and the 1960s IBM management focussed their efforts on total control of the customer, a practise initiated by Thomas J Watson Senior in the 1930s and perpetuated by his son and their successors (Watson and Petre 1990). During the 1970s and 1980s management of independent (of IBM) software and hardware firms followed this approach and since the 1990s, while the nexus between a single supplier and a customer has been effectively broken, the mantra of ‘customer’
ownership continues to pervade the software industry. So, while many of the practises of the software industry reflect rationalised institutional myths the actions of embedded agents in the hardware and software organizations has been significant in shaping organizational practices and structures.

The importance of embedded agency (of the museum workers) as causal influences in the process of field evolution is stressed in DiMaggio’s work but so is the importance of the American Association of Museums that developed into an organization, controlled by professionals to become very influential in the evolution of the national organizational field encompassing art museums. DiMaggio (1991, p. 287) observed:

> The most striking feature of the museum case is the extent to which the creation of a national field was intertwined with the efforts of museum workers to define a profession and increase their own authority

The importance of embedded agency effects expressed through the influence of professional associations in legitimating change in organizational fields is described by Greenwood, Suddaby and Hinings (2002) in their examination of the role of professional associations in the professional business services field in Alberta, Canada. Drawing on the work of Strang and Meyer (1993) and Tolbert and Zucker (1996) Greenwood, Suddaby and Hinings suggest for new practises to be adopted they have to be “theorized”. This involves, firstly, the specification of an organizational failing (which is often associated with a discontinuity or shock in the normal order) and an associated solution or treatment and, secondly, a justification of the solution. Increasingly individuals acting on self interest but expressed through the growing collective efforts of a professional association initiate change as a result of theorization.

While I have stressed that there is little evidence of a united front of computer professionals (refer to section 5.2.3) initiating change, similar processes have resulted in the evolution of the fields encompassing the Australian software industry.
During the 1950s and 1960s the industry was dominated by a limited number of hardware companies. Self interest for the computer professionals in this environment was best served by ensuring that the customer remained loyal to the hardware company.

During the 1970s the emergence of mini computers opened up the opportunities for independent software organizations and for potential customers to be offered solutions from a larger array of vendors. The organizational ‘failing’ of total customer control resulted in a ‘shock’. The self interest of the computer professionals in their role as proprietors of independent software organizations was best served by wresting control of the customer from the hardware companies. At the same time the minicomputer vendors attempted to retain control of the customer. During this period there was much ambiguity about who ‘owned’ the customer.

The introduction of the personal computer in the 1980s resulted in another ‘shock’ that required a solution. Hardware became a commodity and the customers acquired software from many different vendors. Hardware vendors exercise little control over the customers and software vendors have to work together in an environment that relies on substantial interaction between multiple systems. Self interest for independent software vendors is best served by them working closely with their competitors and with other independent software vendors to service and interact in particular vertical customer markets.

In less than fifty years two major shocks (the introduction of minicomputers and then personal computers) have caused the organizational field that encompasses the software industry to change from a hardware company centric field to multiple customer centric fields.
Table 15 Industry Changes 1950-2000+

<table>
<thead>
<tr>
<th></th>
<th>1950s and 1960s</th>
<th>1970s and 1980s</th>
<th>1990s+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>Contract programming</td>
<td>Software products for specific hardware platforms</td>
<td>Enterprise and Mass Market software products</td>
</tr>
<tr>
<td>Customer Ownership</td>
<td>Hardware organizations</td>
<td>Hardware and software organizations (often disputed)</td>
<td>Software organizations</td>
</tr>
<tr>
<td>Dominant Hardware Platform</td>
<td>IBM</td>
<td>IBM and IBM compatible. Minicomputers (Digital, Prime, Data General)</td>
<td>Personal Computers and servers from multiple suppliers</td>
</tr>
<tr>
<td>Dominant Operating System</td>
<td>IBM (many incompatible variants)</td>
<td>IBM/360. Primos, VMS, AOS/VS</td>
<td>Windows, Unix</td>
</tr>
<tr>
<td>Sales Strategy</td>
<td>Demand driven, heavily influenced by hardware organizations</td>
<td>Joint marketing with minicomputer sales force predominant</td>
<td>Reliant on software organization’s own sales force</td>
</tr>
<tr>
<td>Pricing Strategy</td>
<td>Bespoke programming on hourly rates</td>
<td>High licence costs low volume sales</td>
<td>Low unit cost moving towards annual fees</td>
</tr>
<tr>
<td>Effective control of direction</td>
<td>Hardware organizations</td>
<td>Founder/owners in consort with hardware organization directions</td>
<td>Founder/owners</td>
</tr>
<tr>
<td>Initial participant training</td>
<td>Hardware organization training courses</td>
<td>Independent training schools. Limited tertiary training diploma courses</td>
<td>Tertiary degree with frequent postgraduate, industry and independent training courses</td>
</tr>
<tr>
<td>Dominant participant meeting environment</td>
<td>Hardware organization initiated and hardware organization associated user groups</td>
<td>Hardware organization associated user groups. Industry special interest groups. Industry wide trade shows</td>
<td>Customer industry specific user associations. Customer industry trade shows and conferences.</td>
</tr>
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</table>
5.3 Classification of Australian software firms

In section 5.2.3 I have argued organizational fields in the Australian software industry are customer industry centred rather than software industry centred. While this assertion needs to be tested, my preliminary analysis provides a basis for a more focussed analysis of the issues being confronted by the founders or managers of Australian software firms than the generalised nature of the analysis provided by existing studies, which have looked at the Australian software industry as a single unit of analysis.

Having identified one or more organizational fields as the unit of analysis the next task was to identify appropriate organizational classifications that would form the basis for comparison with observations of software organizations encompassed by identified organizational fields.

A thorough review of the literature contributing to the identification of organizational classifications to be used in considering organizational structures in Australian software firms might start with Max Weber’s work, particularly because of his views on the importance of the manner with which authority is legitimated in organizations. For example Weber’s charismatic form (Pugh and Hickson 2007, p. 5) of authority would lend itself to analysis of many of today’s computer software organizations and in time may well provide valuable insights into the development of Microsoft and Oracle upon the departure of their founders as the various disciples claim to be the true heirs to Bill Gates and Larry Ellison. However, as observed previously, Weber’s work predated the development of the computerization, photocopying and low cost international communications that have fundamentally affected modern business operations. It should also be remembered that Weber stressed the importance of time and context in the assessment of ideal types as summarised by Lindbekk (1992, p. 290):

The relevance of a specific ideal-type derives from the value ideas believed to exist in a certain culture…they are also supposed to have a dynamic, causal, aspect within the society studied…the type could serve as a measure
for the evaluation of actions in the light of the causal knowledge of the period studied

On this basis it is appropriate to start with the theorists whose work covers the period during which the software industry has developed.

5.3.1 Burns and Stalker – Mechanistic and Organic Forms

The work of Burns and Stalker (1966) provides a convenient and appropriate starting point in the search for organizational classifications to be used in an investigation of organizational structures in software organizations. Their work in looking at different types of organizations in an industry experiencing substantial technological change occurred at the time when the software industry was in an embryonic stage. In studying change in Scottish electronic firms, Burns and Stalker identified two management systems, the mechanistic structure and the organic structure, which they consider represent the two polar extremities of the forms these systems can take.

The characteristics of the mechanistic structure are similar to those of Weber’s rational-legal bureaucracy where (Pugh and Hickson 2007, pp. 57-58):

The problems of tasks and management are broken down into specialisms which each person carries out in his or her assigned precisely defined task. The hierarchy of control is clear, and the responsibility for overall knowledge and coordination rests exclusively at the top of the hierarchy. Vertical communication and interaction (between superiors and subordinates) is emphasised, and there is an insistence on loyalty to the concern and obedience to superiors.

A mechanistic structure is considered by Burns and Stalker to suit an organization in a relatively stable environment. Students of IBM from 1960 until the late 1970s might see many parallels between this definition and the manner in which IBM was managed during that period. IBM was a highly innovative organization revered by corporate America as the epitome of how a technology organization should be managed. There was an ‘IBM Way’ as Buck Rogers entitled his glowing personal
view of why IBM was so successful. The IBM way started at the top of the organization and (Rodgers and Shook 1987, p. 25) ‘the Watsons were the role models for just about everyone who ever climbed IBM’s organizational ladder’.

The IBM way was very management centric where:

   Every IBM employee’s ambition is apparently to become a manager, and the company helps them out in this area by making management the company’s single biggest business. IBM executives don’t design products and write software; they manage the design and writing of software. They go to meetings. So much effort, in fact, is put into managing all the managers who are managing things that hardly anyone is left over to do the real work.(Cringely 1993, p. 124)

Despite Cringely’s somewhat cynical view of IBM, during Thomas J. Watson Jr’s tenure:

   IBM elbowed its way among the giants at the top of the Fortune 500, clobbering computer rivals like Remington Rand, RCA, General Electric and Honeywell. By the time he stepped down after a heart attack (in 1971), the organization was undisputed ruler of the mainframe computer industry and well on its way to becoming the most profitable business on earth. (Watson 1987, p. 16)

In the information technology industry during the 1960s and 1970s, IBM was the organization other information technology industry organizations aspired to be. IBM, it was said, trained the industry and IBM’s ‘ownership’ of its customers was legend. At any time during that period the IBM organizational practises would have defined the organizational structure by which the rest of the information technology industry measured itself.

In contrast Microsoft, the heir apparent to IBM’s mantle as the world’s most successful information technology organization:
Seems to be unusual in the degree to which it empowers people in these specialities to define their jobs, hire new people, and train new hires. It also appears to us that Microsoft has relatively little formal orientation and education for an organization with so many employees and products. (Cusumano and Selby 1998, p. 74)

Students of organizational practice might well see many parallels between the management style adopted by Microsoft and Burns and Stalker’s organic structure as described by Pugh and Hickson (2007, p. 58):

The organic type of organization is adapted to unstable conditions when new and unfamiliar problems continually arise that cannot be broken down and distributed among the existing specialist roles. There is, therefore, a continual adjustment and redefinition of individual tasks, and the contributive rather than restrictive nature of specialist knowledge is emphasised. Interactions and communication may occur at any level as required by the process, and a much higher degree of commitment to the aims of the organization as a whole is generated.

Modern software industry organizations, seeking to identify an organizational structure upon which they could model their organization, might look at the rapid demise of IBM, which adopted a mechanistic structure, and compare this with the success of Microsoft, which adopted an organic structure. They might conclude an organizational structure based upon an organic structure is the most appropriate for modern software organizations. For many principals of software organizations aspiring to create the next Microsoft, the approach is to attempt to follow Microsoft’s lead in employing the best people and providing them with a very unstructured free form working environment so as to exploit their creative talents to the fullest in what might be considered the most extreme of organic structures. The problem with that approach is just as the structure adopted by IBM was appropriate at the time of its greatest successes the model adopted by Microsoft has to be considered in the context of Microsoft’s role in today’s information technology industry. Most
importantly, the principals of software organizations should be cognisant of the advice proffered by Burns and Stalker (1966, p. 119):

Both types represent a ‘rational’ form of organization, in that they may both, in our experience, be explicitly and deliberately created and maintained to exploit the human resources of a concern in the most efficient manner feasible in the circumstances of the concern.

For the principals of software organizations it is the ‘deliberate and explicit’ strategy in the context of the ‘circumstances of the concern’ that should be central in the decision making process with respect to an appropriate organizational structure. This issue was considered by Sine Mitsuhashi and Kirsch (2006) when they looked at new venture performance of information technology organizations in the light of Burns and Stalkers’ work. Their studies showed for newly formed information technology organizations those firms with a more formal (mechanistic) structure outperformed those firms with a less formal (organic) structure in contrast to the observations of Burns and Stalker. Sine et al concluded, the reason for this apparently contradictory view, was that Burns and Stalker had considered the two polar extremities of structure in the context of change in well established firms, whereas the work of Sine and others was in the context of new venture creation in a very dynamic industry sector. They argued (Sine et al. 2006, p. 130):

...new ventures are already extremely flexible and attuned to their environment, but that they often lack the benefits of organizational structure, such as low role ambiguity, high levels of individual focus and discretion, low coordination costs, and generally high levels of organizational efficiency. Moreover, because new ventures in new economic sectors need to develop new roles, activities, and employees, they require greater managerial resources per employee than mature organizations.

It should also be noted that Burns and Stalker acknowledged that the two organizational forms represented a polarity rather than a dichotomy and that there are intermediary stages between the two extremities. Burns and Stalker (1966, p. 122)
also refer to the importance of the interaction of the formal authority, career and politics in the manner in which an organization functions as a single system and they argue that the hierarchic command system which ensures cooperation and control in mechanistic organizations is countered by the growth and accretion of institutionalised beliefs as the basis of successful operation in organic organizations.

I then asked:

Is Burns and Stalker’s mechanistic structure the structure preferred by investors in Australian software firms and is the organic structure the structure preferred by the principals of Australian software firms?

To explore this question more fully I contacted two of the venture capital managers (VC2 and VC5) whom I had interviewed and discussed this aspect of my research with them. The views of both managers were unequivocal. They both explained that the very successful information technology organizations had clearly defined divisions of responsibility and accountability but within the divisions each leader had considerable authority and flexibility in how to operate their divisions. Further, they explained, those organizations are strongly focussed on outcomes rather than procedures. After I described the work of Sine, Mitsuhashi et al, VC2 responded:

Yes that’s want we want. Flexibility because things move so quickly but adult supervision to look after our money

In response to this comment I then asked VC2 if the organic or mechanistic form might represent the typical organizational structure adopted by the principals of Australian software firms. He gave a very qualified ‘yes’ in that he said if the form adopted was that of a ‘one man show’ with underlings ‘doing their own thing’, then he thought the organic form could describe many Australian software firms.

The comments from VC2 and VC5 and my own observations suggested that in the context of this study Burns and Stalker’s work, combined with the work of Sine, Mitsuhashi et al, essentially describes organizational structures preferred by
Australian investors and the predominant organizational structure adopted by the principals of Australian software firms but that these forms do not correspond directly to mechanistic and organic forms. I took this view because, as described above, Burns and Stalkers’ work dealt with change in the context of well established firms and Sine, Mitsuhashi et al considered operational performance in the context of a newly formed technology company. It is probable that the more mechanistic structure described by Sine, Mitsuhashi et al corresponds to the organizational structure preferred by investors in Australian software firms and that the principals of Australian software tend to adopt organizational structures that have some, but not all, of the characteristics of Burns and Stalkers’ organic form.

The work of Burns and Stalker in the context of this study is of value in that they identify the difficulty of enacting change between different organizational forms. The work of Sine, Mitsuhashi et al is of importance because of their recognition of the importance of organizational structure in gaining operational performance. These are both issues of importance in this study.

5.3.2 Mintzberg – Structures in Fives
Mintzberg (1980, p. 322) posited that an examination of organizations in many diverse fields revealed a tendency for organizations to adopt one of five basic organizational configurations which he named as Simple (Entrepreneurial) Structure, Machine Bureaucracy, Professional Bureaucracy, Divisional Form and Adhocracy. In later years he developed this classification of typologies to assist in the analysis of the development of entrepreneurial and innovative organizations (Mintzberg 2003, p. 315, p. 405). Central to his work is the role of the management team in each of the configurations. Mintzberg’s work has been criticized because of the lack of systematic empirical examination in large scale comparative studies but his work has strong intuitive appeal and has received much attention in management textbooks (see Doty, Glick and Huber 1993, p. 1197). While I am cognisant of these criticisms and I recognise there will be a need to empirically test the appropriateness of the nominated organizational types at a later time, in the context of a grounded theory
approach that deals with very small firms, I believe that Mintzberg’s work provides a sound basis for initial development of theory.

5.3.2.1 Entrepreneurial Organizations

Mintzberg characterizes entrepreneurial organizations (Figure 1) as very simple organizations where the power focuses on the principal who is often the founder or owner, a person with a high personal profile who is inclined to drive the organization by sheer force of personality or by direct intervention. The handling of disturbances and approaches to innovation are often seen by the chief executive as, perhaps, his or her most important role. In contrast the more formal aspects of managerial work receive less attention, as does the need to disseminate information and to allocate resources internally, since power and knowledge remain at the top. Importantly, in the context of this study, Mintzberg observes (2003, p. 316):

Moreover, while new organizations that quickly grow large or that require specialised forms of expertise may make a relatively quick transition to another configuration, many others seem to remain in the entrepreneurial form, more or less, as long as their founding leaders remain in office. This reflects the fact that the structure has often been built around the personal needs and orientation of the leader and has been staffed with people loyal to him or her.

This last comment suggests that the personal power needs of a leader can also, by themselves, give rise to this configuration in an existing organization. When a chief executive hoards power and avoids or destroys the formalization of activity as an infringement on his or her right to rule by fiat, then an autocratic form of the entrepreneurial organization will tend to appear…Charisma can have a similar effect, though different consequences, when the leader gains personal power not because he or she hoards it but because the followers lavish it on the leader.

As the Australian software industry is less than fifty years old and the majority of organizations in the industry employ fewer than 20 employees (see Benson et al.
1999, p. 6, Houghton 2003, p. 15) it is probable that many, if not most, Australian software firms exhibit the characteristics of Mintzberg’s entrepreneurial typology. This view is consistent with my observations of the Australian software industry and with the picture of the typical Australian software firm that has emerged from the data.

**Figure 1 Entrepreneurial Organization**

![Entrepreneurial Organization Diagram](adapted from Mintzberg 1980)

All of the venture capital managers shared the view that most of the organizations they were asked to invest in were rejected as potential investments at a very early stage because they were ‘one man shows’ where the founder continued to be involved in all aspects of the organization’s operations. This is not to say they saw many of these organizations as being failures. Indeed, in many cases the venture capital managers were able to give examples of very successful organizations of this kind. The reason the venture capital managers rejected applications from these organizations was they did not consider them to be investment ready if there was not a clear strategy to reduce the dependency on the principal. Interestingly, VC2 and
ADV2 in this context, both referred to ADV16 who has very successfully listed his software firm on the Australian Stock Exchange and is regularly identified in the media as one of Australia’s most successful information technology entrepreneurs. VC2 and ADV2 considered that ADV16, by continuing to be too involved in all aspects of his organizations, had limited its growth. They pointed to the number of Chairpersons and Chief Operating Officers who had been appointed by the organization since it debuted on the stock exchange as evidence of ADV16’s lack of commitment to ‘let go’. I asked VC2 why then had ADV16 been able to raise a substantial amount of capital and to list on the stock exchange. VC2’s response was that ADV16’s software firm was not investment ready by venture capital managers’ standards because of the deficiencies in its organizational structure but that the public company market was principally interested in product potential at the time of listing.

The interviews with the principals of Australian software firms, while limited in number, also illustrate this view that the predominant organizational structure adopted by the principals of Australian software firms is an entrepreneurial structure as defined by Mintzberg.

Two of the principals, PSA2 and PSB3, clearly had adopted and embraced an entrepreneurial structure and had no intention of changing that structure or of attempting to attract capital. PSB3 liked the idea of continuing to run a small low stress business and PSA2 was very clear that he wanted to maintain control and his primary goal is continued operation as an annuity business.

PSA1, PSA3 and PSB1, for differing reasons, are looking at ways in which they can attract investment into their organizations or sell their organizations. All three are finding this to be a very difficult task for reasons they have some difficulty in understanding, but for reasons that are clear when viewed from a venture capital manager’s perspective. All three businesses are far from being investment ready because of the continuing involvement and dependence on the principal. PSA3 and PSB1 have had a number of attempts to introduce salesmen to their organizations but these attempts have been unsuccessful because the various salesmen have been
incompatible with the principal’s view of how the sales process should be conducted. PSA1 has built a successful business and has, during the last five years, taken positive steps to make his organization investment ready but at the same time has taken steps to groom his son as his replacement in a manner that might suggest he is not totally committed to divestiture of power.

PSB2 differs from the other five principals of Australian software firms in that prior to forming his organization he had been a partner in an international accountancy firm where he worked closely with entrepreneurial organizations. He was very aware of the limitations of an entrepreneurial structure and from inception planned to create a divisional structure so the organization would not be dependent upon his continued direct involvement.

5.3.2.2 Adhocracies – Innovative Organizations

In looking at how innovation can occur within organizations, Mintzberg suggests that entrepreneurial organizations can innovate, but only in relatively simple ways. He posits (2003, p. 405):

Sophisticated innovation requires a very different configuration, one that is able to fuse experts drawn from different disciplines into smoothly functioning ad hoc project teams. To borrow the word coined by Bennis and Slator in 1964 and later popularized in Alvin Toffler’s Future Shock (1970), these are the adhocracies of our society.

Mintzberg characterises adhocracies (Figure 2) as organizations having a highly organic structure with little formalization of behaviour, where many of the jobs require expert training or specific skills and where specialists tend to be grouped in functional units for housekeeping purposes but are available for deployment on a needs basis throughout the organization. In an adhocracy the managers are responsible for coordinating the activities of the organization by mutual adjustment of the resources within the organization so as to enable the effective achievement of the objectives of the organization. In this structure power and decision making is
distributed within various levels of the organization according to the needs of the particular issue.

**Figure 2 Adhocracy Organization**

![Figure 2 Adhocracy Organization](image)

(adapted from Mintzberg, 1980)

Mintzberg further subdivides this view of adhocracies into two separate forms, the operating adhocracy, which is principally concerned with solving problems on behalf of its clients and the administrative adhocracy, which is principally concerned with solving problems on behalf of itself.

Within the information technology industry the in-house development teams of a large organization or government department are most closely characterised as administrative adhocracies and independent software organizations are most closely characterised as operating adhocracies. This study is interested in how independent software organizations are organized and therefore operating adhocracies are of most interest when reviewing Mintzberg’s work.
The role of the top managers in an adhocracy is markedly different from the role that people (or usually one person) take in an entrepreneurial organization. In an adhocracy top management is principally concerned with the battles that ensue over strategic choice and how to direct and channel the energies of the organization into achieving its overall objectives. As Mintzberg notes, the management of innovative project work is notoriously difficult to control. This is certainly true of the information technology industry, where case studies abound describing the failure of client specific development projects undertaken by independent software and service organizations (see Smith 2007, pp. 143-149), the failure of supposedly standardized proven software products to deliver the expected results for clients and the failure of supposedly well researched new endeavours to deliver the expected financial returns for their investors (see Chapman 2006). Mintzberg notes (2003, p. 410):

Perhaps the most important single role of top management of this configuration (especially the operating adhocracy form) is liaison with the external environment. The other configurations tend to focus their attention on clearly defined markets and so are more or less assured of a steady flow of work. Not so the operating adhocracy, which lives from project to project and disappears when it can find no more. Since each project is different, the organization can never be sure where the next one will come from. So the top managers must devote a great deal of their time to ensuring a steady and balanced stream of incoming projects. That means developing liaison contacts with potential customers and negotiating contracts with them. Nowhere is this more clearly illustrated than in the consulting business, particularly when the approach is innovative. When a consultant becomes a partner in one of these firms, he or she normally hangs up the calculator and becomes virtually a full-time salesperson. It is a distinguishing characteristic of many an operating adhocracy that the selling function literally takes place at the strategic apex.

The above comments by Mintzberg will be recognised by information technology consultancies of all sizes as fundamental truths of their business. For the major consultancies (for example: Accenture, Bearing Point, KAZ Computers, IBM Global Services and DMR Group) there is little to differentiate their organizational
structures where partners or senior managers are principally rewarded for their ability to attract additional work. For smaller consultancies, where the principals are often still very much involved in the delivery of the services to the clients, the above comments still hold true but the refrain from the principals is often that it is very difficult to balance the need to obtain new projects with the need to complete existing ones.

For organizations that see themselves principally as vendors of standard products rather than as consultants delivering bespoke solutions, the operating adhocrac form well describes the larger and even the largest organizations. Consider, for example, Microsoft and Oracle. Microsoft might be viewed by many as a supplier of standard personal computer products delivered in shrink-wrapped cardboard boxes or in recent years, via internet downloading, but for major corporate entities, investment in Microsoft products is a major decision, a decision that is regularly reviewed. That the senior management of Microsoft are acutely aware of this was illustrated by Microsoft’s reaction to the news that Telstra were considering Open Source alternatives to Microsoft’s products. This matter was not left in the hands of local management. Microsoft’s CEO Steve Ballmer became a regular visitor to Australia and by 2002 Telstra and Microsoft (Lacy 2002) had started announcing major new partnership arrangements that included commitment by Telstra to Microsoft products. Similarly, Oracle Corporation might be viewed as a supplier of standard database products and a review of its corporate announcements reveals a strong focus on development of new standardised products by a large team of developers. The announcements (Ellison 2006, p. 6) also reveal that a substantial part of Oracle’s business is in the provision of consulting services (services revenues accounted for sales of $US2.84 billion representing 20% of total revenues in 2006 (Ellison 2006)). Conversely while the major information technology consultancies might describe themselves as suppliers of services in a manner that ensures independence from influence from a particular supplier, many of them are very much involved in recommending, supplying and implementing technology products in a manner that mirrors much of the operational behaviour of Oracle and Microsoft. Accenture, for
example, has more than 13,000 professional staff dedicated to the implementation and support of SAP systems throughout the world (Green 2007, p. 2).

In looking at Australian software firms in the context of Mintzberg’s work, the picture that emerges from the interviews with the venture capital managers and with the advisers to the principals of Australian software firms is twofold. Firstly, the structure that both groups perceive as consistent with the concept of investment readiness is one that harnesses the creative talents of the employees of the organization in a structure well described by Mintzberg as an operating adhocracy. Secondly, both groups perceive most principals of Australian software firms do not consider the need to implement an adhocracy structure until faced with the need to raise capital or the desire to sell their organizations.

5.3.2.3 Machine Bureaucracy, Professional Bureaucracy and Divisional Form

Mintzberg’s description of the three other basic configurations quickly eliminates them as potential organizational forms to be considered in this study.

In describing the characteristics of a machine bureaucracy, Mintzberg posits (2003, p. 336):

A national post office, a custodial prison, an airline, a giant automobile organization, even a small security agency – all these organizations appear to have a number of characteristics in common. Above all, their operating work is routine, the greatest part of it rather simple and repetitive; as a result their work processes are highly standardized. These characteristics give rise to the machine organizations of our society, structures fine tuned to run an integrated, regulated highly bureaucratic machine.

Clearly this structure bears very little similarity to the organizational characteristics of most software organizations.

Mintzberg’s professional bureaucracy does, however, have characteristics that might be of relevance when considering the typologies of Australian software firms. These
organization often do employ a considerable number of professionals. Mintzberg suggests (2003, p. 372):

An organization can be bureaucratic without being centralized. This happens when its work is complex, requiring that it be carried out and controlled by professionals, yet at the same time remains stable, so that the skills of those professionals can be perfected through standardized operating programs. The structure takes on the form of professional bureaucracy which is common in universities, general hospitals, public accounting firms, social work agencies and firms doing fairly routine engineering or craft work. All rely on the skills and knowledge of their operating professionals to function; all produce standardized products or services.

However, that this structure is inappropriate for information technology firms is perhaps no better illustrated than by reference to the often acrimonious splits between the major accountancy firms and their consulting arms that occurred during the 1990s. While splits were often because of the widening gap between revenues from traditional accountancy/consultancy tasks and auditor independence issues, many of the problems arose from the flexible organizational structures being implemented by the consulting arms to deal with the varied nature of their assignments when compared with the rigid structures of the audit dominated accountancy practices (see Kaikati 2003).

Mintzberg’s other organization form, the Divisional Form is (2003, p. 434):

...not so much an integrated entity as a set of semiautonomous units coupled together by a central administrative structure. The units are generally called divisions and the central administrative, the headquarters.

This form is common among large corporations and many major information technology organizations, IBM being an example. Interest in an organization managed in this manner would only be to consider one of the divisions, which may exhibit characteristics of an entrepreneurial organization or an operating adhocracy,
rather than the full organization and therefore it would be inappropriate to consider this form in the context of this study.

5.3.3 Classification of Australian software firms

The picture that emerged from the data on Australian software firms and from the work of Mintzberg is that Mintzberg’s entrepreneurial (simple) typology most probably typifies the organizational structure adopted by many of the principals of Australian software firms and that Mintzberg’s operating adhocracy most probably typifies the organizational structure that investors in Australian software firms consider to be most appropriate if these organizations are to satisfy the requirements of investment readiness.

This then invites the following question which will be addressed in the following chapter:

Can the principals of Australian software firms change the structure of their organizations from entrepreneurial to adhocracy so as to be able to present their organizations to potential investors as being investment ready?

5.4 Chapter Summary

In this chapter I sought to determine what organizational structure is appropriate for Australian software firms wishing to attract capital and what predominant organizational structure has been implemented by the principals of Australian software firms. In answering this question I determined I would need to define and delineate one or more organizational fields encompassing Australian software firms. Then I would need to identify organizational structures preferred by Australian investors and the organizational structure most often adopted by the principals of Australian software firms.

In defining the boundaries of organizational fields encompassing Australian software firms my approach was grounded in the work of Paul DiMaggio who described the process by which he constructed an organizational field encompassing art museums.
in America. Whereas DiMaggio had identified the growth in professionalism of the curators as a driving force in the structuration of these fields, I argued that change in ‘ownership’ of the customers of information technology organizations most determined the structuration of organizational fields encompassing Australian software firms. This led me to the view that the Australian software industry consists of many organizational fields, each of which encompasses a small number of software firms centred on a particular customer vertical market.

In identifying classifications to describe organizational structures relevant to the Australian software industry I was guided, initially, by the work of Burns and Stalker on organic and mechanistic structures and then by the work that followed by Sine, Mitsuhashi et al in examining new venture performance in the information technology industry. These works, in concert with my observations and research, suggested the organizational structure of Australian software firms preferred by Australian investors would be essentially organic in nature but would need to incorporate some of the elements of a mechanistic structure and the structure predominantly adopted by the principals of Australian software firms would probably be very organic in nature. In addition, as will be seen in the next chapter, the problems Burns and Stalker observed in organizations attempting to change structures are very germane to this work. However, while the work of both of these groups was very relevant, in order to develop a body of theory describing the workings of the Australian software industry I needed to identify classifications that more accurately described the organizational structures preferred by Australian investors and the organizational structure most often adopted by the principals of Australian software firms. The work of Henry Mintzberg provided me with strong guidance in this area.

Mintzberg posits there is a tendency for organizations to adopt one of five basic configurations and from these five I identified his entrepreneurial (simple) structure and his adhocracy structure (specifically his operating adhocracy structure), as closely corresponding to the classifications that describe organizations in the Australian software industry. An entrepreneurial structure is characterised as a very
simple structure where power focuses on the chief executive and there is little in the way of resource allocation and information dissemination. The entrepreneurial structure very much describes my observations of the predominant structure adopted by the principals of Australian software firms. An adhocracy structure is one where experts from different disciplines are drawn together in ad hoc project teams under the supervision of managers who are responsible for coordinating the activities of the organization by mutual adjustment of the resources within the organization so as to enable the effective achievement of the objectives of the organization. The adhocracy structure very much describes the structure which the investors in Australian software firms consider should be implemented if an Australian software firm is to be considered investment ready.

It appears in order to attract the capital which has been identified as the main driver of sustainable growing Australian software firms, the principals of these organizations will need to implement adhocracy structures if their organizations are to be considered investment ready. This then invites this question which will be addressed in the next chapter:

Can the principals of Australian software firms change the structure of their organizations from entrepreneurial to adhocracy so as to be able to present their organizations to potential investors as being investment ready?
6. ORGANIZATIONAL CHANGE

In previous chapters I described the manner in which I have developed a view of the Australian software industry in the context of a grounded theory study. I have used data obtained via a program of reflection and review of my experiences, analysis of government commissioned reports and field research based upon the use of semi-structured interviews. I have, at the same time increased my theoretical sensitivity in the field of organization studies.

The following view of the Australian software industry has emerged from the data matched to the relevant work of organization theorists:

1. The availability of capital is said to be crucial in the development of sustainable growing Australian software firms.
2. While some industry participants think there is a lack of available capital, there is substantial evidence that capital is available but Australian software firms need to be ‘investment ready’.
3. There is a general view that Australian software firms produce world class products but the quality of management teams is not world class. This suggests many firms may not be ‘investment ready’ so it is this issue which prevents them from attracting capital.
4. The Australian software industry consists of many organizational fields, each encompassing a small number of firms centred on a particular customer vertical market.
5. The preferred organizational structure adopted by the principals of Australian software firms appears to be entrepreneurial, a very simple structure with the power focus on the chief executive, with little in the way of resource allocation or information dissemination.
6. Investors assert that for Australian software firms to be considered ‘investment ready’, the principals of these firms should implement an adhocracy structure, where experts from different disciplines are drawn together in ad hoc project teams, under the supervision of managers responsible for coordinating the
activities of the firm by mutual adjustment of resources, in order to achieve the objectives of the firm.

This invites the following question:

Can the principals of Australian software firms change the structure of their firms from entrepreneurial to adhocracy so as to be able to present their firms to potential investors as being investment ready?

In this chapter, by extension of the work of Greenwood and Hinings (1988, 1996) on organizational change, I develop a body of theory that explains why the principals of Australian software firms have difficulty in changing to an adhocracy structure in their firms.

The chapter proceeds in seven parts:

Section 6.1 deals with the issue of why and when the principals of Australian software firms become aware they need to change the structure of their organization.

Section 6.2 looks at the nature of change likely to be necessary if change is precipitated by a financing shock, and concludes the change will need to be radical and revolutionary in nature.

Section 6.3 examines change in Australian software firms in the context of Greenwood and Hinings’ (1996) work on institutional change. This is extended to develop a model of change in Australian software firms.

Section 6.4 asks if radical revolutionary change can be effected in Australian software firms.

Section 6.5 examines the ways in which change in structure from entrepreneurial to adhocracy might occur, in the context of the Australian software industry using the model of organizational tracks developed by Greenwood and Hinings (1988)
Section 6.6 combines the work of Section 6.3 and Section 6.5 to arrive at a model that describes the workings of the Australian software industry.

Section 6.7 answers the research question asked in the first chapter of this thesis.

### 6.1 Timing of change: ‘A minute to midnight’

Before addressing the question of whether the principals of Australian software firms can change the structure of their firms from entrepreneurial to adhocracy a preliminary question needs to be answered:

> Why and when do the principals of Australian software firms seek to change the prevailing structure of their firms?

Participants in the Australian software industry seem to believe they are operating effectively and the only factor limiting their ability to grow their businesses, is the scarcity of capital. However, the investment community argues, to obtain appropriate levels of capital, the principals of Australian software firms need to change their firm’s structure from entrepreneurial to adhocracy.

Many principals of Australian software firms have implemented an entrepreneurial structure and their firms have continued, over an extended period, to operate profitably and grow at a level consistent with their goals. For these firms it is probable the principals would not attempt any change in structure, unless their own goals change. PSA2 and PSB3, for example, are very comfortable with their firm’s performance and have no intention of changing their firm’s structure. They are the ‘tradesmen of the 21st century’

However, for Australian software firms wishing to obtain appropriate levels of capital, (to become Australian software industry ‘jewels’) change in structure is usually necessary. Therefore, there is a need to understand the institutional pressures that precipitate change in the goals of the principals of Australian software firms and to understand when those pressures are applied.
6.1.1 Institutional Pressures

The work of Meyer and Rowan (1977) and DiMaggio and Powell (1983) anticipates through a process of mimetic, normative or coercive isomorphism, the principals of Australian software firms operating within an organizational field will, in time, implement similar organizational structures. DiMaggio and Powell (1983, p. 150) observe that the three types of isomorphism ‘intermingle in empirical settings’ which suggests that some caution should be exercised in viewing each form in isolation. This issue has been tested by Mizruchi and Fein (1999, p. 680) who conclude, in their review of reports on 26 empirical studies, that ‘It is clear that regardless of which forms of institutional isomorphism authors examine, their indicators are open to alternative interpretations’. As herein explained, it appears, for the principals of Australian software firms, the main institutional pressures influencing their choice of organizational structures will be coercive. Again, it is stressed, that the following observations should be viewed in the context of a grounded theory approach dealing with very small firms and that the interpretations will need to be tested at a later time.

6.1.1.1 Mimetic Pressures

If those successful Australian software firms that have obtained capital had implemented adhocracy structures then one would expect, via a process of mimetic isomorphism, other firms within the same organizational field would implement similar structures. This does not appear to have happened. Firstly, there appears to be very little recognition, within the Australian software industry that attraction of capital is dependent on the implementation of adhocracy structures. Secondly, there are very few role models in the Australian software industry which have been successful in attracting capital as a result of their implementation of adhocracy structures.

6.1.1.2 Normative Pressures

Normative isomorphic pressures existing in the Australian software industry appear to stem principally from the involvement of the participants in trade associations at an organizational field level, centred on a particular customer vertical market, rather than from industry wide professionalization pressures. As normative pressures tend
to give rise to similarity and stability of structures within an organizational field it is probable, in the very small fields that characterize the Australian software industry, the normative pressures from the participants within each organizational field would favour maintenance of the predominant entrepreneurial organizational structures.

6.1.1.3 Coercive Pressures
DiMaggio and Powell (1983, p. 150) explain that coercive isomorphism results from pressures exerted on firms by other organizations upon which they are dependent. In the context of this study, the pressure to change structure from entrepreneurial to adhocracy will most probably be exerted by a potential investor upon whom the software firm is dependent.

6.1.2 Timing of coercive pressures
Coercive pressures that precipitate change of organizational structure from entrepreneurial to adhocracy, probably start as soon as a principal approaches an adviser potential investor with the intention of raising capital. My observations and field research indicate there are two key times when the principals of Australian software firms seeks capital.

6.1.2.1 Upon initial establishment of the organization
VC2 echoed the sentiments of most of the advisers and venture capital managers in expressing, very strongly, the principals of Australian software firms should commence the implementation of appropriate organizational structures as soon as they reach the ‘proof of concept’ stage.

For a very few principals of Australian software firms, their first contact with an adviser or a venture capital manager is when they are planning a proposed venture. It is at this time probable they will be advised to implement an adhocracy-like structure in their organization. From the six principals of Australian software firms I interviewed, only PSB2 had taken this approach. This was probably due to his past extensive experience as an adviser to entrepreneurs.
This facet of building an organization is where I observed a consistent difference between principals of Australian and American software firms. The primary focus of American principals is on building sustainable, growing businesses, whereas the primary focus of their Australian counterparts is in perfecting technology. American principals tend to seek advice at an early stage in the development of their firms while their Australian counterparts seek advice at a much later stage. My views on these differences were strongly endorsed by most of the advisers and venture capital managers interviewed.

6.1.2.2 When confronted with the need for financial assistance

For most Australian software principals, the first time they are first confronted with the need to consider a change in their organizational structure is when they need financial assistance.

ID2 suggested for most principals of Australian technology firms this confrontation usually occurs when:

1. the principals are confronted with a liquidity crisis or a perceived opportunity to realise a large financial gain or;
2. the principals wish to sell their organization to fund their retirement or;
3. the principals are forced to sell part or all of the organization to fund a divorce settlement.

Similar views were held by all of the venture capital managers and advisers whom I interviewed in this study.

When Australian software firm principals approach an adviser or a venture capital manager to seek advice on raising funds or to sell their firm, they don’t consider they will be seeking advice on organizational practice. It’s only when they are advised their current structure will limit the opportunity to realise their perceived value of the organization that they become conscious of the need to change
organizational structures. This is well illustrated by reference to the experiences of PSA1, PSA3 and PSB1.

PSA1 established his organization in the early 1990s, after losing money in property development. His main goal at that time was survival. Recently he retained an adviser to assist him to obtain external investment. Acting upon advice he employed a general manager and restructured his organization towards an adhocracy to increase the organization’s appeal to external investors.

PSA3 established his organization in the early 1990s. He had developed a strata title management software product for a friend, and by word of mouth found other customers for the product. In 2003, having developed a base of more than one hundred customers, he retained me to advise on how to best realise the value in his organization. My initial advice was, as long as his firm continued to be entirely dependent upon him, he would have difficulty in selling or in attracting an investor. Since then PSA3 has employed two general managers who have now left the organization.

PSB1 established his organization in 1982 after military service and a career in the construction industry. As he approached retirement age he wanted to introduce an investor to take over the management of the organization so he could focus on continuing product development. After attending a number of industry seminars PSB1 took the first steps in retaining an adviser to assist him in finding an investor.

For PSA1, PSA3 and PSB1 the realization the structure of their firm’s was unsuitable, only came when they took the first steps to sell or to attract external investors. All three indicated until they sought advice they considered a potential investor or purchaser would value their firm on the basis of its intellectual property and customer base. It is not surprising they harboured these thoughts. During the 1990s the ‘dot.com’ boom had suggested a new business order which was, in Silicon Valley, referred to as ‘Build to Flip’. The ethos then was to develop a product, gain some customers to establish the product’s viability and then sell before there was a
need to worry about sustainability and organizational issues (Collins 2000). Unfortunately for PSA1, PSA3, PSB1 and many other principals of Australian software firms, ‘Build to Flip’ never really worked in Australia and was discredited when the ‘tech boom’ bubble burst in Silicon Valley in 2000. So when PSA1, PSA3, PSB1 first met with their advisers, instead of being informed their perceptions of value could be realised, they were told they would have to make significant structural changes to their firms.

So, most principals of Australian software firms first become aware of the need to implement an adhocracy structure when, as opined by VC2, at ‘one minute to midnight’ they seek to raise capital or to sell their businesses.

6.2 The nature of change

Central to institutional theory is the premise that organizations are a reflection of institutional pressures that give rise to similarity and stability of organizational structures within an organizational field. Greenwood and Hinings (1996, p. 1023) suggest institutional pressures act increasingly as a powerful force against transformational change. If change is to occur, despite these powerful forces, Greenwood and Hinings posit convergent change will occur within the parameters of an existing archetypal template (organizational structure) or radical change will occur when an organization moves from one archetypal template to another. As this thesis deals with the change between two very distinct organizational structures (entrepreneurial and adhocracy) the focus here is on radical change.

Greenwood and Hinings (1996, p. 1024) hypothesise in tightly coupled organizational fields radical change will be unusual but when it does occur it will be revolutionary rather than evolutionary. They draw the distinction between evolutionary change, which occurs slowly, and revolutionary change which happens swiftly. Greenwood and Hinings also hypothesise that organizational fields that are relatively closed to, or are not exposed to, ideas from other organizational fields (i.e. they lack permeability) will be associated with low rates of radical change and if
change does occur it will be revolutionary in nature, whereas permeable organizational fields will be associated with evolutionary change.

6.2.1 Coupling in organizational fields

Tightly coupled systems are those in which the responsive systems do not act independently (Orton and Weick 1990, p. 205). In my meetings with PSA3, PSA1 and PSA2 I was initially surprised at the high level of interaction between them, even though each of their firms was competing for the same customers. Examples of this interaction include their attendance at trade exhibitions and how they determined the pricing policies of their firms. All three indicated the only trade shows they attended were those conducted by the various strata title industry associations within Australia. While this might be expected, the reaction of PSA3 and PSA2 when PSA1’s organization did not attend one of the trade exhibitions was very revealing. PSA3 rang me specifically to tell me PSA1’s organization had not attended the exhibition. PSA3 then wondered whether his organization should continue to attend exhibitions. PSA3 added that he thought he might give PSA2 a ring on the matter. In a later conversation PSA2 was quick to refer to the absence of PSA1’s organization at the exhibition and to add he and PSA3 were reconsidering their policies with respect to trade show attendance. In 2003 PSA1 implemented a new pricing strategy. At first PSA3 prophesied ruin for PSA1’s organization but since then PSA2’s and PSA3’s pricing strategies have also changed in a similar manner. The changes in pricing by PSA3 were not based on any type of cost analysis and did not reflect any pressure from customers for change.

On reflection I was able to see parallels between the actions of PSA1, PSA2 and PSA3 and the interactions I had had with the principals of firms that my own software firm competed against. There was further evidence of the tight coupling of software firms within organizational fields in my conversations with PSB1, PSB2 and PSB3.
6.2.2 Permeability in organizational fields

Permeability refers to the extent to which the principals of Australian software firms, in an organizational field, are influenced by participants in other organizational fields.

My observations of, and discussions with, principals in the Australian software industry indicate their main source of industry contacts are with members of their customers’ organizations, members of large multinational computer organizations (for example, Microsoft, Oracle and Dell), that provide platform technologies used by them in support of their customers, members of other professional organizations that provide services to their companies and members of firms they compete with.

6.2.2.1 Customer influences on organizational structure

In dealings with their customers’ organizations, the main interaction is usually at a service level. If the customers are satisfied with the level of service then little direction or guidance is forthcoming from that customer which might induce the principal of the software company to consider a change in organizational structure. Conversely unless the customer’s organization is comparable to the operation and size of the software firm it would be unusual for its principal to take much guidance from the customer on organizational structures.

6.2.2.2 Platform technology suppliers influences on organizational structure

The disparity in size and ownership structure between Australian software firms and the multinational computer organizations, would suggest very little transfer of ideas about organizational structure except in circumstances where the multinational dictated particular structures as a condition of some form of relationship with the Australian firm. During the operation of the ‘Partnership for Development’ program, (Dougan and Rankine 2003) when multinational organizations attempted to form partnerships with Australian software firms, the multinationals often specified the organizational structure they required of prospective partners. As very few partnerships were established under these programs it suggests Australian software principals were not unduly influenced in this manner. Today most Australian
software firms have some form of relationship with Microsoft, Oracle, Dell or other multinational computer organizations as customers or resellers. In some limited cases the multinationals establish partnership arrangements with Australians which might result in the principal of the Australian software firm having to consider organizational structure but, in the main, the influences are at a technical level.

6.2.2.3  Advisers’ influences on organizational structure

Interaction by principals of Australian software firms, with accountants and lawyers is usually restricted to dealing with annual compliance issues or small legal and financial matters. Whilst legal and accountancy advisers might offer some suggestions on the establishment of effective legal structures it is probably only when the principals seek finance or to sell their business that any advice will be offered on organizational structures. It is probable the principals will then be referred to a specialist who will advise on the need for an appropriate organizational structure.

6.2.2.4  Competitors’ influences on organizational structure

The greatest impact on company principals and the decisions they make on the appropriateness of structural changes comes from members of competing companies from within their own organizational field. If the organizational field consists mainly, or entirely, of small software firms then, it is unlikely these principals will see any reason to undertake radical changes in organizational structures.

However, if any software firms within an organizational field dominate that field then it might be expected the principals of the smaller firms will take guidance from those larger firms in the selection of appropriate organizational structures. My observations of organizational fields, within the Australian software industry, suggests this does not occur for two reasons. Firstly, in most cases, the larger firms are still controlled by a founder closely identified with the organization who is often widely reported as being ‘a leading Australian entrepreneur’. This conveys a message to the principals of the smaller software firms that success is due to the entrepreneur’s brilliance rather than to organizational effectiveness. Secondly, an
increase in size of an organization often occurs after a financing event which conveys
the message to the principals of the smaller software firms that changes in
organizational structure occur after a financing event rather than because of the need
for organizational effectiveness.

Two other issues suggest that organizational fields encompassing the Australian
software industry are tightly coupled and impermeable. Firstly, industry associations
dealing with Australian software firms, are consistent in their message that software
firms are ‘under-appreciated and under-valued’ and the main problem is scarcity of
capital. It is only advisers and financiers who suggest a problem might exist in the
organizational structures of the industry participants. Therefore there is little or no
transfer of ideas from industry associations to the principals of the Australian
software firms regarding the need to consider organizational change. If the
principal’s attempts to obtain finance are unsuccessful, rejection reinforces the
messages about scarcity of capital rather than the inappropriateness of their
organizational structures. Secondly, the principals of Australian software firms are
often very aware of the stories of firms similar to their own that raised large amounts
of capital during the ‘dot.com’ boom of the 1990s. Many of those investments were
highly speculative in firms that had great ideas but little or no structure. The
perception, with some justification, is that structure is irrelevant because investors
will take a good idea and fund the development of appropriate organizational
structures. While Australian investors, in the main, are now not prepared to invest on
this basis the (incorrect) perception persists within the Australian software industry
that a great idea is all an investor requires and organizational issues can be dealt with
after the money arrives.

So I consider with few role models outside of their small organizational fields to
guide the principals of Australian software firms and with external guidance that
does not suggest the need for change in organizational structures, organizational
fields encompassing Australian software firms are tightly coupled and impermeable.
6.3 Change in Australian software firms

From the above discussion it can be deduced, in the face of strong institutional pressures, principals of Australian software firms will be unlikely to initiate change unless there is a strong precipitating event requiring change in organizational structure. This invites the question:

What will precipitate the change from an entrepreneurial structure to an adhocracy structure. Can this change occur?

The issue espoused above has been addressed by Greenwood and Hinings (1996, p. 1032) where they question, observe and conclude in the following manner:

Given the institutionalized nature of organizational sectors, what are the processes by which individual organizations adopt legitimized templates and change them? DiMaggio and Powell (1991, p. 27) suspected that “something has been lost in the shift from the old to the new institutionalism” and “the goal must be a sounder multidimensional theory, rather than a one-sidedly cognitive one.” They go on to suggest that “power and interests have been slighted topics in institutional analysis” (1991, p. 30). This line of thought leads to the conclusion that the role of intraorganizational dynamics in accepting or rejecting institutionalized practises is critical.

To aid in the understanding of the processes by which organizations adopt legitimized templates and change them, Greenwood and Hinings propose a model which they summarize in diagrammatic form in Figure 3.
Greenwood and Hining’s work provides a basis upon which I have developed a model to explain change in Australian software firms. The model, as summarized in Figure 4, consists of five main sections: input context, precipitating dynamics, enabling dynamics, change and output context.

(Adapted from: Greenwood and Hinings 1996, p. 1034)
Figure 4 Model of change in Australian software firms

(Adapted from: Greenwood and Hinings 1996, p. 1034)
6.3.1 Input and Output contexts

While Greenwood and Hinings have specified market context and institutional context as initial inputs to their model, I have chosen to deal with institutional context as the only input to the model and market and institutional contexts as outputs of the model as described herein. This approach is consistent with Greenwood and Hining’s commentary that in their representation of change, the outcome of their model would become the input to a subsequent model (Greenwood and Hinings, 1996, p. 1033).

6.3.1.1 Institutional context

It emerged from my research that the Australian software industry consists of many organizational fields, each of which encompasses a small number of software firms centred on a particular vertical market. These fields are tightly coupled and impermeable and so it is expected most firms will adopt an entrepreneurial structure as their preferred initial organizational structure.

6.3.1.2 Market context

Australian software firms operate in a very dynamic market and have undergone dramatic change in the short history of the industry. It is to be expected these market changes will have a significant impact on the structures being adopted by Australian software firms. If, for example, a software firm operating within an organizational field is seen to be establishing a dominant position due to a changed organizational structure, and as a result, smaller software firms operating within the same field begin to adopt similar organizational structures, then market context will be of considerable interest as an input to the model.

The views of venture capital managers and industry advisers suggest these changes are not occurring. Principals of software firms, faced with the success of a bigger more organised competitor, are likely, at this time, to rationalise their competitor’s success in terms of financial backing or the ability of the entrepreneurial founder rather than improved organizational structures. Therefore, I have not included market context as an input to my model. I have, however, included market context as an
output, as I expect if one or more Australian software firms successfully implement adhocracy structures and, as a result, are seen to achieve dominant positions within their organizational fields then market context will become a significant model input.

6.3.2 Precipitating Dynamics

Greenwood and Hinings treat interest dissatisfaction and value commitments separately, for good reason. In the mature professions they have studied, (law and accountancy), there are many instances of organizations where the original founders are no longer involved but still have financial interests in the organization. The current principals are usually senior experienced practitioners and younger professionals within the organization are mindful of future opportunities within the organization. In many Australian software firms stratification of this kind has yet to occur. The current principals are the founders of the firm, they are still intimately involved and, because of its small size the younger employees are less likely to be performing tasks formerly undertaken by the principals. Therefore, it is likely change will only occur because of the principal’s interest dissatisfaction, which results in a change in their value commitments. In my model I have therefore treated interest dissatisfaction and value commitments as being inextricably linked.

6.3.2.1 Interest dissatisfaction

There are two instances of interest dissatisfaction that need to be dealt with when considering change in Australian software firms. Interest dissatisfaction arising when the principals seek to raise capital or sell their firm and interest dissatisfaction arising when different groups in an organization perceive they are being disadvantaged.

In the first instance, my research indicates, interest dissatisfaction results from a jolt received when the principals become aware of the need to change organizational structure when they seek to raise capital or sell their business. The principal’s self interests can only be served if they change the organizational structure of their firm. Conversely if the principals do not commit to change the structure of their firm they
will not be able to serve their self interests. Therefore interest dissatisfaction, in the form of a desire to benefit from a sale or capital injection, is inextricably linked to the need for a change in value commitment to effect a change in the firm’s structure.

In the second instance remuneration is a significant cause of dissatisfaction in software firms, but not in a way I consider precipitates change of organizational structures. In a software firm where sales people are highly remunerated and where software developers are so vital to the continued operation of the organization (but have no line or sales responsibilities) developing consistent and valuable reward structures is a continuing problem for the principals. Another area where interest dissatisfaction is a significant issue is in the area of equity participation. In software firms, when the company is financially stressed, employees are often remunerated with share options in lieu of salary. As the organization achieves success fewer options, at higher exercise prices, are offered to new employees. High quality new employees soon discover they have been hired to make up for the deficiencies of long term employees, who have a much larger stake in the organization. These issues are a continuing dilemma for the principals of software firms. Although these types of interest dissatisfaction are significant issues there appears to be little evidence in the literature, or in my experiences, that dissatisfaction will lead to change in organizational structures. The more likely outcome of dissatisfaction is either continuing discontent, without action (very typical of software developers), resignation in favour of a new organization (very typical of sales staff), or group resignation to start a new organization where the participants will obtain large amounts of founders’ equity (very typical in Silicon Valley in boom times but rare in Australia). This suggests these forms of interest dissatisfaction are not significant in the context of change, but may need to be revisited at a later time as the software industry matures.

6.3.2.2 Value commitment

Having decided to change organizational structures, to enable raising of capital or sale of their business, principals need to ensure those members of the organization
with the power to influence a decision to change organizational structure are committed to the change. If there is little or no commitment to change then attitudes need to alter to precipitate the actions required to effect any proposed changes. The forces affecting change in commitment are critically important in the change process. Greenwood and Hinings identify four generic patterns of value commitment within an organization:

1. Status quo commitments in which all groups are committed to the prevailing institutionalised template-in-use.
2. Indifferent commitment, in which groups are neither committed nor opposed to the template-in-use. This situation is frequently one of unwitting acquiescence.
3. Competitive commitment, in which some groups support the template-in-use, whereas others prefer an articulated alternative.
4. Reformative commitment, in which all groups are opposed to the template-in-use and prefer an articulated alternative.

I expect in Australian software firms, seeking sustainable growth, indifferent commitment and reformative commitment will prevail.

Status Quo Commitment
Until the principals of a software firm receive a financing jolt there is unlikely to be recognition in the firm of the need for an alternative organizational structure. When a financing jolt is received I expect two forms of value commitment to emerge. The financing jolt will have a polarising effect. The commitment of the principals, acting on self interest, will change to reformative and the software developers will be indifferent to changes in structure. I expect little commitment from either group for the continuance of the existing structure in the face of coercive pressures for change from financiers.

Competitive Commitment
As the receipt of capital or the sale of the business will be the main issue I expect changes in organizational structure will receive little debate amongst the principals.
The focus on the financial rewards will be paramount and therefore any resistance to change in structure will be countered with a ‘do you want the money argument’. In the face of this argument dissenting principals will either acquiesce or leave. Any debate will centre on whether or not to accept new shareholders rather than on the less immediate issues of structure.

Reformative Commitment
As will be seen in the discussion on power dependencies, the principals and the software developers are the two key power groups whose influence I consider to be crucial in terms of enabling the process of change in organizational structure, but I see only the principals of the software firms as being crucial in terms of precipitating a change in organizational structure.

When a financing event does become a possibility the dynamics of the power groups within the organization are likely to change rapidly. I expect the principals will consider any financing opportunity primarily on the basis of financial self interest. Therefore, if the principals want to take advantage of the financing event, requiring a change in organizational structure, I expect their value commitment will change rapidly, from indifference to reformative commitment to change structure in line with the financier’s requirement.

Indifferent Commitment
Software developers will often take a very strong stance on ownership issues but will largely be indifferent to the structure of the organization.

For many, the lure of the information technology industry is the opportunity to achieve financial prosperity in a very short time. For software developers, especially those who belong to the ‘super-creative core of the creative class’ whose values of individuality, meritocracy and diversity are of considerable importance, the attainment of individual wealth is often seen as a by-product of their work rather than a key goal. As Hoch et al observed in commenting on the importance of retaining software developers (2000, p. 78):
In general, organization culture is one of the most important factors for software workers when choosing their “workplace.”

It is unlikely that, under the control of the founder, software developers will be overly concerned at a change in organizational structure, but it is likely they will be very concerned about a change in shareholding that might affect the control of the organization, even if it does not involve a change in organizational structure.

6.3.2.3 Power dependencies

In Australian software firms power, in its different guises, rests with three groups, the shareholders, the principals and the software developers.

The shareholders have the legal power, and ultimately, will need to approve any financing event precipitating a change in structure. They will be able to exercise their power by stopping a financing event, or by dismissing principals who are desirous of change.

The support of the principals of the firm, (who will usually be shareholders) is essential, for they have to implement the changes in structure. They will need to change their commitment to reformative commitment, if changes in structure are to occur. If a financing event is dependent upon a change in structure then the principals will be able to prevent the event from taking place if they do not agree to implement the changes in structure.

The developers of the software wield a considerable amount of power, often in a very overt manner. While the software developers may also be shareholders (and in some cases the controlling shareholders) it is relevant to consider them separately from their roles as shareholders because of the manner in which they can exercise power. For software developers, the introduction of new shareholders is often seen as heralding a change in control from the founder, who is interested in them as individuals, to control by a faceless board of directors whose only interest is in
corporate profits. Presented with this scenario, or the perception of this scenario, software developers may well decide to leave the organization. As the value of a software firm is dominated by the value of its intangible intellectual property, the departure of key personnel might well stop the financing event.

Greenwood and Hinings point out there is a reciprocal relationship between power dependencies and value commitments. In Australian software firms this is a very strong relationship. If a financing event presents itself to an Australian software firm then I expect, to take advantage of the opportunity, the three power groups, shareholders, principals and software developers, will need to agree to accept the finance. But I also expect only the principals will need to change their value commitment to reformative commitment for organizational change to occur. I expect the shareholders and the software developers will either change their value commitment to reformative or, more likely, be indifferent to changes in structure.

If the shareholders and the software developers do not exercise their power to block a change in structure and if the principals change their value commitment to that of reformative commitment to change in structure, then the second enabling dynamic of capacity for action assumes importance, if organizational change is to occur.

6.3.2.4 Capacity for action


Radical change cannot occur without the organization’s having sufficient understanding of the new conceptual destination, its having the skills and competencies required to function in that new destination, and its having the ability to manage how to get to that destination.

For Australian software firms, the enabling dynamic of capacity for action might be the major impediment that stops the principals changing the organizational structure, from entrepreneurial to adhocracy.
Two elements of capacity for action are particularly relevant for Australian software firms. Firstly, as discussed above, if the software developers are not agreeable to the proposed changes in organizational structure they may, effectively, withdraw their labour, usually by resignation, in which case management will not be able to implement a key component of an adhocracy structure.

Secondly, many of the reports referred to above (see Espie 1983, Karpin 1995, Marceau et al. 1997) point to the inadequacies of Australian management, particularly in the area of technology innovation. While I think Australian managers and technologists are technically capable, my international observations suggest Australian managers focus their efforts on the technology whereas a focus on sustainability and growth might achieve better results. Many of the investigations into change of organizational structure have been conducted as studies of organizations in mature, highly structured, organizational fields (see Brock et al. 1999). The principals in these organizations are often senior managers with many years of experience under the tutelage of similarly experienced colleagues, before attaining their current positions. Principals in the legal and accountancy professions also, in many cases, have had the opportunity to assist their clients in undertaking organizational change. For many of the principals of Australian software firms their only experience has been in operating the firms they formed at a relatively young age. Faced with the opportunity to benefit from a financing event, Australian principals may be able to agree to revolutionary radical organizational change, but it is questionable whether they will have the skills to effect change.

This then led me to ask:

Once the decision to implement an adhocracy structure via a process of radical revolutionary organizational change has been made, can that change be effected, and what happens if the change is not effected?
6.4 Radical revolutionary change

Miller and Friesen (1984, p. 202) argue a relatively small number of very common but quite different configurations encompass a large proportion of the population of business firms. In support of this argument they suggest if organizations altered states in a piecemeal and disjointed way they would be continually realigning their profiles and moving from one random state to another. Empirical studies suggest this is not the case and firms tend to settle on a particular configuration and remain with that configuration for some time (see Miller et al. 1984, p. 211), particularly if firms are operating effectively. This view receives support from Khandwalla who, when looking at firm effectiveness, found (1973, p. 493):

...the gestalt or configuration of an organization is likely to be a more potent determinant of its effectiveness than any of the individual components of this configuration, and particularly so if the configuration is the “right” one; that is, if it fits the firm’s situation.

This is an important issue for Australian software firms for, as discussed above, it appears the industry believes it is operating very effectively. This would suggest, to industry participants, the current configuration is the ‘right’ one. Problems in funding its growth are not of its own making but are caused by an Australian investment community that fails to understand the value of the individual organizations within the industry.

Miller (1996, p. 509), in reviewing the analysis of organizations from a configurational approach, commented studies suggest a high level of configuration may be indicated by: attention and focus on a primary goal; a sharing of clear priorities and consensus about decision making; strategy, structure, process and culture shaped by a central focus; power and management, human resource practices and routines all focussed on a central preoccupation. The literature on the Australian software industry does not indicate an industry confused about direction, strategy or focus. Indeed, its main concern seems to be that government and financiers don’t realise how good a job it is doing or as Dennis et al observed (2006, p. 10) it is
'under-appreciated and under-valued'. If this is the case then Miller’s conditions for a high level of configuration might well be satisfied by many of the firms within the Australian software industry.

The conditions affecting change between configurations assumes central importance in this study if, as indicated, most Australian software firms favour an entrepreneurial configuration rather than an adhocracy configuration, and the principals of these firms are of the belief they are operating effectively..

6.4.1 Incremental Change

Hedberg, Nystrom and Starbuck (1976, p. 45) suggest, in order to meet social and technological changes and reap benefits from those changes, the long term viability of an organization is enhanced if it is a self designing organization in which the processes of change are continually being re-evaluated and dynamically balanced. They caution against erecting rigid organizational palaces in which skill specialization, integration, clear objectives and unambiguous authority structures promote the development of harmonious, routine and unchanging organizational structures (1976, p. 44):

Designers who erect an organizational palace had better anticipate problems caused by shifting top soils.

Instead of the development of organizational palaces Hedberg, Nystrom and Starbuck promote the use of ‘camping in a tent’ as an analogy to be conceptualised by organizational designers (1976, p. 45):

Residents of changing environments need a tent. An organizational tent places greater emphasis on flexibility, creativity, immediacy, and initiative than on authority, clarity, decisiveness, or responsiveness; and an organizational tent neither asks for harmony between the activities of different organizational components, nor asks that today’s behaviour resemble yesterday’s or tomorrow’s.
The central tenet of Hedberg, Nystrom and Starbuck’s argument is that an organization should avoid the traumatic effects of radical change by adopting a policy of incremental change in response to changing environments, by dealing with one problem and one goal at a time, in concert with short-term reactions, coupled with short-run feedback or as Hedberg, Nystrom and Starbuck posit (1976, p. 60):

> What an organization should be avoiding is drastic revolutions... Needs for quick action drive out problem-solving modes of behaviour and interfere with the development of priorities founded on substantive analyses.

This approach is well favoured by a myriad of management schools, consultants and senior managers but it fails to address the issue, identified above, that the principals of Australian software firms do not appear to have focussed on the need to change their organizational structures from entrepreneurial to adhocracy. A precursor to adopting a strategy of incremental change presumes those charged with preparing their firms to be attractive to potential investors, recognize the need to take early action. The evidence suggests the principals of Australian software firms have not recognised this need.

**6.4.2 Radical Change**

This then leads one to ask if an approach based on radical revolutionary change in structure is possible. Can the principals of an Australian software firm, when faced with the need or the desire to attract investment capital, rapidly implement an adhocracy structure, satisfying the requirements of the Australian investment community, after years of profitable and comfortable operation of an entrepreneurial organizational structure?

Miller and Friesen argue not only is a dramatic (i.e. revolutionary) organizational change possible but they advocate it as the preferred approach to organizational change (1984, p. 223):

> In sharp contrast to the piecemeal-incremental view, we advocate that changes in structure must be both concerted and dramatic.
Miller and Friesen argue for dramatic organizational change as they contend, for an organization to be effective, it is desirable for the many structural variables, that comprise an effective organization, to be in a stable state. If organizational change is carried out piecemeal and incrementally then many of the structural variables will be in a constant state of change and therefore instability will occur. They acknowledge periods of concerted change may be very costly and disruptive and advise organizations should attempt to delay change until the rewards of disruptive change outweigh the cost of the change. Further, they hypothesise, successful organizations will minimise the number of change periods and move through those change periods as quickly as possible. They add (1984, p. 225):

Thus, effective firms will often tend to be in one of two states: a common state in which they are undergoing very little or no change, and a rarer state in which they will be experiencing far more dramatic changes.

If Australian software firms adopt entrepreneurial configurations, and are comfortable with these environments until they are confronted with the need to seek investment funds, then Miller and Friesen’s hypotheses may help to explain why the principals of Australian software firms don’t take steps to implement adhocracy configurations prior to commencing the quest for investment funds.

Greiner (1972) adds support to this view of quantum change in arguing all organizations go through five distinguishable phases of development, each phase comprising a period of relatively calm growth that ends with a period of management crisis. In developing his thesis and explaining the five phases of development Greiner comments (1972, p. 41):

Organizations in faster growing industries tend to experience all five phases more rapidly, while those in slower growing industries encounter only two or three phases over many years.
As Australian software firms clearly operate in a very rapidly growing industry sector then one might expect to be able to consider them on a framework that analyses firms in terms of their movement through each of Greiner’s five phases. However, as might be garnered from the following discussion and from previous comments, it may well be, for most Australian software firms, that progression is halted at the first period of management crisis.

Greiner identifies the first phase of development as a ‘Growth through Creativity’ phase when the emphasis is on creating both a product and a market. He characterises this period of creative evolution as a time when: the organization’s founders are usually technically or entrepreneurially oriented; they disdain management activities and their physical and mental energies are absorbed entirely in making and selling a new product. At this stage communication between employees is frequent and informal; long hours of work are rewarded by modest salaries and the promise of ownership benefits and control of activities comes from immediate marketplace feedback. The leadership crisis occurs because, as Greiner (1972, p. 42) explains:

All of the foregoing individualistic and creative activities are essential for the organization to get off the ground. But therein lies the problem. As the organization grows...increased numbers of employees cannot be managed exclusively through informal communication; new employees are not motivated by an intense dedication to the product or organization. Additional capital must be secured, and new accounting procedures are needed for financial control.

At this point a crisis of leadership occurs, which is the onset of the first revolution. Who is to lead the organization out of the confusion and solve the managerial problems confronting it? Quite obviously, a strong manager is needed who has the necessary knowledge and skill to introduce new business techniques. But this is easier said than done. The founders often hate to step aside even though they are probably temperamentally unsuited to be managers. So here is the first critical development choice – to locate
and install a strong business manager who is acceptable to the founders and who can pull the organization together.

And so, while Greiner identifies four subsequent phases of development (direction, delegation, coordination and collaboration) interspersed by periods of management crisis, within the context of this study, it is this first period of management crisis that seems to be at the heart of the problem facing many Australian software firms.

6.4.3 Is radical change achievable?

This then invites the question:

If Australian software firms need to change structure from entrepreneurial to adhocracy and they only attempt to do this when faced with the need to raise capital, is radical revolutionary change possible?

Miller and Friesen caution (1984, p. 209):

When change finally comes, it may have to be of a revolutionary nature. The substantial lag in adaptation has created a serious mismatch with the environment or strategy, one that might require dramatic corrective actions.

In a similar vein Greiner talks of crisis and revolution when discussing organizational change. The inference from these authors is while change may be possible it, probably, will be very difficult.

There is a lack of empirical data available to help answer the above question, particularly in the context of the Australian software industry. Much of the work existing in this area has focussed on California’s Silicon Valley because of the maturity of the information technology investment market in that region. The work done by SPEC - the Stanford Project on Emerging Organizations. (SPEC 2007), perhaps the most comprehensive study conducted in this area, gives some guidance.
SPEC tracked the development of nearly 200 Silicon Valley High technology start up organizations over an eight year period up to 2002. In carrying out the research and in analysing the results of the research, Baron and Hannan (2002) sought to understand the organizational models, or blueprints entrepreneurs brought to bear, explicitly or implicitly, in launching their new ventures. They then sought to understand the organizational model of the businesses as they developed.

As cautioned previously, in considering the results of their work it is important to understand the average organization considered in the SPEC study was five years old and employed roughly seventy five people. While these organizations are considerably larger than most Australian software firms I consider it is relevant to refer to this work, in general terms, as it helps in the understanding of the process of change in organizational structures.

A key message emerging from the work of Baron and Hannan is those Silicon Valley high technology organizations that failed initially, to adopt a coherent organizational blueprint, (and therefore had to modify that blueprint significantly at a later stage) experienced significant adverse performance effects. They reported (2002, p. 19):

> Changes in organizational blueprints are in general very destabilising to young technology start-ups, adversely effecting employee turnover, bottom line financial performance, and even mere survival.

This observation, that the process of radical change will not be easy, is consistent with my experiences and observations in the Australian software industry and gives support to the inferences of Miller, Friesen and Greiner.

So, in summary, in developing a model of the manner in which organizational change might occur in Australian software firms I consider that:

1. Organizational change in Australian software firms will be radical and revolutionary as it will usually be initiated by an unanticipated financing jolt.
2. The precipitating dynamic initiating radical revolutionary change will be a change in value commitment by the principals of the organization, driven by self interest in the face of a requirement from a financier for a change in organizational structure. Their value commitment to organizational change, will alter from indifferent commitment to reformative commitment. The software developers in the organization will probably continue to be indifferent to any proposed organizational changes.

3. The power of the software developers will not be reflected in a change in their value commitment (i.e. they will remain indifferent to the organizational structure preferred by the principals) but will be reflected in their ability to prevent the principals of the software firm from implementing a change in ownership.

4. The secondary enabling dynamic is that the proposed change in organizational structure requires management that understands the proposed new structure and has the skills and competencies needed to operate in the changed environment plus, has the ability to manage the change in organizational structure. Studies have suggested, because of deficiencies in Australian management skills, this will be a significant impediment to change.

5. Finally, the literature suggests even if all of the above elements of the model indicate radical organizational change should be attempted, the revolutionary nature of the pace of change needing to take place may result in failure to effect change.

This final point then invites the question of what happens when the principals of a software firm attempt to effect revolutionary radical organizational change. Again, this is an important issue in the context of Australian software firms because, even in the face of the above evidence, there will be firms that will try to effect the change from an entrepreneurial structure to an adhocracy structure. While professional investors may well shy away from opportunities, history has shown many less informed private investors will continue to make investment decisions on the basis of a compelling technology story.
6.5 Organizational tracks

Greenwood and Hinings addressed the issue of what might happen during the attempted change from one archetype (organizational structure) to another using the concept of organizational tracks (1988, p. 303):

The language of tracks has to provide for the study of organizations over time, allowing for the possibilities, not only of radical transformations, but of abortive shifts between archetypes and the absence of change…Tracks, we would suggest, are configurations of interpretive de-coupling and re-coupling.

The applicability of this theory was established in a systematic empirical study of local government in Wales and England during very turbulent times for these organizations in the 1970s and early 1980s (Greenwood and Hinings 1993, Hinings and Greenwood 1988b)

Greenwood and Hinings identify three states in which organizations will find themselves as they attempt to change organizational structures:

1. archetype coherence - in which an organization has achieved a high level of stability with respect to its interpretive scheme;
2. embryonic archetype coherence - in which organizations have achieved a level of stability but are making changes as they head from or towards a stable environment and
3. schizoid incoherence: in which the actors within an organizations are attempting to interpret multiple interpretive schemes.

I have suggested for Australian software firms, the preferred model is an entrepreneurial structure, and for the principals of most Australian software firms, there is little or no attempt to move from that structure until a financing event presents itself. Therefore I would expect software firms to remain in a state of archetypal coherence until confronted with the need to change to an adhocracy structure. I expect when a financing event occurs the financier’s requirement will be
for revolutionary radical change and therefore the expectation (or more realistically, hope) will be that archetype coherence, in the new adhocracy structure, will be quickly achieved. The hoped for process of change from a long period of archetypal coherence, in an entrepreneurial structure, to a long period of archetypal coherence, in an adhocracy structure, might be, as visualised conceptually in Figure 5:

1. A very short period of embryonic archetypal coherence during which the proposed new structure would be explained to the employees and it would be expected, after seeing the obvious benefits of change, the proposed structure would receive their full support.

2. A similarly short period of schizoid archetypal coherence during which new management structures, and probably new managers, are introduced to the organization. During this period there would be some expectation concerns would be voiced by longer term employees, but these concerns could be addressed via appropriate education and counselling services.

3. A possibly longer period of embryonic archetypal coherence as new managers are accepted into the organization and longer term employees gain confidence in the benefits of the new structure.

Figure 5 Movement between archetypes (organizational structures)

(Adapted from: Greenwood and Hinings 1988, p. 304)

As suggested above, attempted changes in organizational structure, by the principals of Australian software firms, rarely, if ever, involve a smooth transition and the reality is that many combinations and permutations, of the five positions illustrated in Figure 5, occur before archetypal coherence is achieved in the adhocracy form.
Having committed to a change in organizational structure it would be expected that the principals of Australian software firms would enthusiastically embrace the process with a view to seem rapid adoption of the new structure. The views of the investment community suggest otherwise. The venture capital managers and funds managers indicated that whereas in the past they had assumed that they could provide added value to the investment process by introducing missing elements of structure they are now reluctant to deal with organizations that do not have the appropriate structures in place (refer, in particular to the comments of ID6 and ID7 in section 3.2). If a change in interest dissatisfaction that leads to a decision to change structure is precipitated by the need to raise capital in the face of possible business failure then it might be reasonable to assume a reluctance on behalf of the principals. However if change is precipitated by the opportunity to achieve financial success then it would be reasonable to assume a strong level of commitment to rapid and effective change by the principals. The experiences of the Australian investment community suggests otherwise. Even when investment is welcomed the principals often resist organizational change. Reasons that resistance to change occur in both circumstances include:

1. First and foremost is the issue of capacity for action as described in some detail in section 6.3.2.4. A continuing theme in the literature is that Australian management skills in the small and medium enterprise sector are not of world class. This suggests that it might be that the principals just do not have the ability to enact change.

2. As most Australian software firms have been formed in recent times, their principals will tend to draw on experiences based on similar political, cultural and economic contexts. When faced with the realities of changing their organizations and little in the way of role models the principals may tend to favour staying with the models that their peers have continued to use. This phenomenon known as the organizational imprinting hypothesis was first noted by the eminent organizational theorist Arthur Stinchombe (1965)

3. Entrepreneurs can often react unfavourably to the disciplines of formal organization even when it is in their best financial interests to do otherwise.
The Australian investment community is comfortable with entrepreneurs in the mining industry where essential strengths are the ability to build teams and to stay with the project (see ID6’s comments in section 3.2). During the 1990s Australian investors in technology companies similarly tended to insist on the entrepreneur staying with the company instead of recruiting a manager with proven organizational building skills. The American investment community tends to take a different tack in that they recognize that different skills are needed at different stages of an organization’s life and don’t hesitate to change. Whereas preeminent American venture capital manager Don Valentine is famous for saying (VCC 2008) ‘I am 100% behind my CEOs right up until I fire them’ Australian investors are often reluctant to change leaders even when the leader resists implementing planned changes.

That permutations and combinations of movement between the five positions are to be expected has been recognised by Greenwood and Hinings in their model of organizational tracks (1988, p. 304):

The study of organizational tracks becomes the mapping of movements between these five positions. Organizations that move from either of the coherent positions experience the process of interpretive de-coupling and, as they move towards the alternative position of coherence, experience the process of interpretive re-coupling.

While there are many possible combinations and permutations of the movement between the five positions of coherence that might be envisaged, Greenwood and Hinings refer to four prototypical tracks which are herein described in the context of the Australian software industry:

**Inertia**

Over time it is expected organizations will gravitate towards one interpretive scheme and remain there. For Australian software firms it is expected the predominant interpretive scheme adopted will be an entrepreneurial structure and for most firms, attempts to change from an interpretive scheme will only occur in the face of a
financing shock. However, it is expected, from time to time adjustments within the context of the entrepreneurial structure will be made, but the basic form will be retained. An example of this change would be when a sales manager is appointed who works very closely with the principal with little real autonomy. This type of track (as illustrated in Figure 6) could occur when the financing event carried with it an expectation of change to an adhocracy form but little external or internal effort was applied to effect a change, allowing the maintenance of the status quo.

Figure 6 Inertia Track

(Adapted from: Greenwood and Hinings 1988, p 305)

Aborted Excursions

In this mode organizations attempt to move from one archetype to another and having encountered a barrier, retreat towards an entrepreneurial structure. This type of track (as illustrated in Figure 7) could occur when new management positions are created and managers are hired or appointed, consistent with the envisaged adhocracy structure, but the changes are mainly symbolic. This situation often arises when the entrepreneurial founder continues to exert a high level of influence within a software firm. In this situation new managers who join, with the expectation that they will operate autonomously, become frustrated and resign so eventually the only remaining managers are those who are subservient to the founder.
Reorientations

In this mode organizations ultimately achieve the movement from coherence, in an entrepreneurial structure, to a new state of coherence in an adhocracy structure. However, these transitions are rarely smooth and often take far longer to achieve than was envisaged by the principals or the financiers. Transitions may also (as illustrated in Figure 8) involve different combinations of the basic building blocks. When the transition does occur in a linear fashion, as envisaged above, it is probable the progression will be much slower and the time spent in the intermediate positions will be proportionally longer. In many software firms the transition involves one or more oscillations between an entrepreneurial structure and an adhocracy structure, before coherence is finally achieved in the adhocracy structure. This can happen when, in the first instance, the entrepreneurial founder maintains control and is the cause of an aborted excursion. In this case the financier might step in and appoint a new chief executive who will then implement the adhocracy structure. It is not unusual to see a number of these cycles before final coherence is achieved. In some software firms the transition to an adhocracy structure is delayed as the founder gives lip service to the financier’s requirement to implement an adhocracy structure by making symbolic changes. The change to an adhocracy structure only occurs after the financier loses patience and takes action. The action usually involves appointment of a new chief executive or absorption into an organization that has adopted an adhocracy structure. Where coherence in an adhocracy structure is eventually achieved it is often via a combination of oscillating and delayed transformations.
Unresolved Excursions

In this mode organizations attempt to move from one coherent archetype to another but never complete the task, nor do they return to the original archetype as illustrated in Figure 9. This state of ‘limbo’ is often seen in software firms following a financing event. Some of the organizational changes required in an adhocracy structure are implemented but others are left unfinished. A very common manifestation of this is that the first focus, after a financing event, is to revamp the sales process. Because it is, first and foremost, a software firm it is therefore important to maintain the support and enthusiasm of the software developers, so revamping the software development process is often ignored, or left to last. As sales increase, demands upon the software developers, particularly in the customer support area, increase. But without a proper management structure, performance
deteriorates. At this stage the software developer’s interpretive scheme is still more aligned to an entrepreneurial structure, while the principals and the sales team are more aligned to an adhocracy structure. As the increased level of sales has changed the original structure of the organization, it is not possible to revert to the original entrepreneurial structure, and by this time, almost invariably, resentment has built up between the sales team and the software team and as a result the software team resists further change.

**Figure 9 Unresolved excursions**

(Adapted from: Greenwood and Hinings 1996, p. 305)

### 6.6 Combining the models

My model for understanding organizational change in Australian software firms provides an explanation of the intra-organizational dynamics that lead to the acceptance of the need for change of a software firm’s organizational structure, from entrepreneurial to adhocracy. I argue the initial impetus for considering change for most Australian software firms will occur when the firms principals are presented with the opportunity to take advantage of some form of financing event and therefore change will need to be radical and revolutionary in nature. The literature on Australian management capabilities suggests the principals of many Australian software firms may lack the capacity for action, in terms of understanding, competency and experience, to be able to effect change. The literature and international empirical studies suggest radical revolutionary change may be problematical even for experienced management.

The work of Greenwood and Hinings in developing the concept of organizational tracks alerts one’s attention to further complexities in implementing radical
revolutionary change. These various observations lead one to suppose that while the Australian software industry points to the lack of finance as the major impediment preventing them from developing sustainable growing businesses, two issues assume far more importance. Firstly, if an adhocracy structure is appropriate in order to attract finance to support growth and sustainability, then, attempting to implement a structure via a process of radical revolutionary change is very problematical. Secondly, if the decision to attempt radical revolutionary change is made, and as a consequence the appropriate level of financing is made available, then the progression towards the possible final implementation of a coherent adhocracy structure may not follow a simple linear track, but may involve protracted periods of interpretive de-coupling and re-coupling.

These observations suggest the model proposed for understanding organizational change in Australian software firms should be expanded to include the concept of organizational tracks as a crucial element of radical revolutionary change as illustrated in Figure 10
Figure 10 Organizational change in Australian software firms

(Adapted from: Greenwood and Hinings 1988, p. 305, Greenwood and Hinings 1996, p. 1034)
6.7 The answer to the research question

In developing the model of radical organizational change in Australian software firms and the supporting theory I have answered the research question of this thesis.

There is a view, very strongly espoused by Australian software industry advisers, observers and participants, to be able to build a sustainable growing business the principals of Australian software firms need to be able to obtain appropriate levels of capital.

The implementation of an adhocracy structure, by the principals of an Australian software firm, is considered by the Australian investment community, to be very important, if an organization is to be considered as being ‘investment ready’. By being able to present to investors an organization that is perceived to be ‘investment ready’, the principals of an Australian software firm will be more able to obtain capital, and as a result, more likely to build a sustainable growing business.

The model and the supporting theory that emerged from this study explains how the principals of Australian software firms can change the structure of their firms from entrepreneurial to adhocracy which is a requirement if their firms are to be considered as being investment ready and therefore able to attract the investment funds required for the attainment of sustainable growth.

6.8 Chapter summary

In previous chapters I have described the process by which I obtained data via a program of field research, reflection on and review of my experiences and analysis of government commissioned reports. I have described the development of my theoretical sensitivity in the field of organization studies from which I determined that an approach based on institutional theory would assist me in understanding why the principals of Australian software firms have difficulty in building sustainable growing businesses. From an analysis of the data I determined the inability of the principals of Australian software firms to raise capital is a major issue impeding the efforts of these principals to build sustainable growing businesses. I also determined
the main reason these principals have difficulty raising capital, is they have not implemented the organizational structures preferred by the Australian investment community. I have then described the view that has emerged from the data that the preferred organizational structure of the Australian investment community is adhocracy and the preferred structure adopted by the principals of Australian software firms is entrepreneurial.

In this chapter I have asked whether the principals of Australian software firms can change the structure of their firms from entrepreneurial to adhocracy as preferred by the Australian investment community.

To answer the above question, by extension of the work of Greenwood and Hinings (1988, 1996) on organizational change using a grounded theory approach, I have developed a body of theory that explains why the principals of Australian software firms have difficulty in implementing an adhocracy structure in their firms and, by implication, why the Australian investment community is reluctant to provide capital to the principals of Australian software firms.

In extending the work of Greenwood and Hinings (1996) in this chapter, I first established for most principals of Australian software firms the first time they considered a possible change in organizational structure was when they attempt to raise capital. I then showed organizational fields encompassing Australian software firms are likely to be tightly coupled and impermeable. This suggests if change, in organizational structure is attempted and is to occur, it is probable that change, will need to be radical and revolutionary in nature. I then developed a model based upon the work of Greenwood and Hinings (1996) describing the forces that would lead to radical revolutionary change in organizational structures in Australian software firms.

As this left unanswered the question of what happens if change in organizational structure is attempted, I then extended my model to include the work of Greenwood and Hinings (1988) on organizational tracks.
The model as developed, provides a platform upon which empirical studies can be conducted in order to further develop an understanding of the issues that affect the ability of the principals Australian software firms to raise the capital they require in order to build sustainable growing businesses.
7. SUMMARY, FUTURE RESEARCH AND CONCLUSION

In 2003, after a career in the Australian software industry spanning more than twenty five years, I decided to apply to enter a doctoral program. This was a course of action I had first contemplated after completing my undergraduate degrees in 1975. At that time my reasoning was I enjoyed the discipline of research and writing and therefore, with the assistance of the academic staff, I would probably be able to find something of value and interest upon which I could base my research. In 2003 my thinking was very different. I expected I would still enjoy the discipline of writing and research, but by then I had a very clear vision of the issue I wanted to explore.

For many years I had listened to, and participated in, the debate on why the principals of Australian software firms experience difficulty in building sustainable growing businesses. I had, during my career in the software industry, travelled extensively, served on the board of directors of software organizations in Australia, America and Britain and attended many domestic and international industry conferences. From these experiences I formed a view the reason the principals of Australian software firms experienced difficulty in building sustainable growing businesses was probably because they did not establish organizational structures that would support sustainable growth.

I commenced my research program before I had been accepted into a doctoral program and, although I did not know it then, I had already embarked on an approach I would later recognize to be a grounded theory study. I reviewed the web sites of the schools of management of the main universities in Sydney, met with members of the academic staff from some of the schools, attended colloquia and started to read the organizational studies literature. My discussions with Professor John Gray and his colleagues on their studies of the legal profession excited my interest in the possibility of using institutional theory as a basis for my research into the software industry and the Organization Studies group within University of Western Sydney seemed to offer an academically stimulating environment. It emerged from my preliminary informal research program, to pursue my research interests, I should
apply to undertake a doctoral program under the supervision of Professor Gray at the University of Western Sydney. In 2004 I applied to and was fortunate to be accepted into the doctoral program at the University of Western Sydney. This was to mark the start of a journey that turned out to be more interesting and enlightening than I had ever envisaged and it took me to many forks in roads which, sometimes, led me to dead ends and, at times, led me to destinations of which I was unaware.

7.1 The study in summary

Somewhat naively I expected to determine an appropriate body of theory quickly, to design a quantitative research program, to carry out the analysis and write up the dissertation. After all, my strengths were in the applied sciences. I had very developed computer skills. I knew everybody in the software industry and I had no problems with being labelled a positivist. The path to graduation day looked very clear.

The journey I did take, and the discoveries I made on the way, as summarized herein, provided me with not only an appreciation of the issues confronting the principals of Australian software firms, as they attempt to build sustainable growing businesses, but also the benefits that might accrue from a stronger engagement between the academic community and industry.

7.1.1 Chapter One

In Chapter One I set the agenda for this study in posing the research question:

Is there a body of theory that explains how the principals of Australian software firms can change their organizations from small ‘surviving’ businesses to sustainable growing businesses?

The manner in which I obtained and analysed the data and answered that question is described below in the summations of the later chapters in this thesis.
I referred to my attendance at the Academy of Management conference in America where Professor Denise Rousseau delivered her presidential address entitled ‘Is there such a thing as “Evidenced-Based Management”?’. A theme of this presentation was that an important component of our research should be to continually seek opportunities to engage with the business community, and to become part of that community, with many feedback loops, where information is systematically gathered, evaluated, disseminated, implemented, evaluated and shared. This message became an objective I set for myself at the start of this work, but as my journey continued the importance of Rousseau’s message became clearer.

As I delved into the literature on organization studies and discussed the development of my ideas with academic and business colleagues, I often paused to reflect on why it had taken twenty-five years for me to become aware of much of the work being undertaken in schools of management throughout the world. It may have been that I did not avail myself of opportunities but the feedback I received, when I presented my ideas suggested I was not alone in this thinking. Fortunately, even during my candidature, I have seen a growing emphasis on the importance of research impact and community engagement in the literature (see Bartunek 2007, Davies, Nutley and Walter 2005, EAG 2005) and from within the academic community. While this study was not about research impact and community engagement, one of the important outcomes of the study was the insight it gave me into the value that could be imparted to the business community from the research work being conducted in schools of management throughout the world. This was not a one way street because it also opened my eyes to the opportunities being missed in the work being undertaken in the schools of management. I concluded that as academics not only do we need to promote our work to the business community by direct contact but we also need to educate the business community on how they can be more continuously aware of the outcomes of our research work.

7.1.2 Chapter Two

In Chapter Two I described the methodology I used to select and collect the data to use in the study.
Initially, again somewhat naively, I had assumed data collection would be a time consuming part of the study, but would be a relatively straightforward process. I thought, wrongly, the software industry had grown so rapidly and was so pervasive that there would be multiple sources of relevant data. Professor Gray cautioned me that identification of an organizational field of Australian software firms might be problematic. I assured him the various industry associations would provide me with the starting point, enabling the easy identification and classification of the field encompassing Australian software firms. My dream of an easy ride down the data road was quickly shattered. The various industry associations were very cooperative in providing access to their membership records, but they were not adequate. As there is no requirement for software firms or software developers to register with any authority, membership lists were clearly not representative of the industry. Those studies that have been conducted, on the software industry, tended to be very general, or to use projections based on limited data sets. Data available from the Australian Bureau of Statistics provided a macro view of the Australian information technology industry, but little detail in the areas being dealt with in this study. The stark reality of the situation was presented to me when ADV2, the former managing director of the Australian division of a major international information technology research company, opined ‘we really don’t have that data and where are we going to get it?’.

After discussion with my colleagues, and some soul searching, it emerged that my experiences, and my continuing involvement in the software industry, could provide a valuable source of data. I was introduced to the concepts of sensemaking and self-ethnography. From my readings and discussions in these areas, and from my continued readings of the organization studies literature, I realised before I could contemplate undertaking a quantitative study of any kind, I would need to identify a body of theory that would help to explain the workings of the Australian software industry. As this process evolved, I was drawn to the work of the institutional theorists, and particularly to the work of Greenwood and Hinings, on organizational change. Much of this work seemed to explain the workings of the Australian software industry, but left some questions unanswered, particularly in the focus on
normative pressures resulting from professionalization. From these various contemplative efforts emerged my understanding that I should use a grounded theory approach, and my study should focus on the development of a body of theory which would help to explain why the principals of Australian software firms have difficulty in building sustainable growing software businesses. While I would not go as far as to agree with the observation of a colleague, who suggested I had ‘come over from the dark side’, I had certainly made a major transition in my thinking about research methods.

My research evolved into a qualitative study, using a grounded theory approach. I identified sensemaking, self-ethnography, government commissioned industry reports, international studies on the information technology industry, and a plethora of writings on people and organizations that have framed the information technology industry, as sources of data for the study. In selecting these sources, I was very aware the value of my interpretation and analysis would be viewed in the light of potential biases I brought to the study. To reduce the effects of biases, I developed a checklist that helped me to focus on issues that might threaten the validity of my research. I also developed a program of semi-structured interviews to support and complement the other sources of data.

7.1.3 Chapter Three

In this chapter I describe the analysis of the data using the constant comparative methodology.

The first question asked was, ‘What issues are referred to as most affecting the growth and sustainability of Australian technology organizations’? The industry reports and venture capital manager interviews were analysed against this question. At each subsequent stage I posed a question based on the analysis that had been performed to that stage, and then collected data from the various sources which could be used for comparison against that question. I then compared the question against the collected data and coded it using an appropriate scheme. This process was
continued until theoretical saturation was achieved. Following the completion of each stage, a new question was posed and the process was repeated.

The development of the body of theory emerging from the data collection and analysis, is covered in the ensuing summations of Chapters Five and Six, but some important issues that emerged from the collection and analysis of the data, are described herein.

7.1.3.1 Availability of data and industry representation

I was very surprised on how little was known about the Australian software industry by those who advise industry participants. Many of the views about the strengths and weaknesses of the industry seemed to be based on anecdotal evidence with very few of the people interviewed being able to identify more than five success stories within the industry. Conversely I was also surprised at the number of successful Australian software organizations, identified to me, that had no visibility with those people recognised as leaders in the Australian information technology industry. It seemed to me those industry associations purporting to represent the Australian information technology industry are, in reality, sectional interest groups with little to sustain their claims they represent the industry as a whole. This lack of data caused me to reconsider how I could define an organizational field encompassing the Australian software industry, and to ask how policy could be developed to assist the software industry, if so little was known about it. I am, apparently, not the only person who has had difficulties in this area, as evidenced by this extract from the Australian newspaper (Bajkowski 2007):

Senator Coonan\textsuperscript{11} publicly castigated the Australian information technology industry at the CeBIT conference in Sydney this month for its inability to form a single voice capable of articulating its needs. She said it was unrealistic to expect the government to cater for the demands of more than

\textsuperscript{11} Senator Coonan at that time was the Australian Government’s Minister responsible for the Department of Communications, Information Technology and the Arts
20 different groups that all had differing views on what the government should do.

### 7.1.3.2 Availability of capital and quality of management teams

The availability of capital was identified as a very significant issue affecting the ability of the principals of Australian software organizations to build sustainable growing businesses.

The quality of Australian management was identified as an important issue, and the venture capital managers had very strong views on the need for an appropriate management team to be in place, before investment could be provided.

These two issues appeared to be central to the question being asked in the study, and as a result, I examined these issues in more detail, as described in Chapter Five.

### 7.1.3.3 Nature of the Australian software industry

The comments of ID1, ADV9 and VC2 alerted me to an issue that might be the most revealing reason why the perception exists, that the principals of Australian software firms experience difficulty in building sustainable growing businesses. ID1 commented the aim of many Australian graduates was to join, rather than create a great company. VC2 suggested Australia’s best information technology managers were to be found in the multinational information technology companies and ADV9 suggested the desire of many principals of Australian software organizations might be just to be comfortably self employed in a small business without any great growth aspirations. This might well be the realistic face of the Australian software industry in which case a supportive, but non interventionist policy, might be the appropriate manner in which government should deal with the industry.

### 7.1.3.4 Sources of advice

My interviews with venture capital managers revealed an emphatic view on the importance of organizational structure. As this message did not seem to have been received by the principals of Australian software firms I at first assumed the advisers
to those principals were not providing the correct advice. However, it became very clear that the advisers shared the views of the venture capital managers on the importance of organizational structure. This alerted me to the important issue that the timing of principals of Australian software organizations first seeking advice on organizational structure might be a factor in the ability of principals to obtain capital for their firms.

These issues were all very important in developing the theory that emerged from the data.

7.1.4 Chapter Four

Glaser and Strauss (1967) stressed the need for researchers to be continually developing their theoretical sensitivity so as to be able to conceptualise and formulate theory as it emerged from the data. I brought to this study my experiences in the software industry, but my development of theoretical sensitivity in the field of organization studies, was limited.

From my preliminary pre-candidature research had emerged the initial definition of this work, as an investigation into the reasons why the principals of Australian software firms have difficulty building sustainable growing businesses under the rubric of organization studies. In concert with my collection and analysis of data, I recognised the need to build my theoretical sensitivity in the field of organization theory so I could, as appropriate, marry the theory emerging from my data with the existing work of organizational theorists.

I therefore sought to answer the question:

Is there a body of formal theory within the rubric of organization studies that will provide insights into the manner in which the principals of Australian software firms have developed their companies?
My approach to answering this question was to use the seminal work on organizations by Richard Scott (2003) as a starting point and, in the context of my knowledge of the information technology industry, to consider the development of the various schools of thought that constitute the field of organization theory as it exists today.

This approach led me to the conclusion that the work of the institutional theorists would provide a sound platform upon which I could develop a body of theory that would help explain the workings of the Australian software industry. In doing so I considered the applicability of the work of Meyer and Rowan (1977) and DiMaggio and Powell (1983) as a basis for the development of theory using a grounded theory approach. The emphasis within these works on the influence of socially constructed belief and rule systems on the determination of organizational structures, with two variations, very much fitted in with my view of how organizations had developed, within the Australian software industry. The first variation was that DiMaggio and Powell emphasise the normative pressures resulting from the increasing influence of professionalization within organizational fields whereas I argue, for the Australia software industry, normative pressures arise from the influence of industry associations in particular vertical industries. Secondly, I considered much of the work of the aforementioned theorists tended to defocus self-interest whereas, in the Australian software industry, where many of the principals are continuing founders, the emerging theory would need to take account of self-interest and agency.

The work in this chapter and in Chapters Two and Three, where I described the methodology adopted for collection and analysis of data, provided me with the theoretical and empirical platform upon which, using a grounded theory approach, I could develop a body of theory to help explain why the principals of Australian software firms have difficulty in building sustainable growing businesses.

7.1.5 Chapter Five

In my analysis of the data, I identified the availability of capital as a very significant issue affecting the ability of the principals of Australian software firms to build
sustainable growing businesses. I also identified organizational structure as an important determinant of whether an Australian software firm was seen to be investment ready. Therefore, in this chapter I sought to answer the question:

What organizational structure is appropriate for an Australian software firm that wishes to attract capital, and what is the predominant organizational structure that has been implemented by the principals of Australian software firms?

In answering the above question I sought to identify the organizational structure of Australian software firms, as preferred by venture capital managers, and to identify the organizational structure most commonly adopted by the principals of Australian software firms for their organizations.

What emerged from the literature was that I first needed to identify an organizational field encompassing all or part of the Australian software industry. As previously noted, there is a dearth of data available on the Australian software industry, and it was outside the scope of this study for me to collect a comprehensive set of data. I therefore referred to the work of Paul DiMaggio (1991) wherein he constructed an organizational field of art museums in America. I followed the approach used by DiMaggio in the context of the Australian software industry. From this work I determined it was the change in ‘ownership’ of customers that most determined the structuration of organizational fields encompassing Australian software firms. This led me to the view that the Australian software industry consists of many organizational fields, each of which encompasses a small number of software firms, centred on a particular customer vertical market.

Having determined the unit of analysis should be an organizational field delineated by the vertical markets in which the customers of Australian software firms operate, I then drew on the work of Burns and Stalker (1966) and Mintzberg (2003, 1980, 1985) to identify appropriate organizational structures to be used in this study. From this work I determined Mintzberg’s adhocracy structure most closely characterizes the organizational structure of Australian software firms, as preferred by venture
capital managers, and his entrepreneurial structure most closely characterizes the organizational structure most commonly adopted by the principals of Australian software firms.

This then led me to ask, whether the principals of Australian software firms are able to change the structure of their organizations from entrepreneurial to adhocracy.

7.1.6 Chapter Six
In this chapter I sought to answer the question:

Can the principals of Australian software firms change the structure of their organizations from entrepreneurial to adhocracy?

I first attended to a preliminary question:

When and why does the need to change the structure of their organization first become apparent to the principals of Australian software firms?

I had developed a sense that this was a very important issue in the context of investment readiness. It appeared self evident from the emphatic views of the venture capital managers, and the supporting views of the advisers, in order to be considered to be investment ready, the principals of Australian software firms should implement adhocracy structures in their firms. That the principals appeared to persist with entrepreneurial structures suggested the timing of when they received advice on appropriate structures might be at the heart of this issue. I considered the forces that might affect the decision making of those principals and consulted with a number of advisers who deal with the principals of technology organizations seeking investment. From this research, I determined it is probable that most principals of Australian software firms do not seek early advice on appropriate organizational structures. Rather, it is when faced with a financial shock in the form of the need to raise capital, or the desire to sell their organization, that they seek advice. It is only
then that they are informed that the entrepreneurial structure they have implemented will prevent them from realizing their perceived value of their firms.

I then considered the issue of change in organizational structure, in terms of the nature of the change. As the change being envisaged would be between two distinct organizational structures, the work of Greenwood and Hinings (1996) suggested change would most probably be radical in nature. I also determined Australian software firms would most probably be encompassed by tightly coupled, impermeable organizational fields. As the impetus for organizational change will most probably arise because of unanticipated financing shocks, this suggests, for the principals of Australian software firms, change in structure from entrepreneurial to adhocracy will most probably be radical and revolutionary in nature.

From my continued readings on institutional theory, I identified two papers by Greenwood and Hinings as describing a body of theory covering many of the areas emerging from my study. I considered the work described in these two papers could be extended and combined to develop a body of theory helping to explain change in Australian software firms. The first paper (Greenwood and Hinings 1996) proposed a model explaining radical organizational change in terms of the interaction of organizational context and organizational action. The second paper (Greenwood and Hinings 1988) proposed a model explaining the paths taken by organizations, in changing from one archetype (organizational structure) to another.

I first developed a model to explain change in structure from entrepreneurial to adhocracy by the principals of Australian software firms based on Greenwood and Hinings’ model (1996, p. 1034). In my model I focused on the change in value commitment of the principals as the result of a financing shock, as being the main precipitating dynamic of organizational change in Australian software firms. I argued the prospect of obtaining capital, or the prospect of selling their organizations would precipitate a change in commitment by the principals of Australian software firms from indifference to change, to reformatory commitment to change. As this change would only occur after a financing shock, I argued the resulting change would need
to be radical and revolutionary in nature. I then suggested the enabling dynamic of capacity for action might be the major impediment that prevents the principals of Australian software firms from implementing a change in structure, from entrepreneurial to adhocracy, based upon general and specific views on the deficiencies of Australian management skills.

To complete the picture of the Australian software industry I then considered the issue of whether change in structure from entrepreneurial to adhocracy can be effected by the principals of Australian software firms, after they have committed to make a change. This is a key issue for those principals who attempt to change organizational structure in order to be able to present their firms as being investment ready and for venture capital managers who decide to invest in Australian software firms in the expectation that the financing provided will enable the implementation of an adhocracy structure.

The literature describing theoretical and empirical studies on organizational change strongly suggests, when radical and revolutionary change is attempted, change will not be easy. Indeed, empirical studies and my observations of the Australian software industry suggest the majority of attempts fail.

To explain what might happen when the principal of an Australian software firm attempts to change the organizational structure, from entrepreneurial to adhocracy, I extended the model of organizational tracks, as proposed by Greenwood and Hinings (1988, p. 305), based upon my observations of the Australian software industry.

Finally, I combine the two models described above, to arrive at a model of radical revolutionary organizational change that represents the theory emerging from the data, as this thesis has developed.

In developing the model of radical organizational change in Australian software firms, and the supporting theory that has emerged from the data collected and analysed in this study, I have answered the research question of this thesis.
The model and the supporting theory explains how the principals of Australian software firms can change the structure of their firms, from entrepreneurial to adhocracy enabling them to obtain the capital required to build sustainable growing businesses.

7.2 The Contribution of this thesis to organizational research

The contributions this thesis makes to the field of organizational research reflects the forces that led me to consider undertaking doctoral studies after a twenty five year career in industry, my decision to apply to undertake those studies in a School of Management when my undergraduate studies were in Computer Science, Mathematics and Engineering and the development of my interest in the impact of academic research on contemporary management practices.

My experiences in industry have provided me with a wealth of practical experiences that I have been able to relate to theoretical work in the field of organizational research.

By entering a School of Management without the encumbrances of undergraduate training in particular schools of thought I have been able to consider and evaluate the work of many eminent organizational scholars in an open and enquiring manner.

My developing interest in the impact that academic research can have on contemporary management practices provided me with a clear sense of direction to where my research should head.

These factors have provided me with the solid platform which has enabled me to contribute to the field of organizational research in the following areas:

7.2.1 The Integration of Configuration and Institutional Theory

In 1996 in his paper *Configurations Revisited* Danny Miller (1996, p. 506) mused:
For all of its promise, the literature on configuration remains underdeveloped, and my *SMJ* \(^{12}\) piece represented a very preliminary and tentative attempt to further it along. Today, 10 year later, there remains a great deal of work to be done’

Today, a further 12 years later, Miller’s comments remain as valid as they did in 1996.

Critics of configuration theory remind us that organizations come in a bewildering array of shapes and sizes and therefore to attempt to categorize them into a limited set of types must limit the accurate depiction of too many variants of organizational structure. Pugh et al (1963), in stating the case for a dimensional method of classification of organizations, observed that with even a limited analysis there are a very large number of potential organizational profiles. They compared the type versus dimensional classification to the personality theorists debate of “type versus trait” and commented (1963, p. 299) ‘No classification of personality types from Hippocrates to Jung has stood up to a dimensional analysis in terms of traits’ and by inference suggested that a configurational analysis will not stand up to a dimensional analysis of organizational structure.

Critics of particular configurational theorists are readily able to empirically demonstrate that limited typologies do not reasonably represent the organizations they have studied. Doty et al (1993), for example, in a study of over 100 organizations with median employee numbers of over 226 with median organization ages of over 43 years were able to find strong support for their view of Mintzberg’s work that ‘few theories have received so much attention in management textbooks and organizational science journals with such meager empirical support’

Institutional theory with its emphasis on the manner in which socially constructed belief and rule systems affect the way in which organizations are structured sees organizations as open systems, strongly influenced by their environments.

\(^{12}\) (Miller 1986)
Institutional analysis of collectives of organizations relies heavily on identification of common field level processes and so the starting point of study is to identify the field in which an organization operates.

I was immediately attracted to the work of the configurational theorists because of the preciseness of their descriptions of organizational structure. I was not concerned with the criticisms of the possible limits on the organizations for which specified types were applicable. From my engineering training I was well used to clearly placing temporal and physical boundaries on the applicability of theories. For example: the linear elastic behaviour of plexiglass is a function of time, temperature and loading rate (Rankine 1975, p. 13). However linear elastic behaviour of plexiglass only occurs within clearly defined limits of these three variables. Any analysis involving plexiglass that does not specify those limits is meaningless. Therefore, while I acknowledge the criticisms of Pugh et al and Doty et al to be valid, I do so only to the extent that that configurational analysis is not applicable over an all encompassing range of organizations. It is clear that to be effective, configurational analysis needs to be selective in it application.

I was also attracted to the work of the institutional theorists because of the manner in which their work resonated with my observation of how organizations had developed in the Australian software industry during my career in this field. Again I was comfortable with placing limitations on the field being examined because my interest was in looking at a very particular industry segment, that of Australian software firms.

I also was concerned, as observed by Aldrich (1999, p. 8) that there appears to be a bias in the contemporary literature towards analysis of large publicly held organizations. The research that is being carried out in the small business area seemed to have a focus on the entrepreneur rather than the organization being created by the entrepreneur.
These observations alerted me to a gap in the literature in the area where I wished to focus my research and to an opportunity to combine aspects of configuration theory and institutional theory in investigating change in small Australian software firms.

By limiting my interest to small Australian software firms I have been able to identify that the work of configurational theorists (in particular, Henry Mintzberg) has applicability in categorising organizational types of industry participants and then that the work of institutional theorists (particularly Hinings and Greenwood) has applicability in explaining change in small Australian software firms.

My contribution to organizational theory has been to focus attention back to the power of configurational theory when combined with institutional theory with respect to organizational change in small software firms.

7.2.2 Explication of the relationship between field and firm level dynamics

When I started to read the literature pertaining to organizational studies I was immediately excited by the insights that institutional theory gave me into the manner in which socially constructed belief and meaning systems influence the development of organizations. As I considered the views of many eminent scholars in the field I related their observations and comments to my experiences in the Australian software industry. As I delved further into the literature I searched for more detailed accounts of the application of the theory in specific organizations. Having read Gray’s doctoral thesis (1998) wherein he examined, in detail, the workings of fifteen Sydney based legal practices, in an institutional theory context, I expected to find similar works looking at firms in other domiciles or industries. I was somewhat disappointed as most of the works I found provided very sound analyses of participants at a field level but provided little, if any detail, at a firm level. This alerted me to a potential gap in the literature, a gap that I felt I could help to fill because of my detailed experiences in the Australian software industry.
My approach to filling this gap was to conduct my research using a number of different methods which enabled me to consider the field of Australian software firms at both a field level and at a firm level.

I conducted a program of field research wherein I interviewed Venture Capital managers who invest in Australian software firms and advisers to the principals of Australian software firms. I examined Australian and international reports and articles pertaining to Australian and international software firms. In this manner I was able relates the workings of the Australian software industry to the institutional literature at a field level.

Using the concepts of sensemaking I was able to look back at my particular experiences in operating Australian software firms. During my candidature I continued to, as Chairman of the advisory board, actively participate in the Australian software industry and therefore using the concepts of self-ethnography as an ‘observing participant’ study the workings of the Australian software industry rigorously and in detail. In this manner I was able to relate the workings of the Australian software industry to the institutional literature at a firm level.

The manner in which I have related field and firm level dynamics to the theory is well illustrated by the way in which I have considered DiMaggio and Powell’s (1983) work on the three mechanisms through which isomorphic change occurs (refer to section 4.6.3). In doing so, by considering equally all three aspects of isomorphic pressure (rather than just focussing on mimetic isomorphism), I have also addressed a concern that has been voiced by Mizruchi and Fein (1999, p. 654):

although there are several components to DiMaggio and Powell’s (1983) argument, one aspect of their discussion has received disproportionate attention – at the expense of other, equally formulations – which we believe we can be accounted for by the extent to which this component corresponds with prevailing discourse in organizational theory.
My contribution to organization theory has been to show how field and firm level dynamics can be used in co-evolutionary manner to support and expand upon existing theory.

7.2.3 Relating management research to management practice

A driving force in undertaking this study was a desire to better understand why the principals of Australian software firms have difficulty in building sustainable growing businesses. As I conducted my research and read the literature on organizational theory I often mused that I wished I had been aware of much of this work when I was building Australian software firms. At the same time I wondered why, in the literature, there are not more examples of the application of the theory to real world problems. While I, because of my twenty five years in the Australian software industry, could relate the theory to my knowledge of the industry I could see that it would be difficult for a new founding principal of a software firm to make similar connections. During my candidature I had the opportunity, on many occasions, to address software industry groups or to discuss my developing ideas with principals of software firms, with advisers to principals of software firms and with potential investors in software firms. On these occasions I perceived an enthusiasm for learning more about research being conducted into management practice and an appreciation of the relevance of the theory being presented by me with respect to their organizations.

Denise Rousseau (2006) asked ‘why does management not take more account of our research into their management practices?’. The answer in part is that we academics may conduct excellent research but in documenting our findings we don’t relate the work to real world examples in a meaningful way that can be easily digested by industry (and particularly new industry) participants.

My contribution to organizational research has been to show how industry experience can be related to academic research in a rigorous and objective manner so as to, firstly, facilitate its use by the practitioner community while continuing to meet the exacting standards required of the academic community and, secondly, to
draw to the attention of academia aspects of my industry experience that can facilitate improved industry engagement.

7.3 Future Research

In conducting this study I have formed a number of views on the nature of the Australian software industry which frame the areas where I consider further research can have an impact within the academic community and the Australian software industry.

I have, in development or planning, three papers in conjunction with Professor Gray which have emanated from this thesis. I consider these papers to be important for the contribution that they will make to the literature on the development of small software firms in particular and small technology firms in general. These papers also serve the important function of describing the framework upon which a programme of future research will be based.

I have developed a programme of research that will be conducted to empirically test the body of theory that has been developed in this study.

The results of this study, the resulting papers that will be derived from this study and the proposed research programme provide a valuable source of information on a badly neglected sector of the Australian information industry. I will be communicating the results of this work to the relevant industry associations and government departments by continuation of my existing direct interactions with these bodies and by the development and dissemination of a summary paper that can be used in support of policy formulation by these bodies.

7.3.1 Views on the Australian software Industry

Perhaps the most significant message to come from this study is, that there appears to be a lack of detailed data available on the Australian software industry. The nature of the available data appears to be general or based on projections from limited data.
sets. There is little evidence of any studies looking in detail at software organizations that service customers in particular vertical markets.

As noted by the Federal Department of Communications, Information Technology and the Arts through its former Minister, Senator Helen Coonan (see section 7.1.3.1), there are many industry groups representing sections of the information technology industry but no one body that can claim to speak for the industry with one voice and certainly no one body that can claim to speak for the wide array of software organizations within Australia. The result is that government has shown a reluctance to develop industry specific support programs.

Some of the many successful small Australian software firms are achieving success in international markets but have little or no visibility within the various industry associations purporting to represent the Australian information technology industry, nor are they prominent with many of the consultants or venture capital managers who deal with various sections of the Australian information technology industry.

There are very few organizations within the Australian software industry which could serve as role models for principals of new or existing software firms that would encourage those principals to focus on the early implementation of an appropriate organizational structure.

These are all important issues that must be dealt with if the Australian software industry is to achieve the successes that are expected of it.

7.3.2 Papers in development
The following abstracts describe three papers in development or planning that have emanated from this thesis.

Constructing an Organizational Field of Australians Software Firms
Many reports prepared for government and industry have bemoaned the lack of successful sustainable growing software firms yet many, if not all of those reports,
fail to clearly identify the boundaries of the Australian software industry. In attempting to delve into the problems of the Australian software industry one must first be cognisant of Richards Scott’s (2001) advice on the importance of organizational fields and the dangers in generalizing across fields.

Drawing upon the work of Paul DiMaggio (1991) in which he described the process of constructing an organizational field of American Art Museums the development of organizational fields in the context of Australian software firms is described. Personal knowledge of the software industry using sensemaking and self ethnography research methods is complemented with data from semi-structured interviews and secondary sources.

What emerges is that the Australian software industry is likely to consist of multiple organizational fields each one of which encompasses a small number of software firms servicing customers in specific vertical markets.

Are organisational structures important if the principals of Australian software firms are to create growing sustainable organizations?

A recent report on the state of the Australian Software and Services industry echoed the common refrain that the industry suffers from the difficulty of gaining appropriate investment capital, maintaining domestic market share and developing supportive relationships with the public research base. Other studies in identifying these issues, suggest that they result from poor management practises rather than insuperable barriers to success.

Internationally, the research literature on successful enterprise highlights the significance of organising processes in emerging fields and counterpoints this with product or technology focus. This paper uses these ideas to construct a research framework to investigate the root causes of the problems. It hypothesises that the failure of the firms’ principals to focus on the establishment of appropriate organisational structures inhibits their ability to build sustainable growing businesses.
A qualitative research program was conducted encompassing semi structured interviews with venture capital managers and advisers to the principals of Australian software combined with an analysis of reports on information industry development.

This paper summarises the theoretical and empirical bases upon which the study was developed, reports major initial findings and identifies opportunities for research impact and regional engagement.

Building a Theory about Change in Australian Software Firms

A body of theory is developed, drawing on the work of Hinings and Greenwood (1996, 1988a), explaining why the principals of Australian software firms have difficulty in changing the organizational structures of their businesses. The need for change is predicated on the view that availability of capital is an essential prerequisite for sustainable growth in Australian software firms and that firm principals, in the main, have not implemented organizational structures preferred by Australian investors.

A grounded theory approach is used, drawing upon personal knowledge of the software industry using sensemaking and self ethnography research methods. Personal knowledge is complemented with data from semi-structured interviews and secondary sources. Concepts developed from the data are related to theoretical and empirical work under the rubric of organization studies.

7.3.3 Future Research Projects

The genesis of this development was a doctoral programme that I had envisioned would be based upon the use of quantitative research techniques. Through a journey of discovery it became clear that before a quantitative study could be conducted a body of theory needed to be established to provide a platform upon which a quantitative study could be based. The outcome, achieved using qualitative techniques, is a body of theory explaining why the principals of Australian software companies find it difficult to build growing sustainable businesses. To establish the
validity of this work as a basis upon which the principals of Australian software firms can develop appropriate organizational structures for their firms is a need to operationalize the developed body of theory.

The following outlines three research programmes which will be conducted centred on the above objective:

**Construction of an organizational field of Australian software firms**

Central to this thesis has been the use of configuration theory and institutional theory as a basis for the development of the body of theory explaining why the principals of Australian software firms have difficulty in building sustainable growing businesses. An important observation, in doing so, is that boundaries need to be placed upon the field that encompasses Australian software firms if a configurational and institutional approach is to be effective. A limited analysis grounded in the work of DiMaggio (1991) principally based upon the use of ethnographic and sensemaking techniques has hypothesised that the Australian software industry might consist of multiple organizational fields centred around particular customer vertical markets.

A quantitative study will be conducted to test the hypothesis that:

> The Australian software industry consists of multiple organizational fields centred around particular customer vertical markets.

An important outcome of this study will be the identification of organizational fields within the Australian software industry that will provide a platform for further research in this area. The methodology suggested by DiMaggio will again be followed but with emphasis on the use of quantitative techniques.

A survey will be conducted to identify all of those Australian owned software firms providing software products to customers operating within one vertical market segment. Choosing the vertical market segment to be considered will be one of the initial project tasks, but it is expected it will be selected from the mining industry, the
health industry or the education industry. These three sectors are regularly referred to in industry publications, and by participants in my study, as vertical markets where Australian software firms have achieved some success.

**Does an adhocracy structure predict sustainable growth**

The views of Australian venture capital managers and advisers to the principals of Australian software firms suggests that the adoption of an adhocracy structure is an important predictor of sustainable growth for Australian software firms. This needs to be tested empirically.

A quantitative study will be conducted to test the hypothesis that:

The organisational structure adopted by the principals of Australian software firms is a predictor of their future growth and sustainability characteristics.

Surveys based upon the approaches used by Gray (1998) and Malhotra, Hinings, McAllister and Gray (2003), in their examinations of the organizing modes of Australian legal practices, will be conducted to examine the organizing modes and the effectiveness of firms selected from the organizational field identified in the research project described above. The organizational structure of each firm will be categorized by comparison with entrepreneurial and adhocracy organizational structures. Each firm will then be further categorized in terms of longevity, revenue growth, profitability and size to provide a measure of their sustainable growth profile. The data will then be tested to determine the effectiveness of using entrepreneurial or adhocracy organizational structures as a predictor of sustainable growth for Australian software firms.

**Examining change in Australian software firms**

The model developed in this thesis explains why the principals of Australian software firms have difficulty in changing the structure of their organizations from an entrepreneurial structure to an adhocracy structure grounded in the work of Hinings and Greenwood.
A longitudinal quantitative study will be conducted to test the hypothesis that:

The model described in this thesis represents the organizational change characteristics of Australian software firms

The longitudinal studies will be developed around firms identified from the two research programmes described above.

7.3.4 Policy Input and Formulation
During my candidature I have continued my involvement in the Australian software industry via attendance at industry forums and by interaction with government and industry participants. I will continue these interactions and will prepare briefing documents of my research output which can be used by industry associations and government to support their policy formulation efforts. This has started and will be a continuing process.

7.3.5 Research Agenda and Timeline
The programme of writing and research described above is summarised in the table of Research Projects (Table 16) and the Programme Timeline (Figure 11)
<table>
<thead>
<tr>
<th>Project</th>
<th>Duration</th>
<th>Comments</th>
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<tr>
<td>Constructing an Organizational Field of Australians Software Firms</td>
<td>6 Months</td>
<td>Paper in conjunction with John Gray</td>
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<tr>
<td>Are organisational structures important if the principals of Australian software firms are to create growing sustainable organizations?</td>
<td>6 Months</td>
<td>Paper in conjunction with John Gray</td>
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<td>Building a Theory about Change in Australian Software Firms</td>
<td>6 Months</td>
<td>Paper in conjunction with John Gray</td>
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<tr>
<td>Construction of an organizational field of Australian software firms</td>
<td>One Year</td>
<td>Quantitative study to identify, in detail, organizational fields in the Australian software industry</td>
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<td>Does an adhocracy structure predict sustainable growth</td>
<td>Two Years</td>
<td>Quantitative study to determine if structure is an accurate predictor of sustainable growth for Australian software firms</td>
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<tr>
<td>Examining change in Australian software firms</td>
<td>Five Years</td>
<td>Quantitative longitudinal study to operationalize the model developed in this thesis</td>
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<tr>
<td>Input to industry and government policy formulation</td>
<td>continuing</td>
<td>Involvement in industry forums and preparation of briefing documents</td>
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### Figure 11 Project Timeline

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<tr>
<td>Constructing an Organizational Field of Australians Software Firms</td>
<td>Paper</td>
<td>commenced</td>
<td>6 months</td>
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<tr>
<td>Are organisational structures important if the principals of Australian software firms are to create growing sustainable organizations?</td>
<td>Paper</td>
<td>July 2009</td>
<td>6 months</td>
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<td>Building a Theory about Change in Australian Software Firms</td>
<td>Paper</td>
<td>January 2010</td>
<td>6 months</td>
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<td>Construction of an organizational field of Australian software firms</td>
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<td>Does an adhocracy structure predict sustainable growth</td>
<td>Quantitative Study</td>
<td>January 2010</td>
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<tr>
<td>Examining change in Australian software firms</td>
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<td>Input to industry and government policy formulation</td>
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<td>commenced</td>
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7.3.6 Potential Outcomes

It is envisaged that four key outcomes will develop from this programme of research.

Firstly, the validity of the model of organizational change, as a representation of the development of organizational structures within the Australian software industry will be tested.

Secondly, the resulting research reports will identify those Australian software firms that have achieved sustainable growth and the process by which they achieved it. Those firms will then be able to serve as role models for existing, and new, entrants to the software industry. This will encourage the development of better organizational structures within the Australian software industry through the process of mimetic isomorphism.

Thirdly, the conduct of the study will encourage the development of engagement between the academic community and particular segments of the Australian software industry.

Fourthly, by focusing on an identifiable segment of the Australian software industry, government will be provided with a realistic view of the issues affecting the development of sustainable growth within that segment. This will provide that segment with the opportunity to seek assistance from government at an industry level, rather than at an individual organizational level. This could mark an important change in the government approach to support programs for the software industry. It appears government has become frustrated at attempts to deal with a very diverse industry and, as a consequence, has chosen to provide only generalized research and development grants. Some software industry participants have suggested to government it should implement a program of selecting potential winners from within the software industry. Government has rejected this approach as the identification of winners is a task the venture capital industry has difficulty with and therefore it would be difficult for government and politically very dangerous. A
focus on an industry segment in the software industry would overcome some of those issues.

7.4 Concluding Commentary

From what started as a desire to undertake doctoral studies, following a twenty five year hiatus, with a preconceived view that the work would be based on a very structured quantitative study has emerged, via a qualitative study, a body of theory that helps to explain why the principals of Australian software firms have difficulty in obtaining the capital to assist them in building sustainable growing businesses.

During the journey I took to arrive at this final destination, I have not only learnt a great deal about organization theory, but also identified many opportunities for research projects that will be of benefit to the Australian software industry. In taking the journey, my research efforts and, I would hope, the understanding of my colleagues in the Australian software industry have benefited from the engagement between the academic community and the business community that has been an important by-product of this study.

From this study has emerged a body of theory that contributes to the understanding of factors affecting the ability of the principals of Australian software firms to build sustainable growing businesses.

This thesis has identified a research programme that will empirically verify the model developed in this thesis, lead to a fuller understanding the above issues and will contribute to the development of strong links between the academic community and the Australian software industry community.

This thesis contributes to the field of organizational studies in that it has demonstrated the applicability of the work of institutional theorists to the study of organizations within the Australian software industry.
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AAPM see The Australian Association of Practice Managers
ABS see Australian Bureau of Statistics
ACS see Australian Computer Society
ACSPRI see Australian Consortium for Social and Political Research Incorporated
AIIA see The Australian Information Industry Association
ALGA see Australian Local Government Association
AMJ see Academy of Management Journal
AOM see Academy of Management
ASX see Australian Stock Exchange Limited
AVCAL see The Australian Venture Capital Association Limited
BIE see The Australian Bureau of Industry economics
BITS see Building on Information Technology Strengths
CAL see Coopers and Lybrand
CeBit see Centrum für Büro und Informationstechnik (Centre for Office and Information Technology)
CSC see Computer Science Corporation
DCITA see Department of Communications Information Technology and the Arts
DEST see Department of Education, Science and Training
EDS see Electronic Data Systems Corporation
GWSEB see The Greater Western Sydney Economic Board
IBM see International Business Machines, Incorporated
IBMYF see IBM – Yahoo Finance
ICT see Information Communications and Technology
IEEE see Institute of Electrical and Electronics Engineers
IR see Integrated Research Limited
ISTM see Institute of Strata Title Management Limited
IT see Information Technology
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APPENDIX A – LETTER TO PARTICIPANTS

Mr Andrew Investor  
Venture Capital Manager 
Venture Capital Organization  
123 Technology Street  
Blue Sky  
NSW 9999

16\textsuperscript{th} March 2006

Dear Andrew,

Sustainable Growth of Western Sydney IT Companies

I am conducting a study of Information Technology (IT) companies in Western Sydney to better understand how they can prepare themselves to achieve sustainable growth.

In undertaking the study I will be interviewing senior people from three groups:

Investment Organizations These interviews will seek to better understand the factors that primarily influence the decision of organizations to invest in IT companies.

Advisers to IT Companies These interviews will seek to better understand how companies were able to structure themselves so as to achieve sustainable growth.

Western Sydney IT Companies These interviews will seek to better understand how companies organise themselves and how they plan to achieve sustainable growth.

The results of this study will benefit the participants and organizations charged with assisting Australian ICT companies in several ways including:

By gaining a better understanding of how successful IT companies have structured themselves for sustainable growth and the factors that influence decision makers who invest in IT companies Western Sydney IT companies will be better able to plan for sustainable growth.

By comparing how Western Sydney IT companies are planning for sustainable growth with the expectations of Investment Organizations and with how successful IT Companies have achieved sustainable growth those organizations charged with
assisting Western Sydney IT companies will be better able to prepare assistance programs for Western Sydney IT companies.

This study is being conducted as part of my Doctoral studies in the School of Management at the University of Western Sydney under the supervision of Professor John Gray.

I would be appreciative if you could assist me in this study by allowing me to interview you at a suitable time and location of your choosing. The interview will take approximately one hour. The interview will be taped for analysis purposes only and your anonymity will be protected by you not being identified in any reports unless you specifically agree to any identification in writing. I am personally responsible for the security of the tapes and they will be kept at a secure location at the University of Western Sydney for five years after the study has finished.

If you are agreeable to assisting me in this study I would be appreciative if you could confirm this by signing the attached consent statement and handing it to me prior to the commencement of the interview.

Should you have any questions or require clarification of any aspect regarding your involvement in the study, please do not hesitate to contact me by telephone on (02) 9817-7290 or via e-mail at t.rankine@uws.edu.au. Alternatively you may contact my supervisor, Professor John Gray by telephone on (02) 8255-6216 or via e-mail at j.gray@uws.edu.au.

Thank you for your assistance in this study,

Yours faithfully,

Tim Rankine
PhD Candidate
University of Western Sydney

NOTE: This study has been approved by the University of Western Sydney Human Research Ethics Committee. The Approval Number is HREC 06/017 If you have any complaints or reservations about the ethical conduct of this research, you may contact the Ethics Committee through the Research Ethics Officers (telephone: 02 4736 0883 or 4736 0884). Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.
Semi – Structured Interview Participation Consent Form

Study on Western Sydney ICT Companies

Investigator’s Copy

I (the participant) have had the opportunity to review the information provided to me relating to this study and any questions that I have asked have been answered to my satisfaction. I understand that I will be audio taped for analysis purposes only. I understand that my further written consent must be obtained before the publication of any data that identifies me or my organisation. I understand that my participation is voluntary and I agree to participate in the semi-structured interview, knowing that I can withdraw at any time. I have been given a copy of this form to keep.

Andrew Investor

Participants name

-------------------------------------------------------------------------------------  ---------------------
Participant’s Signature                               Date

Investigators Name : Tim Rankine
Semi – Structured Interview Participation Consent Form

Study on Western Sydney ICT Companies

Participant’s Copy

I (the participant) have had the opportunity to review the information provided to me relating to this study and any questions that I have asked have been answered to my satisfaction. I understand that I will be audio taped for analysis purposes only. I understand that my further written consent must be obtained before the publication of any data that identifies me or my organisation. I understand that my participation is voluntary and I agree to participate in the semi-structured interview, knowing that I can withdraw at any time. I have been given a copy of this form to keep.

Andrew Investor

Participants name (print)

...........................................................................................................  ........................................
Participant’s Signature                           Date

Investigators Name : Tim Rankine
27 February 2006

Timothy Balkeme
253 Wybakana Road
Hunners Hill NSW 2110

Dear Timothy,

HREC 06/017 Fostering innovation in small and medium enterprise information communications technology companies in Western Sydney

The Committee has reviewed your application for the above mentioned project and has agreed to approve the project. Please remove your signature from the consent form as it is not required.

You are advised that the Committee should be notified of any further changes to the research methodology should there be any in the future. You will be required to provide a report on the ethical aspects of your project at the completion of this project. The form is located on the Research Services Ethics Web Page.

The Protocol Number HREC 06/017 should be quoted in all future correspondence about this project. Your approval will expire 28 February 2008. Please contact the Human Ethics Officer, Kay Buckley on tel 02 49 360 853 if you require any further information.

The Committee wishes you well with your research.

Yours sincerely,

[Signature]

Associate Professor Christine Hole
Chairperson
UWS Human Research Ethics Committee
Co-Associate Professor John Gray
SECTION A: The Interviewee and his/her organisation

I would now like to get some preliminary information about you and your organisation

- Could you give me a thumb nail sketch of your experiences in investment in ICT or other industries?

- Could you give me some idea of the level of funds your organisation has available to invest in ICT or other organizations?

- Could you give me some idea of the typical investment that your organisation makes (amount invested and % of company that you own after the investment) in ICT or other organizations?
SECTION B: Selection of suitable SME / ICT Candidates

I would now like to ask some questions relating to your decision making process when looking at potential investments.

- How do you typically make first contact with potential candidates (web solicitations, referrals, mail outs …) ?

- What is you primary filtering device (for example Business Plan, Application, Interview/meeting at your office or their office, recommendation from bank, accountant or product, turnover/profits etc)?

- What are the key characteristics that you look for in a potential investment?

- Do you have documented evaluation criteria that you use when considering whether you will make an investment in a company - is it available?
SECTION C: Management Issues

Let’s assume that you have identified a prospective investment with a suitable product or service. I would now like to obtain your views on the importance of some aspects of management and the organisational structure of an investment.

The Chief Executive / Leader
I would now like to get some feel for the skills that you think are important in the Leader of the organisation that you are considering investing in.

- How important is it that the leader has technical skills related to the product or services?
- Should the leader have formal qualifications relating to the product or service (e.g., CA, BSc trade etc)?
- Should the leader have had sales experience?
- How important are the leader’s financial and administration skills?
- How important are the leader’s presentation and public speaking skills?
• How important is the leader’s track record in the ICT industry?

• How important is the leader’s track record in similar firms?

• How important is it to you that you believe the leader can take the company to your desired exit point?

The Management Team

I would like to get some feel for the importance you place on various components of the management team being in place before you would invest or if you think that some of these components can be put in place after the investment has occurred.

• Is it important to have a product team in place (as opposed to a single key specialist) before you invest?

• Is it important to have a sales team in place before you invest?

• Is it important to have a finance and administration team in place before you invest?
Control and Advice

Some investors take the view that it is their role (or right) to create the board structure and to provide management advice. Others look for an existing structure that they can complement.

In this section I would like to get a feel for your view of some governance issues.

- How important is an existing board structure?
- What importance do you place on having external independent directors?
- What importance do you place on the leader having had an experienced advisor / mentor?
Change before or after investment

I would like, now, to get a feel for how much work you would be prepared to put into a potential investment that did not meet all of your main requirements for investment.

If you find a very good product with a technically very competent founder but little or no team structure covering sales or administrative functions would you tend to?

- Choose not to invest and take no further action

- Choose not to invest and direct the opportunity to another investor

- Choose not to invest and direct the opportunity to a consultant or government or semi government program

- Choose not to invest but detail your investment requirements and then continue to monitor and review the opportunity as the appropriate resources are in place.

- Work with the organization to help them put in place the missing resources then re-consider investment.

- Make a staggered investment with the balance being subject to retention of appropriate resources
• Invest and see it as part of your investor role to take an active role in implementing the retention of missing resources.

**Last Investment**

I would now like you to think about your last investment in a technology related company (or a non technology company if no investments have been made in technology companies)

• How well did it meet your requirements for investment?

• Did you have to or did you put much work into the company before submitting it to your investment review board?

• Has the investment been successful?
SECTION D: General View of Australian Environment

I would now like to seek some general comments on your view of investment opportunities in Australian ICT Companies.

- How do you rank our ICT companies in terms of Technology, and Business acumen with other Australian Industries, USA and Other regions?

- Do you think the various government and non-government programs are doing a good job in preparing ICT companies for sustainable growth. What changes or additions (if any) would you suggest?

Excellent Australian Technology Companies

The second part of my field research is to interview the founders of successful Australian Sydney based technology companies.

- If you were nominating Australia’s most successful technology companies who would you include on your short list?
APPENDIX D – GLOSSARY

A vertical market consists of a group of similar businesses and customers which engage in trade based upon specific and limited sets of requirements. For example: strata title managers service customers who own or occupy properties covered under strata title legislation.

Multinational Corporations (MNCs) are major enterprises that offer services or products in two or more countries. In the Australian information technology context the term multinationals usually is used to refer to overseas owned organizations.

Customer Ownership is a term often used in the information technology industry to signify that a particular supplier has a strong relationship with a particular customer and therefore that customer will exclusively favour the supplier over other suppliers.

Unbundling describes the separate selling of discrete software and hardware products. Until 1963 IBM sold hardware and software as a single package with a single price. After that date they allowed customers to buy software separately.

Plug Compatible describes computer products supplied by third parties that can be interfaced without modification to another suppliers computer or that operate identically to another suppliers product. After IBM was required to publish details of its computers, companies (for example: Fujitsu) built computers that were functionally identical to IBM computers but offered superior price performance. The term was originally applied to manufacturers who made replacements for IBM peripherals and later IBM mainframes.
Reverse engineering involves discovering the technological workings of a device by analysing its inputs and outputs without infringing copyright or patent protection.

Initial Public Offering (IPO) refers to the initial offering of shares by a company on a public stock exchange.