

FIRM INNOVATIVENESS IN SMES: LESSONS FROM JAPAN

David H. Gilbert

ABSTRACT

Fostering greater firm innovativeness may just be the most critical advantage organisations must develop to effectively compete in the markets of not only today, but those of tomorrow as well. The connection between volatile and dynamic environments and the need for firms to be more innovative is oft made, and Japan in particular has faced trying conditions, experiencing perhaps the most prolonged recession any developed country has witnessed since the Great Depression. This article reports on research undertaken into the underlying components of firm innovativeness in Japanese SMEs. Ten case studies were developed building on results of a quantitative study of over 2000 Japanese SMEs which investigated the underlying components of firm innovativeness. Findings from the case studies support and extend results of the quantitative study, detailing critical associations amongst management and firm employees, individual firm members, groups and work teams, leaders and mentors, along with firm environment issues including regional systems of firm agglomeration and consumer and market uncertainty; associations which have significant impacts on a number of levels in regard to firm innovativeness.

Keywords: firm innovativeness, SMEs, regional milieu, empirical study, managerial implications

INTRODUCTION

Firm innovativeness has increasingly become a core research focus at the individual, firm, regional, national and global levels, across a diverse group of disciplines. The prominence of researching innovativeness has increased as a function of the increasingly dynamic environments in which we live and work. Business-wise, cycle times have shortened for all value chain activities, pressuring firms to be more creative and efficient in meeting ever increasing demands. Yet, our understanding of the underlying components of firm innovativeness remains rather underdeveloped (Wang & Ahmed 2004), despite considerable cross disciplinary research efforts, in fields of enquiry such as management, marketing, economics, and organisational psychology.

It is readily observed in the literature that the two terms innovation and innovativeness are often used interchangeably by theorists (see for example Van De Ven 1986 or Deshpande *et al* 1993), yet there remains significant confusion as to what is being referred to (Gudmundson *et al* 2003). Avlonitis *et al* (1994:21) points out that barely 10 years ago “current thinking...sought to assess innovation on the basis of a single or a small number of adoption decisions undertaken by the firm in the past”. Similarly, Slappendel (1996:108) observed “there is a tendency to objectify the concept... the word innovation is frequently used to describe an object such as a new microcomputer or a late model car”. Hurley and Hult (1998) seeking to clarify definitional issues proposed that innovation pertains to “the number of innovations successfully implemented” and that innovativeness is “associated with cultures that emphasize learning, development, and participative decision making” (1998:42). While recently Wang and Ahmed (2004) conceptualised innovativeness across five dimensions; product, market, process, behavioural and strategic.

David Gilbert is from the School of Management, RMIT University Melbourne Australia

As the research objective of the study reported on here was to examine the overall conditions and actions that influence innovativeness at the firm level and not to trace the development and implementation of a particular ‘innovation’; the term innovativeness in this article encompasses the concepts of newness in systems, processes, products and services, behavioural change, environmental adaptation, and learning and knowledge development; all which occurs in context over time. This embracing of a dynamic conceptualisation of firm innovativeness is significant for several reasons. Firstly, it distinguishes innovation as a tangible new concept, product or service that is developed and adopted by the firm in engendering a performance outcome such as increased sales or reduced labour hours. Secondly, innovativeness whilst also comprising perhaps more evolutionary notions of newness, encompasses and integrates the roles of organisational players, in regard to issues of support and collaboration, decision-making, as well as the learning and development of the individual, team and firm. Thirdly, it allows examination of systems of innovativeness developed over time that may exist external to the firm, a critical issue that in view of some theorists is virtually overlooked (see for example Johannessen *et al* 2001).

Even though theoretical and practical understanding of the critical components that drive firm innovativeness remains somewhat underdeveloped there is consensus amongst theorists that more innovative firms perform better. As Wolfe (1994:405) notes “few issues have been characterized by as much agreement among organizational researchers as the importance of innovation to organizational competitiveness and effectiveness”. Policy-makers likewise concur, Takeo Hiranuma, the Japanese Minister of Economy, Trade and Industry (METI) in the Annual White Article on SMEs in Japan (*Chusho Kigyo Hakusho*) noted in regard to recent Japanese industrial performance, “in all size categories enterprises that are more innovative perform better” (2003:73).

The observation that fostering innovativeness may just be the most critical advantage firms must develop to remain competitive is poignant given Japan’s experiences over the past 15 years where economic growth has been severely stymied and firm competitiveness significantly eroded. The well documented adverse effects of the ‘Lost Decade’ (see for example Hayashi & Prescott 2002; Fukao 2003) indicate that the lessons learnt by managers surviving and even prospering over this difficult economic period enables deep insights to be developed into firm innovativeness. Japanese management practices have long been the source of extensive research, especially given the success of Japanese firms in transforming a war-torn country into a world economic power. However, during the nineties and the early years of the 21st century Japan has appeared to be not so much that mighty world economic power, rather its economy has been beset with maladies that at times have given commentators cause for much hand wringing. As Pain (2003:2) stated “Japan has been in the doldrums for so long that most of us have given up on spending too much time analysing it”. It would appear that the halcyon era of ‘Japan is No.1’ as Vogel (1979) and other observers proclaimed has waned and that the shining light focused on the ‘art of Japanese management practices’ has dimmed somewhat.

Japan has been enmeshed in a more than decade long Keynesian liquidity trap (Lincoln 2004), for even though interest rates are at historical lows the collapse in asset values and decline in prices has led to entrenched deflation. This combined with the insolvency of the Japanese banking system resulting from massive non-performing loans (estimated by the Bank of Japan at a staggering 35 trillion yen) and the strategic paralysis of its politicians has led to a

significant loss of confidence on the part of individuals, households and companies. It is only in very recent times that flickering rays of hope have breached the heavy pall that has remained fixed over the economic landscape and at the forefront of this revival stands the nation's SMEs. As Hiranuma notes, "over the past 40 years, throughout various dramatic changes in the economic environment, SMEs have continued to display their unique strengths. SMEs have underpinned the development of the Japanese economy and it is SMEs that have the leading contribution to make to economic regeneration" (2003:6).

However, Cabinet notes in 2004 regarding the *Structural Reform and Medium-Term Economic and Fiscal Perspective* clearly state that the 'incipient recovery' has been seen "mainly in large corporations and in the manufacturing industry, showing disparity between different sizes and categories of businesses" (2004:2), providing justification to views held by many analysts such as Nabashima (2004) who have labelled the past years as 'the decade of empty slogans'. Policy response to the disparity in economic rejuvenation is that "the government will improve environments to spread the economic recovery movements to small and medium corporations" (2004:2). The policy documents are rather scant in detail regarding how the government proposes to improve environments except for outlining the provision of "revival funds for small and medium corporations" (2004:7) and "the promotion of management innovation" (2004:9). It would appear that the detail will be left to individual firms in regard to engendering greater firm innovativeness.

It is not just in Japan that the value of SME's contribution to economies is acknowledged, Ghobadian and Gallear (1996:85) observe that SMEs are "the life blood of modern economies". However, much of the research into firm innovativeness up to this point has focused on the activities of large corporations (Gudmundson *et al* 2003), yet SMEs contribute more significantly to many country's economic landscape than do large companies. Statistics on business enterprise published by OECD (2004) are compelling, detailing that in Japan 99.5% of all enterprises are SMEs, and that in terms of employment, SMEs in Japan employ 72% of all private sector employees. Rapid technological innovation and diversification in market requirements are generating significant shifts in industrial activity and dramatically transforming many economies from primary output to the manufacture of high value-added products and from the production of goods to the provision of services. As a consequence, all economies, regardless of their stage of development, need to develop and produce an increasingly diverse array of high value-added goods and services. This is an area in which the capability of SMEs to respond flexibly works to their advantage, and SMEs can be at the forefront of driving further structural sophistication and sustained economic growth. Such industrial development must, however, be built upon the presence of SMEs with appropriate managerial and technological know-how. It will also depend upon the development of suitable supporting infrastructure for SMEs. Supporting industries constitute an essential part of the industrial infrastructure needed for expanding foreign direct investment, stimulating the formation of regional production networks, and contributing to domestic and regional economic growth.

The Shock Absorbers of a Nation's Economy

Masayuki Morikawa (1999:12), Director of the Research Office, Small and Medium Enterprise Agency at METI noted that "in a mature economy, growth-oriented and innovative businesses are what give the economy as a whole its vitality. It is therefore no exaggeration to say that the future of the Japanese economy will depend on such SMEs". The importance of SMEs to a nation's economic well-being is substantial, and there is some evidence to suggest

that in times of adversity the importance of SMEs is further enhanced due to the 'shock absorber' effect they have in dampening adverse impacts. The 'shock absorber' thesis centres on the notion that SMEs being smaller, dynamic and versatile in nature are more easily able to leverage their flexibility in adapting to, for example, changes in market demographics and requirements than their larger counterparts. Likewise on the crest of the next peak in the business cycle they are able to take advantage of first-mover advantages by flexibly competing on scope as opposed to scale. Underlying business cycle dampening, however, remains the issue of prolonged economic adversity and it is in these conditions posit theorists such as Nugent and Yhee (2002) that the real value of SMEs is manifested. SMEs enable smoother and quicker structural adjustments in response to any prolonged downturn due to SMEs being less likely than larger enterprises to engage in "collective action to protect their old businesses" and more likely when conditions improve to start new businesses "that can be expected to go through the various stages of growth" (Nugent & Yhee 2002: 99).

It is undeniable that SMEs contribute significantly to Japan's economic performance; 81% of the total workforce (public and private) or 49.11 million people are employed in SMEs, while 51% of total exports are produced by SMEs adding annually approximately 105 trillion yen to Japan's economic activities. Given the importance of SMEs to Japan's economy (and for that matter most other country's economies), combined with the lack of understanding regarding factors that contribute to greater firm innovativeness, the research set out to answer the question 'What are the underlying components of firm innovativeness?' as perceived by owners and managers of SMEs in Japan. The results extend our understanding of the critical issues that impact upon firm innovativeness and provide firm owners and managers with valuable knowledge that will assist their firms in becoming more effective in meeting the ever increasing demands of dynamic business environments.

METHOD

To advance the understanding and definition of the complex issue of firm innovativeness a multi-method research approach was taken. Firstly, from the literature it was observed that factors researchers have accepted as useful in examining innovativeness fall into three broad areas – environmental factors, firm conduct factors and outcome factors. Measurement items were selected from previously validated scales and Appendix 1 presents the constructs, measurement items and sources. Strong patterns emerge in the literature regarding the reliability and usefulness of the items and it is possible in many cases to trace their historical development. However, the scope and diversity of factors and the variables used to measure those factors remains very broad. Hence, in order to condense and create some sense of order amongst so many variables, Principle Components Analysis (PCA) was considered the most appropriate approach given the exploratory nature of the research. As Tabachnick and Fidell (2001:612) detail "PCA is the solution of choice for the researcher who is primarily interested in reducing a large number of variables down to a smaller number of components". Following the PCA, a phenomenological design using case study methodology was used to investigate further the nature of the components. This process enables the researcher to 'tease out the core characteristics' (Renstch 1990) of the issues under investigation or as Hofstede (1999) observes provides both the skeleton and the flesh to the phenomenon.

Quantitative Sample

The sample for the quantitative study is taken from a peak association based in Tokyo representing SMEs whose members are located in the Kanto area of Japan. The association has 2,235 members representative of a wide range of firm sizes and industries. The sample is

consistent with sampling frame characteristics as detailed in the Japanese Government's Small and Medium Enterprise Agency's 2003 *Chuso Kigyo Hakusho* (White Paper on Small & Medium Enterprises). In almost all cases, surveyed firms have been operating throughout the Lost Decade (from 1992 onwards) hence providing an appropriate catalogue of experience regarding issues faced over an extended period of economic lethargy in Japan. Of the 2,235 questionnaires sent to firms 1,868 were returned at a response rate of 83.6%. Of the 1,868 responses 16 responses were not considered useable, meaning the number of useable responses was 1,852 resulting in an effective response rate of 82.9%. Kaiser's measure of sampling adequacy using SPSS 12.0 returned a value of 0.842 indicating that sampling adequacy was achieved and given the matrix exhibited numerous correlations in excess of the significant 0.3 level advocated by Hair *et al* (1998) it was considered suitable for factor analysis. The data analysis was systematically run using all seven extraction techniques individually with each of the five rotation techniques available in SPSS 12.0. Following examination of the thirty five iterations it was found that PCA using varimax rotation would result in the solution converging most expediently (after 16 iterations) and critically in providing the best level of interpretability to the components, while accounting for a slightly higher percentage of variance explained. The PCA accounted for 78.4% of the variance with 12 components extracted having eigenvalues greater than 1. The varimax rotation yielded a range of loadings from 0.414 to 0.835 with all variables identifying strongly with at least one component. To test the reliability of the items and the components, Cronbach's coefficient alpha was computed and at 0.858. exceeds the 0.60 level for exploratory research proposed by Hair *et al* (1998) and the more rigorous 0.80 level advocated by Bryman and Carter (2001).

The quantitative analysis was undertaken to bring some sense of order to a diverse and broad scope of factors thought to be associated with firm innovativeness. The following table provides interpretation of the extensive component matrix given the sample size and number of measurement items. Results of the multivariate analysis were then used to guide and inform the case study analysis clarifying and sharpening conceptualisation in regard to the underlying components of firm innovativeness.

TABLE 1
Summary of Extracted Components

Component Number	Component Label	Component Interpretation
Workplace Factors		
1	<i>Supportive and Trusting Firm Environment</i>	Relates that human actions are centre stage in the innovativeness debate and that the core component facilitating firm innovativeness is the quality and depth of relationships and personal development in terms of trust, support and participation. This supports key issues such as organisational pride, employee competence and reward systems
2	<i>Workplace Atmosphere</i>	Relates that firms must strive to develop an atmosphere of dynamism in the workplace that stimulates firm members, building on personal development, training, employee competency and satisfaction through embracing new technologies, products, processes and solutions

Component Number	Component Label	Component Interpretation
11	<i>Empowerment</i>	Relates that there is an inverse relationship between operational decision-making, empowerment and management approaches based on highlighting mistakes and irregularities and adherence to formal job rules
8	<i>Proactiveness</i>	Relates a strong association between flexibility in management approaches, the development of open, informal communication channels and the firm's ability to initiate action in market environments
Environmental Factors		
3	<i>Regional Networks</i>	Relates that formal and informal networking activities with both business and government agents are critical in increasing firm knowledge
9	<i>Regional Mix</i>	Relates that there is an association between external opportunity, the degree of diversity amongst firms in milieu and the rate of firm learning as a result of knowledge diffusion
12	<i>Regional Agglomeration</i>	Relates that input/output cost reductions a firm may be able to achieve, are associated with access to specialised resources concentrated in a firm's particular local region
6	<i>Environmental Uncertainty</i>	Relates that uncertainty is associated with customer preference and demands for a firm's products and services
Strategic Factors		
4	<i>New Market Development</i>	Relates that new market development supported by key institutional capabilities of being able to change operational processes while maintaining focus on quality control are associated with overall performance
7	<i>Firm Flexibility</i>	Relates that firms must be operationally flexible in adapting to changing business conditions and that underlying this is management's approach to decision-making
5	<i>Ecommerce</i>	Relates that a firm's propensity or inclination to undertake business activities using the internet is dependent upon the level of IT infrastructure in the firm (i.e. quality of system's hardware), sophistication of software to drive the hardware and the level of expertise on the part of employees in using the system. Underlying this is senior management's inclination to take risks in undertaking such activities and investing in such systems
10	<i>Action Orientated</i>	Relates that firms that place strong emphasis on continually seeking to develop new products and services will also be better positioned to take advantage of opportunities and that supporting this there should be a strong focus on cost control

The table describes the critical components necessary to achieve greater process and outcome innovativeness at the firm level, highlighting the importance of a trusting and supportive firm environment. An environment that fosters personal development and interpersonal relationships based on trust, support and participation. This supports key issues such as organisational pride, employee competence and the establishment of appropriate reward systems. As well, such a firm environment nourishes dynamism in the workplace enhancing the employees' capabilities in, and predisposition to, developing and embracing new technologies, products, processes, and solutions. Regional systems of innovativeness were also found to be influential in facilitating greater firm innovativeness, particularly in regard to the creation and development of heterogeneous knowledge networks of both formal and informal nature, especially in combination with the enabling effects of resource and infrastructure agglomeration.

Qualitative Sample

'The power of statistical sampling depends on selecting a truly random and representative sample which will permit confident generalization from the sample to a larger population. The power of purposeful sampling lies in selecting *information-rich cases* for study in depth" (Patton 1987:51-52).

Leveraging the empirical 'power' referred too by Patton in developing a representative sample of SMEs, ten case studies were developed to further investigate the critical issues brought to light by the quantitative study. Eisenhardt (1991), like Patton, recommends researchers choose cases that provide some 'extreme' highlight from which they may learn the most from. Given various interpretations of 'extreme' may be invoked, cases were selected and developed after consideration of several factors. Firstly, analysis of case study data is strengthened by analysis over time (Rogers 1986) hence research participants had to be aware of the significant level of commitment to achieve this. The managers whose views are presented were actively involved in the research for close to three and a half years and in business a lot longer. Secondly, experience of the managers and thus their ability to add to the understanding of what drives innovativeness at the firm level, particularly when guiding organisations through the worst economic times Japan has seen since the Second World War. Thirdly, a wide range of industries would be required to gain a representative perspective in keeping with the design of quantitatively exploring possible factors from a large sample and investigating the issues behind these factors in a qualitative fashion - the skeleton and flesh approach advocated by Hofstede (1991). The ten case studies developed all met the criteria detailed and were considered capable of providing the 'information-rich' data Patton (1987) advocates.

The case participants were all owners or presidents of SMEs operating in Japan and bring to the table a wealth of experience and knowledge. A case protocol was developed to ensure uniformity in approach and each case participant was interviewed three times over a period of eighteen months. The interviews were semi-structured in nature with all proceedings taped using an IC recorder which enabled the interview proceedings to be downloaded to a laptop for thematic analysis. The first series of interviews centred on two open-ended questions; "What does firm innovativeness mean to you?" and "What are the likely outcomes of greater firm innovativeness?". At the conclusion of the first interview each case participant was provided with an extensive summary of each of the 12 components extracted from the PCA (similar in nature to Table 1 but more comprehensive outlining the measurement items that

loaded on each component) and asked to consider the nature of each component and their importance in influencing firm innovativeness. The second round of interviews began six months after the first and on this occasion the interviews were more focused in nature whereby firstly results from the initial interview which had been coded and tabulated were presented and discussed. Following which, case participants were asked to discuss their opinions regarding the nature of the 12 components and then to compare or contrast this with their own perceptions provided in the first interview. At the conclusion of the second interview case participants were asked again to consider the results from the first interview and the material from the quantitative analysis and requested to examine the importance of the material in regard to firm innovativeness. At this stage it was indicated that during the third round of interviews case participants would be asked their opinion regarding the relative importance of the material in regard to firm innovativeness. The final round of interviews which began some fifteen months after the first round served to refine and focus results gathered from the first two rounds of interviews.

RESULTS AND DISCUSSION

As a result of the iterative process undertaken in the case studies strong themes emerged which to a significant extent reflected the results that emerged from the quantitative study. The factors found to be relatively important are summarised and presented in the following table.

TABLE 2
Results of Case Thematic Analysis

Nature of Themes	
Workplace Related	In innovative companies the relationship between management and employees is very healthy and based on trust and respect
	Innovativeness must be nurtured and supported by a core group of leaders who must be prepared to grow and change.
	Employees and management must be challenged by providing them with on-going training and development
	Working harmoniously together but also encouraging individual brilliance
	Strong strategic orientation - action needs to be undertaken in the present to take advantage of opportunities in the future
	effective leadership that brings out the best in individuals while ensuring that combined efforts are exponential in power
	Bringing new blood into the organisation
	Creating an atmosphere at work that makes it enjoyable to be there
	The need to be skilful at putting together the right amount of resources in the right combinations
	The leaders of innovative firms know how to reward their people, not just monetarily but in other ways, for example recognition and greater personal development
	Strong skill and competency base
	Open communication channels and flatter organisational structures
Environment Related	

Nature of Themes	
	Being ahead in understanding customers by refining constantly the way the business interacts with its customers
	Firms become more innovative in response to uncertain and hostile business conditions
	Regional focus extremely important from a cost reduction and resource access perspective. Innovative firms take advantage of what their region has to offer
	Innovative firms are open systems that are not afraid of what the environment holds, the environment will always be dynamic and prone to change hence innovative firms welcome the opportunities that this presents
	Being abreast of the latest developments in the industry and in other industries particularly those associated in some way with the firm's main industry
	The need for sharply focussed policy direction on the behalf of government agencies
	Strong need for effective infrastructure
Outcome Related	
	Creating a brand built on quality
	Being novel and dynamic
	Being flexible but standards orientated
	Embracing maturity but remaining young.
	Ensuring everybody in the firm felt like they were part of a big family
	Innovative firms have an 'energy' that is difficult to explain but can be felt
	Innovative firms strike the right balance between creating and doing
	Innovative firms also do the little things correctly. They have an eye for detail
	Quick to understand new paradigms and taking advantage of them
	Innovative firms listen to their employees
	Resourceful and flexible, doing more with less which is driven by the cross-pollination of ideas and effective knowledge diffusion
	The firm is associated with being creative and cutting edge
	Innovative firms are proud firms because they know that something a little special sets them apart, they believe they can do things better than most anyone else due to greater skills and competencies
	High rate of learning. More knowledge leads to more open minds, meaning employees and management are more willing to investigate and adopt new systems. Effective networking essential in developing knowledge and formal and informal means should be used to access information
	Understanding and using new technology
Innovative companies learn from their mistakes and are not afraid to make them	

The results synthesise and extend critical aspects of a number of theoretical perspectives including the individual innovativeness perspective, the structural perspective, interactive perspectives and regional and national systems of innovativeness. It is evident that our understanding of the drivers of firm innovativeness must be multifaceted, managers must

actively work towards developing and nurturing firm-centric and firm-exterus climates for innovative activity to occur.

The individual innovativeness perspective assumed that individuals were the drivers of change in an organisation. Schumpeter (1934) noted that in order for individuals to be entrepreneurial and achieve innovative behaviour development of 'new combinations' was vital. These long held views supported by numerous others such as Scott and Bruce (1994:582) who detailed the significant impact of the interaction between "individual, leader, work group, and climate for innovation" on individual innovative behaviour, are echoed by results of this research; though in conjunction with other drivers of change external to the organisation that have become increasingly more important.

A considerable body of empirical research has been developed in regards to the components of organisational structure. Damanpour (1991) conducted a meta-analysis of research findings whereby empirical results were systematically cumulated to test the stability of the wide array of variables offered by researchers as structural determinants of innovativeness. He considered this exercise important as "organizational variables have been the most widely studied, and some authors have pointed to their primary importance as determinants of innovation" (Damanpour 1991:557). Malecki (1995) has noted that SMEs are disadvantaged in terms of resource munificence compared with larger companies however, one plane that SMEs can effectively compete with larger companies on is the development of an innovative climate and culture. In this regard managers would do well to cast a wide net in building-up the capabilities of firm members through training and development programmes, through supporting employees in their endeavours and through rewarding firm members in an appropriate fashion. Results from the case studies reflect Damanpour's views and those of Johannessen, Olaisen and Olsen (1999) who proposed that managers in more innovative firms exhibited the qualities of 'focus, mastery, intensity and integrity' (1999:116). In order to 'focus' on being more innovative managers need to be willing to take risks, be proactive and set personal goals. In terms of 'mastery' managers need to develop tools and processes that inspire commitment, initiate change whilst effectively managing time. 'Intensity' describes drive and energy; that little bit extra beyond 'motivation, focus, self-confidence, determination or will'. Whilst 'integrity' is critical in the development of trust, personal values and guiding ethical heuristics, which impact upon the capacity of the manager to nurture and respect others.

Stronger interpersonal relationships among firm members have been found in this study to be critical in facilitating greater creativity and learning. Furthermore, the ability of management to provide support to employees via open communication channels on both formal and informal levels, training and education programmes to enable personal development and what may be referred to as systemised freedom and creativity, is also vital. Systemised freedom may appear to be somewhat of an oxymoron however, Japanese philosophy is oft characterised by a paradoxical undercurrent representing the mutuality between underlying structure and beauty and elegance. To enable freedom and creativity, employees and management must be confident in the support of organisational systems that deal with the tangible so that the intangible may be fostered. So too, they must be confident in each other's competency which is a function of the skills and capabilities developed through experience, managerial support, training and education. To conceptualise and develop novel ways of doing things, firm members must feel the security of support and trust from management which will empower them to participate and contribute at a level far in excess, than if support

and trust was lacking, creativity and learning will not magically occur without a supportive framework. Firm members need to be listened to, for they are a valuable source of internal knowledge, they must be encouraged and provided a means to feedback formally and informally into a firm's communication channels. As well, recognition is a powerful motivator and the issue of appropriate rewards being developed and bestowed is an essential element in fostering greater participation and effort. It is vitally important that firm owners and management build emotional equity in the firm, bestowing great value on firm members but netting collectively for the firm even greater value in terms of knowledge, skills, competencies, creativity and commitment.

Knowledge management has also become an area of critical interest for theorists, with Nonaka (1988) and Takeuchi (1992) in particular, going to great lengths to explore the impacts that both explicit and implicit knowledge has on organisational learning and innovativeness. As Nonaka (1994:14) observes, "knowledge, and not simply information, is the primary source of an organization's innovative potential". More recently Rodin and Galunic (2004) examined individual managerial performance in fostering innovativeness in a European communications company. Their results suggest that it is critical to understand how managers develop and implement knowledge, claiming the paramount factor in innovativeness development to be knowledge heterogeneity amongst managers in a network setting. This reflects the interactive perspective which points to the influence that human behaviour and learning has on shaping environments and the influence that environments have on shaping human behaviour and learning. Interestingly, findings from this study extend these views into the domain of spatial economics and suggest that it is vital that SME managers compliment internal organisational development with external engagement in regional systems of innovativeness to fully realise the learning and innovative potential of their firms.

The interaction between firm behaviour and geographical systems, particularly regional systems of innovativeness, has emerged in the past few years as a new and exciting avenue of enquiry. According to Johannesson *et al* (2001:20) in the last decade there has been 'explosive attention' levelled on firm innovativeness "as a means to create and maintain competitive advantages" and one of the key drivers they hypothesise is the influence of regional systems on innovative activities at the firm level. The authors' results of a study into European firms indicate that firm innovativeness is positively influenced by the firm's ability to interactively learn by creating and using new knowledge. Yamada (2003:302) concurs, noting that "the social infrastructure and learning environment in a region" are "the determinants of competitiveness and innovation". For managers, the value of effective engagement in regional network building has perhaps become slightly overlooked in our rush to be 'global' in outlook. This study's results show that a readjustment may be required in that tapping into and developing further, regional knowledge networks heterogenous in scope and both formal and informal in nature, should become a priority for SMEs. In developing this regional interaction, positive impacts on profitability issues such as cost and risk reduction as well as access to new markets and specialised resources can be achieved. But perhaps more significantly, in the long run being engaged in the region enables firms to develop capabilities in gathering information on a number of levels that may offer immediate opportunity or be transformed to knowledge, fuelling a continual growth cycle in organisational learning and development.

CONCLUSION

Firm innovativeness has become an issue of major importance in the quest to develop companies that are more creative, efficient, competitive and most importantly healthy in the long-term. Results presented in this article highlight the importance of a trusting and supportive firm environment; one that fosters personal development and interpersonal relationships based on trust, support and participation. This supports key issues such as organisational pride, employee competence and the establishment of appropriate reward systems. As well, such a firm environment nourishes the development of dynamism in the workplace enhancing the employees' capabilities in, and predisposition to, developing and embracing new technologies, products, processes, and solutions. Regional systems of innovativeness were also found to be influential in facilitating greater firm innovativeness, particularly in regard to the creation and development of heterogenous knowledge networks of both formal and informal nature, combined with the enabling effects of resource and infrastructure agglomeration. The strong associations found between regional systems and firm innovativeness included input/output cost reduction issues as well as resource access issues. Furthermore, it was found that firm networking activities were enabled by a diverse mix of businesses in milieu which impacts positively on information gathering activities and knowledge development on individual, group and firm levels. This facilitates the generation of ideas, creativity and hence innovativeness in respect to operations, customers, market maintenance and development and perhaps most critically feeds back into the firm's psyche, promoting learning, competence, commitment and satisfaction.

The study of firm innovativeness has in most cases occurred from a uni-dimensional perspective due no doubt to the complexities involved, with activities such as new product development or new technology adoption isolated via a priori assumptions to gauge impacts on firm outcomes. This propensity to isolate a particular factor and examine its impact on firm innovativeness has in recent times been challenged. Criticism has been levelled at this approach as the results tend to be skewed in favour of the uni-dimensional selection of variables, depriving the findings of any real meaning. Yet this reductionist approach to investigating a complex phenomenon continues (see for example Salavou 2004), with some claiming that by examining a multi-dimensional phenomenon through a microscope it will help "shed light on a more focused orientation within this research stream" (Salavou 2004:37). However, others remain unmoved by this appeal, as Wang & Ahmed (2004:303) note "product innovativeness emphasises the outcome-orientated innovative capability, but undermines the importance of underlying factors, such as behavioural changes, process innovation and strategic orientation towards innovation". Likewise, Wilson *et al* (1999) assert innovativeness must be treated as a multi-dimensional phenomenon otherwise the conceptualisation will remain shallow and threadbare. The study this article reports on was extensive involving well over 2000 SMEs and their owners and/or managers, engaging both quantitative and qualitative approaches to data gathering and analysis and was conducted over a three year period. The results unequivocally validate a multi-dimensional approach to better understand the issue of firm innovativeness and perhaps the most puissant result of the research is that instead of focusing on a particular innovative activity, such as new product development or rates of adoption of new technology, managers would be better rewarded by concentrating on the underlying support mechanisms and interpersonal links that form the basis of any human interaction involved in these and other organisational activities. The quality of the interrelationships between management and firm members and amongst firm members themselves is the fabric which binds the character of the organisation—the raw

ingredients for greater innovativeness largely reside within the firm, yet often lie wastefully dormant.

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Appendix 1: Quantitative Constructs & Measurement Items

Construct	Measurement Items	Source
Strategy	<ul style="list-style-type: none"> • Strong tendency for high-risk projects • Adoption of a very competitive posture • Initiating competitive strategies • Focus on cost control • Focus on quality control • Degree of customer focus • Degree of operational flexibility • Leaders make bold wide-ranging decisions • Ability to process information • Level of participation of organisational members • Flexibility in decision-making 	<ul style="list-style-type: none"> • Khandwalla (1977); Covin & Slevin (1988); Hart(1992) Ozsomer <i>et al</i> (1997) Tegarden <i>et al</i> (2003) • Khandwalla (1977); Covin & Slevin (1988); Ozsomer <i>et al</i> (1997); Tegarden <i>et al</i> (2003) •Covin & Slevin (1988); Matsuno, Mentzer & Ozsomer (2002); Tegarden <i>et al</i> (2003) •Herbig et al (1994) Wagner & Digma (1997); Miller & Toulouse (1998) • Robinson & Pearce (1988); Miller & Toulouse (1998) • Khandwalla (1977); Covin & Slevin (1988); Samiee & Rogers (1992); Miller & Toulouse (1998) • Covin & Slevin (1988); Avlontis <i>et al</i> (1994)Matsuno <i>et al</i> (2002) • Khandwalla (1977); Miller & Droge (1986); Ozsomer <i>et al</i> (1997); Tegarden <i>et al</i> (2003) • Covin & Slevin (1988); Eisenhardt (1989); Takeuchi & Nanoka (1991); Hart (1992); Sarason &Tegarden (2003) • Hart (1992); Takahashi (1997); Tegarden <i>et al</i> (2003) • Simon (1962); Butler <i>et al</i> (1986); Harrison & Pelletier (2000)

Construct	Sub - Elements	Measurement Items	Source
Uncertainty		<ul style="list-style-type: none"> •Rate of product/service obsolescence •Unpredictability of competitor's actions •Unpredictability of customer demands and tastes •Rate/degree of industry technology changes 	<ul style="list-style-type: none"> • Miller & Droge (1986); Ozsomer et al (1997) •Miller & Droge (1986); Ozsomer et al (1997) •Miller & Droge (1986); Miller (1993); Ozsomer et al (1997); Miller & Toulouse (1998) • Miller &Droge (1986) Lee & Miller (1996); Miller & Toulouse (1998)

	Hostility	<ul style="list-style-type: none"> •Degree of riskiness of environment •Degree of hostility •Opportunities available to firm •Degree of control 	<ul style="list-style-type: none"> •Khandwalla (1977); Miller & Droge (1986); Miller (1993); Ozsomer <i>et al</i> (1997) •Khandwalla (1977); Miller & Droge (1986); Miller (1993); Ozsomer <i>et al</i> (1997) •Khandwalla (1977); Miller & Toulouse (1986); Hart (1992) •Khandwalla (1977); Covin & Slevin (1988) Avlonitis, Kouremenos & Tzokas (1994)
	Turbulence	<ul style="list-style-type: none"> •Degree of dynamic change •Market reorientations •Degree of periodic fluctuation 	<ul style="list-style-type: none"> •Khandwalla (1977); Miller & Droge (1986); Miller (1993); Ozsomer <i>et al</i> (1997) •Khandwalla (1977); Miller & Toulouse (1986); Hart (1992) •Khandwalla (1977); Covin & Slevin (1988) Ozsomer <i>et al</i> (1997)
	Heterogeneity	<ul style="list-style-type: none"> •Degree of market diversity •Customer preferences •Diversity of marketing strategy 	<ul style="list-style-type: none"> •Miller & Droge (1986); Miller (1993); Ozsomer <i>et al</i> (1997); Miller & Toulouse (1998) •Khandwalla (1977); Covin & Slevin (1988) Ozsomer <i>et al</i> (1997) •Khandwalla (1977); Miller & Droge (1986); Miller (1993); Tegarden <i>et al</i> (2003)
	Technological Complexity	<ul style="list-style-type: none"> •Degree of technological change •Degree of sophistication •Level of R&D 	<ul style="list-style-type: none"> •Khandwalla (1977); Covin & Slevin (1988) Avlonitis, Kouremenos & Tzokas (1994) •Khandwalla (1977); Covin & Slevin (1988) Ozsomer <i>et al</i> (1997) •Khandwalla (1977); Covin & Slevin (1988)

Construct	Measurement Items	Source
Regional Systems of Innovativeness	<ul style="list-style-type: none"> •Degree of interaction with suppliers/distributors •Level of network development •Nature of networks •Degree of static agglomeration •Extent of Government support 	<ul style="list-style-type: none"> • Hekanson (1989); Harrison, Kelley & Gant (1996); Neely; Filippini, Forza, Vinelli & Hii (2001) •Abe & Alden (1988); Rothwell (1991); Ozsomer <i>et al</i> (1997); Goto & Odagiri (1997) •Covin & Slevin (1988); Rothwell (1991); Fujita 1993; Goto & Odagiri (1997); North & Smallbone (2000) •Herbig <i>et al</i> (1994); Harrison <i>et al</i> (1996);

Construct	Measurement Items	Source
	<ul style="list-style-type: none"> • Diffusion of knowledge • Degree of learning • Access to scarce resources • Extent of cost reductions (economies of scale) 	<p>Johannessen <i>et al</i> (2001) Urata (2002)</p> <ul style="list-style-type: none"> • Shapira (1992); Camagni (1996); Harrison <i>et al</i> (1996); Neely <i>et al</i> (2001) • Covin & Slevin (1988); Rothwell (1991); Nanoka (1994); Goto & Odagiri (1997) • Fujita & Hill (1993) Cooke & Morgan (1994); Neely <i>et al</i> (2001) • Camagni (1996); Edgington (1997); Neely <i>et al</i> (2001) • Herbig <i>et al</i> (1994); Cooke & Morgan (1994); Neely <i>et al</i> (2001) Urata (2002)
Structure	<ul style="list-style-type: none"> • Nature of interpersonal relationships • Employees participation in decisions • Leadership facilitation • Provision for training and advancement • Awards and Rewards • Work group co-operation, trust and friendliness • Degree of conflict and ambiguity • Job challenge, variety and importance • Professional & organisational esprit • Reasonableness of workload • Degree of decision-making centralisation • Degree of specialisation and level of employee competency • Functional differentiation • Emphasis on adapting 	<ul style="list-style-type: none"> • Deshpande & Webster (1989); Scheider <i>et al</i> (1996); Ahmed (1998) • Newman (1977); Pettigrew (1979); Scheider <i>et al</i> (1996); Ahmed (1998) • Quinn & Rohrbaugh (1983); Deshpande <i>et al</i> (1993) • Dennison (1995) Ahmed (1998) Gudmundson <i>et al</i> (2003); Humphreys (2002) • Kanter (1983) Schneider <i>et al</i> (1996) Ahmed (1998) • Newman (1977); Scheider <i>et al</i> (1996); Ahmed (1998); Wallace <i>et al</i> (1999) • Jones & James (1979); Kanter (1983); Wallace <i>et al</i> (1999); Kangis <i>et al</i> (2000) • Jones & James (1979); Wallace <i>et al</i> (1999); Kangis <i>et al</i> (2000) • Jones & James (1979); Wallace <i>et al</i> (1999); Kangis <i>et al</i> (2000) • Newman (1977); Locatelli & West (1996); Ahmed (1998) • Thompson (1965); Pierce & Dalbecq (1977); Damanpour (1991) • Aiken & Hage (1971); Kimberly & Evanisko (1981); Damanpour (1991) • Baldrige & Burnham (1975); Damanpour (1991); Kangis <i>et al</i> (2001) • Khandwalla (1977); Miller & Droge (1986); Ozsomer <i>et al</i> (1997); Tegarden <i>et al</i> (2003) • Khandwalla (1977); Miller & Droge (1986); Ozsomer <i>et al</i> (1997); Woods & Joyce (2003) • Burns & Stalkker (1961); Thompson (1965); Aiken & Hage (1971); Damanpour (1991); Woods & Joyce (2003)

Construct	Measurement Items	Source
	<p>to changing circumstances</p> <ul style="list-style-type: none"> • Favouring open channels of communication • Degree of formalisation and flexibility • Idealized influence • Inspirational motivation • Contingent rewards • Intellectual stimulation and prevailing atmosphere • Management by exception • Individualized consideration 	<ul style="list-style-type: none"> • Bass (1985); Avolio, Waldmen & Einstein (1988); Avolio & Bass (1995); Humphreys (2002) • Bass (1985); Avolio, Waldmen & Einstein (1988); Avolio & Bass (1995); Humphreys (2002) • Bass (1985); Avolio, Waldmen & Einstein (1988); Avolio & Bass (1995); Humphreys (2002) • Bass (1985); Avolio, Waldmen & Einstein (1988); Avolio & Bass (1995); Humphreys (2002) • Bass (1985); Avolio, Waldmen & Einstein (1988); Avolio & Bass (1995); Humphreys (2002) • Bass (1985); Avolio, Waldmen & Einstein (1988); Avolio & Bass (1995); Humphreys (2002) • Bass (1985); Avolio, Waldmen & Einstein (1988); Avolio & Bass (1995); Humphreys (2002)
Innovativeness	<ul style="list-style-type: none"> • Seeking of novel, unusual solutions • Dynamic atmosphere in firm • Rate of adoption of new technologies • Quick to act on opportunities • Extent of knowledge development and diffusion • Astute information gathering in formal and informal channels 	<ul style="list-style-type: none"> • Miller & Friesen (1983); Miller & Droge (1986); Ozsomer et al (1997) • Locatelli et al (1996); Ahmed (1998); Kangis et al (2000); Tegarden et al (2003) • Khandwalla (1977); Miller & Friesen (1983); Avlonitis et al (1994); Ahmed (1998) • Ahmed (1998); Kangis (2000); Tegarden et al (2003) • Covin & Slevin (1988); Eisenhardt (1989); Takeuchi & Nanoka (1991) Imai (1996) • Takeuchi & Nanoka (1991) Imai (1996); Takahashi (1997); Harrison & Pelletier (2000)