

Technological Change Management Strategies in Asian Small-Scale Businesses: Trends in Singapore*

THOMAS MENKHOFF / CHAY YUE WAH

1. Introduction

Small and medium-sized enterprises (SMEs) are of critical importance for a country's economic growth, industrial development, and employment generation (Rauch et al. 2005; Bjerke 1998; Howard 1991; Toffler 199). Operating in an era of rapid industrial and technological change, the need for SME owners to make strategic responses towards external changes is crucial for sustaining success and survival (Begley et al. 2005; EIU and Andersen Consulting 2000; Pfeffer and Salancik 1978). An important external change driver is the rapidly evolving knowledge-based economy with its emphasis on ideas, research & development, know why, technology and intellectual assets. Knowledge is increasingly replacing traditional factors of production such as land, capital and labor (Drucker 1994; Krogh 1998; Krogh, Ichijo, and Nonaka 2000; Krogh, Nonaka, and Nishiguchi 2000; Evers 2003; Evers and Menkhoff 2004; Hornidge 2007).

The Republic of Singapore represents an interesting case study in this respect given its effective knowledge and technology governance policies¹

* An earlier draft of this paper was presented by Thomas Menkhoff at the University of California Pacific Rim Research Conference on "A New Breed of Chinese Entrepreneurs? Culture, Organizational Imperatives, and Globalization" at the Hong Kong University of Science and Technology in May 21–22, 2004.

¹ In contrast to the management of knowledge in companies and other large-scale organizations, *knowledge governance* implies governmental support for the development of a knowledge infrastructure by providing a legal framework, re-organising the educational system and setting up institutions to support research and development activities. According to Evers, knowledge governance is both an administrative process and a structure of authority relations; it involves the channelling of resources in building up knowledge management capabilities and improving the competitive advantage of a country in the world market by utilizing knowledge as a factor of production (Evers 2003; Evers and Menkhoff 2004; Menkhoff et al. eds. 2005).

as well as strategic exploitation of IT which have been instrumental in transforming the small city-state at the tip of the Malaysian Peninsula into an increasingly knowledge-driven economy. The political knowledge economy goals of the Singapore government represent both opportunities and challenges for the local small and medium-sized enterprise (SME) sector which is increasingly recognized as important vehicle for increasing the country's economic competitiveness in the increasingly globalized market and sustaining the country's long-term economic stability. In the year 2000, the 10-year Strategic SME 21 Plan was launched to prepare Singapore's SMEs for the new paradigm of the knowledge-based economy and to enable them to gain the required expertise to undertake knowledge-intensive activities (Singapore Productivity and Standards Board 2000:4). In 2003, SME promotion bodies launched the so-called Get-Up Scheme (Growing Enterprises with Technology Upgrade) aimed at raising the standards of the technological capabilities of local firms to support their transformation into more knowledge-intensive players (Ng 2002; Menkhoff, Chay, and Loh 2004). A recent outcome of Singapore's continuous SME upgrading measures is the 2007 Facility Sharing Programme as part of the Get-Up initiative jointly administered by A*Star, the Economic Development Board, IE Singapore and SPRING Singapore aimed at helping SMEs with research and development (R&D) by providing them with instant access to various research institutes.

While the number of SMEs participating in these schemes has steadily increased over time, there is still a relatively large number of owner-managers who are unaware and/or ignorant about the scheme's benefits and how technological change management can help them offer greater value and compete internationally. The characteristics of those small entrepreneurs who take up the challenge (and those who do not) have yet to be ascertained empirically.

2. Background and Methodology of Research Project

Research on Asian small business suggests that the response of many family-owned SMEs to the new wave of economic and technological forces is not always adequate and sufficient. Potential change targets such as strategy, people, technology, or culture seem to represent major challenges for many SME owners. In a survey of 158 ethnic Chinese enterprises in Singapore, Chua (2001) found that a relatively large proportion of firms paid insufficient attention to IT skills upgrading, product customization, customer satisfaction, e-commerce operations, and innovation as a source of competitiveness. Based on these indicators, Chua concluded that many SMEs in

Singapore are not yet ready for the new economy. However, the predictors and key ingredients of entrepreneurial 'new economy compliance' remained unclear and unspecified in this study.

Representative empirical data and sophisticated theoretical models about the change propensity of local SMEs are hard to come by. Mindful of this empirical void, our research² was conducted to generate preliminary data on the change management behavior of the local SME business community vis-à-vis the rapidly changing business environment and associated challenges such as the process of economic globalization, and continuous technology development. Our study seeks to provide tentative answers to the following key questions:

- To what extent are the often heard 'change or go bust slogans' in conjunction with local SMEs based on facts or imagination?
- What is really going on in local SMEs in terms of organizational change practices and management?
- How important are demographic variables and traits of owner-managers of SMEs as possible predictors of the successful initiation of organizational change?
- To what extent are local small entrepreneurs willing to take risks? How receptive are they towards change?
- What is their entrepreneurial orientation?
- What are the results and outcomes of change efforts at the firms' organizational level and their determinants?

The essay is based on semi-structured, qualitative interviews with management consultants and small entrepreneurs as well as the descriptive analysis of a survey of 101 SMEs. The research project evolved under the context of our ongoing consulting work as human resource development (HRD) advisors for SMEs in the Asia-Pacific region. During these assignments, we increasingly realized that there are significant barriers towards change not only amongst middle managers or lower level employees, but also amongst members of the firms' top management team. This observation represented a

² We are grateful for the support we received from the National University of Singapore (NUS Research Grant R-317-000-035-112 "The Management of Organizational Change and Resistance in Small and Medium-Sized Enterprises – The Singapore Case"), the Singapore Chinese Chamber of Commerce and Industry (SCCCI), the Institute of Management Consultants, the Singapore Management University (SMU Research Grant 01-C207-SMU-002 "Benchmarking Organisational Knowledge") as well as the various local SME owners and consultants who participated in the research.

puzzle, to us at least, in view of the mainstream theoretical presumptions about the (strong) spirit of Chinese capitalism, (good) corporate governance, and the premises of the Confucian ethics thesis as an explanatory framework for the 'successful' economic behavior of Chinese entrepreneurs who also tend to ignore the downside of organizational behavior in Chinese firms such as (mis-)management, resistance to change, and authority (Menkhoff and Gerke eds. 2002; Menkhoff 2001; Chan and Ng 2000; Backman 2000; Redding 1993). It seems that owner-managers of SMEs should recognize that change *is* a necessity and therefore be more receptive towards change management, particularly in view of the various external forces of change impacting on both small and big firms. The latter includes developments in technology and IT, changing customer needs and tastes, new legislation, and increasing competitive pressures. Similarly, there are also potentially disruptive internal forces of change such as customer complaints, reduced profits, outdated business strategies, and so forth.

To shed light on these issues, we conducted a baseline survey in order to generate empirical understanding on the change propensity of local SMEs and their owners. As of today, this area represents – despite all the 'change-or-go-bust-slogans' put forward by SME promotion bodies, consulting firms, and other groups – a relatively poorly researched area. The study involves multiple methods: library research, qualitative fieldwork, and descriptive analysis of survey data. Key data collection methods included semi-structured, qualitative expert interviews with management consultants and representatives of SME promotion bodies such as Singapore's SPRING; semi-structured, qualitative in-depth interviews with top executives, human resources specialists, and lower-level employees of SMEs; and a structured questionnaire survey covering members (exclusively SMEs) of the Singapore Chinese Chamber of Commerce and Industry (SCCCI) in various sectors.

During the initial exploratory stage of the study, qualitative interviews with nine management consultants and five small entrepreneurs were conducted to develop specific hypotheses about the change management practices of local SME owners and to facilitate the development of the research model as well as various measuring instruments. These key informants were identified with the help of the Singapore Chinese Chamber of Commerce and Industry and Singapore's Institute of Management Consultants. Quantitative data were obtained from SICCCI's corporate members (which has a total membership of about 3,000). The SME survey questionnaire included six major sections: demographics, business characteristics, organizational change, personality traits, firm performance, and external management consultants. Interviewees were interviewed either in English or Chinese (Mandarin). The questionnaire was discussed, modified, and pre-

tested with various subject matter experts and a selective group of small businessmen to ensure that the questions were adequately formulated and properly understood. The final sample consisted of 101 small and medium-sized firms (defined as firms with less than 200 employees) operating in the following sectors: manufacturing (28.7%), trading (23.8%), professional services (20.8%), retailers (8.9%), and others (17.8%).

3. Organisational Change Management Defined

External forces of change in the form of economic globalization, intense competition, rapidly evolving knowledge-based economy, and technological innovations such as E-commerce arguably require not only adaptive organizations with new management approaches, but also competent business leaders and managers who can adapt to changing times quickly and manage organizational change effectively (Beckhard 1969; Beckhard and Harris 1987; Tushman et al. 1997; Schaffer and Thompsen 1992). Organizational change refers to both planned and unplanned transformations of an organization's structure, technology, and/or human resources (Leavitt 1965).

Planned organizational change entails activities that are intentional and purposive in nature and are designed to fulfill specific organizational goals. Note that the emphasis is on *managerial choice* (Child 1972, 1997). This is in sharp contrast with unplanned change, specifically shifts in organizational activities attributable to external forces that are beyond the control of individual organizations. In reality, change targets such as structure, technology, people, and tasks are highly interdependent. That is, "change in any one usually results in compensatory (or retaliatory) change in others" (Leavitt (1965:1145). Professional consultants define change management as a systematic process of aligning the organization's people and culture with changes in business strategy, organizational structure, systems, and processes resulting in ownership; and commitment to change, sustained and measurable improvement, and improved capability to manage future change. Practitioners of organizational change have developed various diagnostic models detailing such change processes (e.g. Burke and Litwin 1994) to illustrate the complex interrelationships between environmental forces, intra-organizational change targets, feedback loops, and alike. Effective change with regard to management practices, organizational climate, motivation patterns, or performance requires special competencies. They are much more difficult to implement as compared to changes in the area of leadership, structure, or strategy.

4. Results

Business Characteristics and Entrepreneurial Profile

The typical firm surveyed was a 100% locally-owned, private limited company that has been established in the early 1990s by the respondent himself who owned a substantial proportion of the business without any involvement of external parties, such as institutional and/or equity investors. The average respondent was a middle-aged (42.4 years), English-educated, male Chinese Singaporean with tertiary education, and had specialization in either engineering or management. He has been in his current position for 10.5 years, with an average organizational tenure and total working experience of 13.3 years and 20.8 years, respectively.

Most respondents perceived themselves as opportunistic entrepreneurs (46.5%) who are achievement-oriented, effective (in terms of adaptation and business planning), and willing to take risks (Smith 1967; Carland, Boulton and Carland 1984; Bracker, Keats and Pearson 1988). Consistent with the entrepreneurship literature, particularly the so-called entrepreneurial venture model, this type of entrepreneur tends to be growth-oriented and more likely to be a champion for innovations (Thornhill 2006; Megginson, Byrd and Megginson 2000). In contrast, craftsman entrepreneurs (Filler and Aldag 1978), who are typified as relatively non-adaptive and more risk adverse persons aiming for a comfortable living rather than the highest possible level of performance, made up 36.6% of the sample. The latter represents the typical mom-and-pop operation or small business venture (Megginson, Byrd and Megginson 2000). Finally, the remaining 17% could not be categorized as they comprised a mix of different types of businesses. In the following we refer to these two entrepreneurial types as “innovators” and “entrepreneurs”.

We report the measurement of two personality traits that have been commonly identified as change drivers: ‘willingness to take risks’ and ‘receptivity to change.’ Most local entrepreneurs (52.5%) classified themselves as risk-takers while 36.6% appeared to be risk-averse (i.e., not willing to take risks), with the remaining 10.9% who were neutral. With respect to the degree of change propensity, an overwhelming majority (76.2%) of the sampled entrepreneurs turned out to be quite receptive to change while 13.9% were not. Again, approximately 10% were neutral. Contrary to the sometimes negative image of small entrepreneurs as being backward, risk-averse, and static, our data suggest that the sampled entrepreneurs (men and women) are flexible, adaptable individuals who – perhaps owing to their personality traits – are open to the initiation of change and quite willing to

take risks. This hypothesis receives additional support later when we examine the firms' change management practices.

Change Management Practices

The survey suggests that the sampled Singaporean SME owners implement organizational change measures on a routine basis. In terms of technology-related changes, Internet and E-commerce, purchase of new tools and equipment, and office automation and implementation of online procedures were classified as the three most important, major and critical change areas (see Table 1). Over one-third of the companies have already adopted these practices in their operations. These companies are also quite committed to change. For example, an overwhelming majority of firms (60 to 70%) rates changing the firm's strategic direction and technology, IT-related changes, and changes related to people and their task behaviors as the most frequently adopted measures. On the other hand, the institution of people-related changes clearly lags behind technology-related changes. Only about one-third of these SMEs have instituted significant people-related changes such as the provision of employees with more company-related information, more consultation, and more staff participation in decision-making processes.

Forces of Change

According to Table 2, the three most important external forces of change that motivated respondents to initiate organizational changes were changing customer needs (88%), customer complaints (79%), and activities and innovations of competitors (69%). Not surprisingly, the need to accommodate customer, customer complaints in particular, also serves as the most important internal forces of change. An overwhelming 83% of respondents cited this as an important factor. On the other hand, the other factors such as outdated business strategy, a new emphasis on quality, ineffective management practices, and reduced profits are all equally important (about 70%) internal forces of change.

TABLE 1: Change Management Practices in SMEs

Description	Percent
Most Frequently Adopted Change Measures	
Changing the Firm's Strategic Direction	73.3
Technology/IT	70.3
Changing People, Including Task Behaviors	62.4
Intra-organizational Cultural Change	58.4
Changing Systems and Work Processes	58.4
Altering Organizational Structures	53.5
Major/Critical Changes in Technology-Related Areas	
Internet/E-Commerce	40.0
Purchasing New Tools and Equipment	34.6
Office Automation/Online Procedures	33.3
Adding New Production Lines	19.8
Innovations in Operating Methods	19.5
Major/Critical Changes in People-Related Areas	
Providing Employees with More Company Related Information	35.4
More Consultation with Staff and Delegates	33.8
More Participation of Staff/Delegates in Decision Making	28.8
Recruiting More Qualified Employees	23.8
Increasing Wages and Salaries	21.1

Type and Extent of Organizational Change Measures

Most respondents interpreted the nature of organizational change measures that had been initiated in their firms during the past three years as both reactive and proactive (58.8%) while 27.5% assessed the changes as reactive in nature. Only a small minority of respondents (13.8%) had proactively implemented organizational change measures in anticipation of future difficulties, threats, and opportunities. Nonetheless, the majority of them (66.3%) claimed that the adopted change measures were based on a detailed plan of action and slightly less than half (46.3%) characterized the situation they had faced as one of high urgency of change and low resistance towards change.

TABLE 2: Forces of Organizational Change

Description	Percent
External Drivers	
Changing Customer Needs, Preferences, and Tastes	87.7
Customer Complaints	79.0
Activities and Innovations of Competitors	69.1
Developments in IT/Technology	66.7
Internal Drivers	
Customer Complaints	82.6
Outdated Business Strategy	71.3
New Emphasis on Quality	70.1
Ineffective Management Practices	70.0
Reduced Profit	70.0

TABLE 3: Extent of Organizational Change Initiated by Respondents

Description	Percent
Distinct Changes in Strategy	40.7
Improvements Here and There	34.6
Radical Redirection and Restructuring	17.3
Sweeping, Revolutionary Changes	6.2

Most of these changes are incremental rather than abrupt and hasty (see Table 3). Only a very small proportion (6.2%) had implemented sweeping, revolutionary changes throughout their firms. An additional 17% had initiated a radical redirection and restructuring of certain departments. However, most respondents characterized the extent of change as either distinct (40.7%) or gradual (34.6%). According to their responses, the latter mainly includes improvement in work methods and policies and/or procedures in specific areas.

Outcome and Impact of Change Measure(s)

The experience associated with these changes was seen as rather positive by the respondents. More than half of the participants characterized the outcome of organizational change measures as successful (55.6%). A large

majority (75.3%) even claimed that they had measured the effects of implemented organizational change measures, suggesting that they were real rather than perceived positive outcomes. In particular, improved job performance (60.5%), retained business (60.5%), higher sales volume (59.2%) and lesser customer complaints/higher customer satisfaction (56.8%) were cited as the four most important benefits of change initiatives (see Table 4). On the other hand, adverse administrative effects, increase in staff turnover, and disruption of production were often cited as the negative consequences of such implementation.

TABLE 4: Scale of Benefits Obtained by Change Measures

Description	Percent
Improved Job Performance	60.5
Retained Business	60.5
Higher Sales Volume	59.2
Less Customer Complaints/Higher Customer Satisfaction	56.8

Resistance to Change

While the implementation of organizational change measures appears to be successful, it is not entirely a smooth operation. Many firms encountered resistance to change, particularly amongst non-executive employees. It is also important to recognize that resistance amongst middle managers and top managers is notable as well. Generally speaking, the majority of our respondents felt that they had handled the situation well and without encountering major problems. Slightly more than half of them (57.5%) felt that they had handled the situation well while 41.3% interpreted themselves as somewhat successful. Only a tiny proportion (1.3%) felt that they were not successful in overcoming resistance amongst staff. Cost factors, fear, bad habits and mindset problems, inability of old staff to catch up with new developments, insufficient knowledge about new technologies, managerial perception differences, and poor communication were often cited as the main barriers to change.

Change Management Competency and Consultancy Services

More than 70% of the respondents rated their change management competencies as either good or very good. However, almost all of them (79% to be exact) had not attended any relevant training courses. Perhaps a bit

puzzling at first, less than one third of our SME representatives (31%) believed that they have either a good or very good understanding of the change management concept. Based on these inconsistencies, it is doubtful that the competency measure actually represents an objective evaluation of the situation and the reliability or validity of this measure may not be high.

As expected, more than two-thirds of participants (70.3%) had *never* utilized the services of external management consultants. Amongst those who had hired external expertise, the most frequently cited consulting inputs include general management, financial management, and information management/computer applications. Their evaluation of its overall effectiveness, however, is mixed. Among those who had utilized external expertise, although a good proportion (about 40%) acknowledged that the consultant(s) had a high impact on firm performance, close to half of the respondents assessed the impact as moderate while the remaining (10%) as low instead. For those who did not seek external advice, the three most cited reasons include the perception of high cost, the lack of such need to hire a consultant, and that consultants may not fully understand the nature of their own business (see Table 5 for details). Altogether, less than half (45%) of the SMEs surveyed had utilized official SME assistance schemes provided by the government.

TABLE 5: Reasons for Not Utilizing External Consultancy Services

Description	Percent
External Consulting Inputs are Costly	53.5
Simply Don't See the Need	35.2
Lack of Knowledge about the Usefulness of Consultants	21.1
No Contacts with Consultants	18.3

How Singapore's Small Business Entrepreneurs Manage Technological Change

Technology has been identified as one of the most important factors behind the competitive advantage of successful SMEs (Simon 1996). This might partly explain why technology/IT-related changes scored as the second most important/critical change target of the small entrepreneurs surveyed (see Table 1). In view of the general paucity of data on the management of technological change in local (Chinese) SMEs, the following section examines potential differences between (craftsman) entrepreneurs and innovators in adopting technological change. In the literature, (craftsman) entrepreneurs

are typified as relatively non-adaptive and risk adverse persons who mainly aim for a comfortable living rather than the highest possible level of performance. As a result, they are expected to be less receptive towards technological change than innovators (opportunistic entrepreneurs). Innovators in contrast are commonly characterized as more achievement-oriented, effective in adaptation and business planning, and willing to take risks. A prominent example of this type of entrepreneurial leader is Olivia Lum, head of Hyflux, one of the largest water treatment companies in Singapore. The firm was listed on the Singapore Exchange in 2000 and has been named by Forbes as one of the “Best 200 Small Companies in the World”. Trained as a chemist, Olivia Lum led her firm from a small trading company into a regional water specialist that provides advanced membrane-based water-treatment and recycling systems (Garnsey et al. 2006).

As noted earlier, in our sample of SME entrepreneurs, 37 of them can be classified as the former and 47 the latter; with the remaining 17 unclassifiable. Results from the cross-tabulation analyses showed that innovators (59%) are indeed more likely to implement technological change measures when compared to (craftsman) entrepreneurs (41%), $\chi^2 = 3.92$, $df = 1$, $p \leq 0.05$. With regard to the top three major/critical technology related changes adopted by the small Singaporean entrepreneurs illustrated earlier in Table 1, our analysis revealed that innovators are comparatively more active in implementing internet and E-commerce initiatives (64.3% versus 35.6%; $\chi^2 = 3.98$, $df = 1$, $p \leq 0.05$), purchasing new tools and equipment (60% versus 40%; $\chi^2 = 3.90$, $df = 1$, $p \leq 0.05$), and automating their offices as well as operating procedures (57.4% versus 42.6%; $\chi^2 = 3.85$, $df = 1$, $p \leq 0.05$) than (craftsman) entrepreneurs.

Critical Drivers of Technological Change(s)

Our study identifies that the five most important/critical internal forces of change that motivate respondents to initiate technological changes are customer complaints, outdated business strategies, ineffective management strategies, reduced profit, and a new emphasis on quality. On the other hand, changing customer needs, preferences and tastes, customer complaints, and activities and innovations of competitors turned out to be the most important external forces of change triggering technological change measures, followed by developments in new technology and the Asian crisis (see Table 6).

TABLE 6: Important/Critical Drivers of Technological Change

Description	Percent
Internal Drivers	
Customer Complaints	85.7
Outdate Business Strategy	75.0
Ineffective Management Practices	73.7
Reduced Profit	71.8
New Emphasis on Quality	60.6
External Drivers	
Changing Customer Needs	70.3
Customer Complaints	63.4
Activities and Innovations of Competitors	55.4
Development in New Technology	53.5
Asian Crisis	49.5

TABLE 7: Important/Critical Drivers of Internet & E-Commerce Related Technological Changes

Description	Percent
Internal Drivers	
Customer Complaints	87.6
Outdate Business Strategy	81.0
New Emphasis on Quality	78.3
External Drivers	
Retained Business	48.5
High Sales Volume	47.5
Less Customer Complaints	45.5
Increased Profit	42.6
Higher Productivity	40.6

In view of the fact that a relatively large number of respondents (68% yes versus 4% no) had, in one way or another, embraced Internet and E-commerce as part of their technological change projects, we decided to explore further the internal drivers of these initiatives. The results are reported in

Table 7. Customer complaints (87.6%) turned out as the most critical internal driving force of Internet and E-commerce related technology change measures, followed by outdated business strategies (81%) and quality considerations (78.3%). On the other hand, external drivers play a relatively insignificant role than internal drivers. None of the top five external drivers received support from more than 50% of respondents. They include retained business/improved job performance, higher sales volume, lesser customer complaints, increased profit and higher productivity.

Utilization of External Management Consultants

SME policy makers often expect that the new economy related assistance schemes would be sufficient to motivate local small entrepreneurs to embrace related changes proactively. To increase online transaction capability of local SMEs and to encourage small entrepreneurs to adopt “ready-made” e-commerce solutions, both Singapore’s SPRING (the former Productivity and Standards Board) and the Infocomm Development Authority of Singapore (IDA) have implemented various new economy related SME upgrading schemes during the past few years. As the new Chairman of SPRING, Mr. Philip Yeo, pointed out recently, the agency’s \$150 million Technology Innovation Programme (SPRING TIP) aims at providing SMEs with funds to help them to develop new processes, products and services and to adopt new technologies. SPRING TIP has also provided funds to set up Centres of Innovation (COI) at Singapore’s polytechnics and A*STAR research institutes to support innovation in SMEs. Two examples of local SMEs that have been funded under SPRING’s Technology Innovation Programme (TIP) include (i) CyberInc which developed a small laser mouse called Z-Nano and (ii) AWA Instruments, which develops environmental monitors to manage water and air pollution. R&D spending by Singapore’s local SMEs has increased by 73% to \$432 million between 2001 and 2005. “Revenue from licensing patents and commercialising research also topped the \$1 billion mark” (SPRING 2007). As the data indicate, “SMEs are moving in the right direction” (Philip Yeo). Helping local SMEs to grow and globalize remains a challenging task of SME promotion bodies. How did the firms surveyed perform in terms of utilizing external support?

As we reported earlier, about two-thirds of all survey participants (70.3%) had never utilized the services of external management consultants. Do the two types of entrepreneurs differ significantly in terms of utilization? Consistent with our expectation, the results of the analysis suggests that innovators are more likely to utilize the services of external management consultants than entrepreneurs (craftsman entrepreneurs) – 34% of innovators

compared to 24% of (craftsman) entrepreneurs. The results of the cross-tabulation chi-square indices for all variable items³ related to the question “Why have you never sought assistance from an external management consultant?” were non-significant except for the one item, ‘Consultants do not fully understand the nature of my business’ ($\chi^2 = 5.26$, $df = 1$, $p \leq 0.025$). This finding reflects the way innovators feel about seeking external assistance and illustrates the challenges official SME promotion bodies are facing in ensuring that more local SMEs leverage on technology to grow and glow. Significant differences in this regard between Chinese-educated and English-educated Chinese entrepreneurs could not be found.

5. Conclusion

Contrary to popular belief that local SME entrepreneurs in Singapore are risk-averse, unprogressive, and rigid, our study revealed that the majority of the respondents (53%) are risk-takers. Three in four respondents (76%) characterized themselves as receptive to change. The data show that local entrepreneurs have the gusto to take up risks, and that they are flexible and responsive to both internal and external forces of change. Our survey indicates that the demographic characteristics of small entrepreneurs in terms of age, organizational tenure, educational level, and specialization as well as the cognitive perspectives of SME owners are decisive when it comes to an understanding of the propensity to change, proactive change management, and improved firm performance.

Findings from our study support advocates of Child’s strategic choice theory who have postulated a close positive relationship between the demography of top decision-makers in organizations and strategy-related organizational outcomes (Wiersema and Bantel 1992:112; Naldi et al. 2007). Effective change masters are receptive to change and willing to take risks. “Receptivity to change suggests an openness to pursuing different business approaches [that are] essential to strategic change. Willingness to take risks is important because changing firm strategy involves risk: established ways of conducting business are abandoned in favour of making commitments to strategic directions for which the payoffs are not guaranteed” (Wiersema and Bantel 1992:93).

³ Items included ‘consultant’s skills and expertise are not adequate’, ‘consultants do not fully understand the nature of my business’, ‘external consulting inputs are costly’, ‘consultants don’t add value’, ‘I simply don’t see the need to hire a consultant’, ‘consultants can’t help me’, ‘lack of knowledge about the usefulness of consultants’ and ‘no contacts to consultants’.

The study clearly shows that Singapore's SME entrepreneurs put great value on new technology adoption and respective change projects. After strategy, technology is the second most important change target of the sampled small Singaporean Chinese entrepreneurs. Case companies did proactively embrace Internet and E-commerce (and increasingly knowledge management) and invested in the modernization and automation of tools, equipment, operating procedures, and offices. Besides internal and external forces of change such as customer complaints and outdated business strategies, entrepreneurial orientation and demographic traits are important predictors of one's receptivity to technological change. 'Young' entrepreneurs with a passion for innovation, a relatively short organizational tenure, tertiary education, and a specialization in either engineering or management are more likely to be technological change masters as compared to (craftsman) entrepreneurs who put significantly less emphasis on technology change. The study also suggests that the latter are not averse to seeking assistance in the form of external management consultants in effecting change and therefore positive outcomes for their enterprise. Qualitative interviews suggest that information may represent a crucial variable and differentiator in this respect as English-educated Chinese (craftsman) entrepreneurs may have easier access to new economy related management resources and assistance (Menkhoff, Badibanga and Chay 2007).

SMEs can benefit significantly from technology and R&D. As economies and businesses shift towards a new world configuration of digital information and knowledge-based environment, SME owners arguably need to confront this challenge directly and find out how new technologies can assist them. To assist the SME sector to keep pace with the emerging knowledge-based economy, government agencies, chambers of commerce, industry associations, and private sector organizations will need to commit more resources and assistance to help SMEs to intensify their R&D efforts. Similarly, owners and managers of SMEs arguably must be willing to break away from old practices that might work well in the past, and embrace changes associated with the new economy.

In sum, our data show that more local Chinese small and medium-sized companies have come to accept the importance and benefits of organizational change and external change advocates such as management consultants and official SME incentive schemes. However, to further propagate concepts such as change and knowledge management as new economy survival tools, relevant skills upgrading and awareness building measures are necessary to turn more local SME owner-managers into real innovative technological change masters.

References

- Backman, M. (2000), *Asian Eclipse – Exposing the Dark Side of Business in Asia*. Singapore: Wiley.
- Beckhard, R. (1969), *Organizational Development: Strategies and Models*. Reading, MA: Addison-Wesley.
- Beckhard, R. and Harris, R.T. (1987), *Organizational Transitions – Managing Complex Change*. 2nd ed. Reading, MA: Addison-Wesley.
- Begley, T., Tan, Wee-Liang and Schoch, H. (2005), Politico-Economic Factors Associated with Interest in Starting a Business: A Multi-Country Study, *Entrepreneurship Theory and Practice* 29(1): 35–55.
- Bennis, W. (1969), *Organizational Development: Its Nature, Origins and Prospects*. Reading, MA: Addison-Wesley.
- Bjerke, B. (1998), “Entrepreneurship and SMEs in the Singaporean Context,” in M. H. Toh and K. Y. Tan (eds.), *Competitiveness of the Singapore Economy: A Strategic Perspective*. Singapore: Singapore University Press, pp. 249–293.
- Bracker, J., Keats, B. and Pearson, J. (1988), Planning and Financial Performance Among Small Firms in a Growth Industry, *Strategic Management Journal* 9(6):591–603.
- Burke, W. and G. H. Litwin (1994), “Diagnostic Models for Organizational Development,” in A. Howard and Associates (eds.), *Diagnosis for Organizational Change*. London/New York: Guilford Press.
- Carland, J.W., Hoy, F., Boulton, W.R. and Carland, J.A.C. (1984), Differentiating Entrepreneurs from Small Business Owners: A Conceptualization, *Academy of Management Review* 9(2):354–59.
- Chan, K.B. and Ng, B.K. (2000), “Myths and Misperceptions of Ethnic Chinese Capitalism,” in Chan Kwok Bun (ed.), *Chinese Business Networks: State, Economy and Culture*. Singapore: Prentice-Hall and Copenhagen: Nordic Institute of Asian Studies, pp. 285–302.
- Child, J. (1972), Organizational Structure, Environment, and Performance: The Role of Strategic Choice, *Sociology* 6:1–22.
- Child, J. (1997), Strategic Choice in the Analysis of Action, Structure, Organizations and Environment: Retrospect and Prospect, *Organization Studies* 18 (1):43–76.
- Chua Soo Ee (2001), *The New Economy and Chinese Enterprises in Singapore*. Unpublished Manuscript. Faculty of Business Administration, National University of Singapore.
- Drucker, P. F. (1994), *Postcapitalist Society*. New York: Harper Business.
- Dutrenit, G. (2000), *Learning and Knowledge Management in the Firm: From Knowledge Accumulation to Strategic Capabilities*. Cheltenham and Northampton, MA: Edward Elgar.

- Dyer, W.G. (1985), "The Cycle of Cultural Evolution in Organizations," in R. Kilmann, M.J. Saxton and R. Serpa (eds.), *Gaining Control of the Corporate Culture*. San Francisco/London: Jossey-Bass, pp. 200–229.
- Economist Intelligence Unit and Andersen Consulting (2000) *Beyond the Bamboo Network: Successful Strategies for Change in Asia*. Hong Kong: Economist Intelligence Unit.
- Evers, H.-D. (2003), Knowledge Society and the Modernization of Southeast Asia (Interview with Prof Evers). *Harvard Asia Quarterly*, Winter Issue.
- Evers, H.-D. and Menkhoff, T. (2004), Reflections about the Role of Expert Knowledge and Consultants in an Emerging Knowledge-based Economy, *Human Systems Management* 23(4):137–49.
- Filley, A.C. and Aldag, R.J. (1978), Characteristics and Measurement of an Organizational Typology, *Academy of Management Journal* 21(4):578–91.
- Garnsey, E., Dee, N. and Ford, S. (2006), Clean Technology Ventures and Innovation. University of Cambridge Engineering Dept., Centre for Technology Management Working Paper Series No 2006/01.
- Greenberg, J. and Baron, R. A. (1997), *Behavior in Organizations: Understanding and Managing the Human Side of Work*. 7th ed., Upper Saddle River, NJ: Prentice-Hall.
- Hornidge, A.-K. (2007), *Knowledge Society – Vision and Social Construction of Reality in Germany and Singapore*. Münster: LIT Verlag.
- Howard, R. (1991), *Can Small Businesses Help Countries Compete? Entrepreneurship: Creativity at Work*. Boston, MA: Harvard Business School Press.
- Kirkpatrick, D. (1985), *How to Manage Change Effectively*. San Francisco/London: Jossey-Bass.
- Leavitt, H.J. (1965), "Applied Organizational Change in Industry: Structural, Technical and Human Approach," in J. G. March (ed), *Handbook of Organizations*. Chicago: Rand McNally and Company, pp. 1144–1170.
- Lee, T. Y. and Low, L. (1990), *Local Entrepreneurship in Singapore: Private and State*. Singapore: Times Academic Press.
- Megginson, W.L., Byrd, M.J. and Megginson, L.C. (2000), *Small Business Management: An Entrepreneur's Guidebook*. Boston, MA: Irwin McGraw-Hill.
- Menkhoff, T. (1993), *Trade Routes, Trust and Trading Networks – Chinese Small Enterprises in Singapore*. Saarbrücken/Fort Lauderdale: Breitenbach Publishers 1993.
- Menkhoff, T. (2001), "Chinese Market Cultures in the Asian-Pacific Region between Continuity and Change (in German)," in H. Schrader, M. Kaiser and R. Korff (eds.), *Markt, Kultur und Gesellschaft – Zur Aktualität von 25 Jahren Entwicklungsforschung. Festschrift zum 65. Geburtstag von Hans-Dieter Evers*. Münster: LIT Verlag, pp. 53–75.

- Menkhoff, T. and Gerke, S. (eds.) (2002), *Chinese Entrepreneurship and Asian Business Networks*. London/New York: RoutledgeCurzon.
- Menkhoff, T., Badibanga, U. and Chay, Y.W. (2007), Managing Change in Asian Business – A Comparison between Chinese-educated and English-Educated Chinese Entrepreneurs in Singapore. *The Copenhagen Journal of Asian Studies*, 25:50–73.
- Menkhoff, T., Chay Y. W., and Loh, B. (2004), Notes from an ‘Intelligent Island’: Towards Strategic Knowledge Management in Singapore’s Small Business Sector, *Internationales Asienforum / International Quarterly for Asian Studies* 35(1–2):85–99.
- Menkhoff, T., Evers, H.-D. and Chay, Y.W. (eds.) (2005), *Governing and Managing Knowledge in Asia*. New Jersey: World Scientific Publishing, 2005.
- Nahapiet, J. and Ghoshal, S. (1998), Social Capital, Intellectual Capital, and the Organizational Advantage. *Academy of Management Review* 23(2):242–66.
- Naldi, L., Nordqvist, M., Sjöberg, K. and Wiklund, J. (2007), Entrepreneurial Orientation, Risk Taking, and Performance in Family Firms, *Family Business Review*, 20(1):33–47.
- National Computer Board (1997a), *IT 2000. A Vision of an Intelligent Island*. Singapore.
- National Computer Board (1997b), *Transforming Singapore into an Intelligent Island*. Singapore.
- Ng, Beoy Kui (2002), “The Changing Role of Ethnic Chinese SMEs in Economic Restructuring in Singapore: From ‘Two-legged’ Policy to ‘Three-legged’ Strategy,” in Suryadinata, L. (ed.), *Ethnic Chinese in Singapore and Malaysia: A Dialogue between Tradition and Modernity*. Singapore: Times Academic Press, pp. 255–275.
- Pfeffer, J. and Salancik, G.R. (1978), *The External Control of Organizations: A Resource Dependency Perspective*. New York: Harper and Row.
- Rauch, A, Frese, M. and Utsch, A. (2005), Effects of Human Capital and Long-Term Human Resources Development and Utilization on Employment Growth of Small-Scale Businesses: A Causal Analysis, *Entrepreneurship Theory and Practice*, 29(6):681–698.
- Redding, S.G. (1993), *The Spirit of Chinese Capitalism*. Berlin: de Gruyter.
- Schaffer, R.H. and Thompson, H.A. (1992), Successful Change Programs Begin with Results, *Harvard Business Review*, Vol. 70, No.1, pp. 80–89
- Simon, H. (1996), *Hidden Champions: Lessons from 500 of the World’s Best Unknown Companies*. Boston, MA: Harvard Business School Press.
- Singapore Productivity and Standards Board (2000), *SME 21: Positioning SMEs for the 21st Century*. Singapore: SPSB.

- Smith, N. (1967), *The Entrepreneur and His Firm: The Relationship between Type of Man and Type of Company*. East Lansing, M: Michigan State University.
- SPRING (2007), Speech by Mr Philip Yeo, Chairman, SPRING Singapore, at the Launch of the Collaboration between Philips InnoHub and New Business Development Academy (NBDA) at 2pm on Friday, 21 September 2007, at Philips InnoHub, Philips Electronics Singapore Pte Ltd in Toa Payoh Lorong 1.
- Tan, Hock (1996), "State Capitalism, Multinational Corporations and Chinese Entrepreneurship in Singapore," in G. Hamilton (ed.), *Asian Business Networks*. Berlin: de Gruyter, pp. 157–170.
- Toffler, A. (1991), *Power Shift*. London: Bantam Books.
- Thornhill, S. (2006), Knowledge, Innovation and Firm Performance in High- and Low-Technology Regimes. *Journal of Business Venturing* 21(5):687–703.
- Tushman, M.L., Newman, W.H., and E. Romanelli (1997), "Convergence and Upheaval: Managing the Unsteady Pace of Organizational Evolution," in M.L. Tushman and P. Anderson (eds.), *Managing Strategic Innovation and Change – A Collection of Readings*. New York/Oxford: Oxford University Press, pp. 583–594.
- Von Krogh, G. (1998), Care in Knowledge Creation, *California Management Review* 40(3):133–54.
- Von Krogh, G., Ichijo, K., and Nonaka, I. (2000), *Enabling Knowledge Creation – How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation*. New York: Oxford University Press.
- Von Krogh, G., Nonaka, I., and Nishiguchi, T. (2000), *Knowledge Creation – A Source of Value*. London: McMillan Press Ltd.
- Wiersema, M. F. and Bantel, K.A. (1992), Top Management Team Demography and Corporate Strategic Change, *Academy of Management Journal*, 35(1):91–121.