Defining knowledge management (KM) activities: towards consensus

Lisa G.A. Beesley and Chris Cooper

Lisa G.A. Beesley and Chris Cooper are both at the University of Queensland, Ipswich, Queensland, Australia.

Abstract

Purpose – *The purpose of the paper is to present a vocabulary of terms that clearly define knowledge management (KM) activities in order to move towards consensus in the adoption of a common language within the field.*

Design/methodology/approach – *Existing literature across several disciplines has been integrated to provide a clear description of the sorts of activities an individual undertakes in order to move from knowledge acquisition to innovation, and a clarification of the terms used to describe such activities is put forth.*

Findings – *Adoption of a common vocabulary to describe KM activities provides a platform to better understand how best to manage these activities, and enables clearer identification of the knowledge management capabilities held by various sectors within the broader business community.*

Research limitations/implications – *There is a need to undertake empirical research and in-depth case studies of knowledge management practices using a common vocabulary as a framework with which to interpret findings.*

Practical implications – *The adoption of a common frame of reference to describe knowledge management activities will deepen understanding of current KM practices, enable identification inhibitors and facilitators of KM, lead to increased dialogue between academia and industry, and present opportunities to the education sector to incorporate such a vocabulary into its curriculum.*

Originality/value – *The framework presented here will remove the veil of mystery that currently clouds knowledge management and facilitate broader uptake of KM practices, thereby realising the benefits of a knowledge-based economy in the broader business community.*

Keywords *Small to medium-sized enterprises, Knowledge management, Innovation, Knowledge transfer*

Paper type *Conceptual paper*

Introduction

In the knowledge-based economy innovation is key to competitive advantage and economic growth. As such, it is high on the agendas of government policy makers as they seek to create environments that support the activities needed to foster innovation (OECD, 2000). Knowledge is well recognised as a fundamental antecedent to innovation (Darroch and McNaughton, 2002), and how it is generated, disseminated, managed and applied will continue to be a distinguishing factor among the strongest economies (OECD, 1996; DETYA, 1999). As a concept, knowledge management (KM) has enjoyed a decade of immense popularity and moved past the status of being ''fashionable'' to now being anchored in strategic and management processes of corporations, governments, and institutions (Malhotra, 2005). However, whilst KM is lauded as an approach that will foster economic growth, it is surrounded by confusion and poor understanding of its use and this has limited the extent to which the broader business community has employed deliberate KM practices (Raub and Von Wittich, 2004).

Part of the confusion that surrounds KM can be attributed to its evolution - KM is multidisciplinary and many of the terms used to describe KM activities have been adapted from other disciplines and although they have distinctly different meanings among those who use them, they are often used interchangeably (Chase, 2006; Hicks *et al.*, 2006). Recent contributions to the field have sought to dilute the hype and bring some clarity to models, terms, and constructs used to describe KM activities, yet no consensus on terminologies to describe the activities that characterise KM has been reached (Spender, 2006; Debbie, 2006; Wong and Aspinwall, 2006). Perhaps the most frequently cited construct used to describe knowledge is the tacit (implicit)/explicit dichotomy (Polanyi, 1966). Explicit knowledge is that which has been codified and is easily available to others. By contrast tacit knowledge is intensely personal and difficult to impart to others in ways that are meaningful. Early work within the field of KM focused on storage and accessibility of explicit knowledge in central repositories.

More recent research has stressed the importance of tacit knowledge and has sought to identify means to harness and utilise this knowledge to contribute to organisational competitiveness. From this perspective knowledge is increasingly viewed as an activity within and among individuals, rather than as an object – data and information are ''objects'' that can be stored and traded and classified as tangible assets, but knowledge is an intangible asset that develops as a result of certain mental activities undertaken by the individual. If knowledge is to be shared with others then the recipient/s must also engage in certain cognitive activities if the transfer of knowledge is to be successful. This perspective accentuates the ''humanness'' of knowledge and the role of the individual in KM initiatives, yet it is possibly within this arena that the greatest confusion exists in relation to the terms used to describe KM activities. The purpose of this paper is to present a clear description of the sorts of activities an individual undertakes in order to move from knowledge acquisition to innovation, and a clarification of the terms used to describe such activities. In so doing, it will provide a platform to better understand not just how best to manage these activities, but also will enable clearer identification of the knowledge management capabilities held by various sectors within the broader community.

This paper has been structured into three parts. The first part of this paper highlights the nexus between knowledge and innovation and the incumbent need to engage the broader business community in the knowledge-based economy. The second section details the sorts of activities an individual engages in to acquire knowledge and terms that can be used to describe these activities. The final part of this paper offers strategies for achieving knowledge acquisition and innovation within the broader business community, and implications for utilisation of the terminologies in future research undertakings.

It is important to note that throughout this paper a purposeful endeavour has been made to present concepts in a simplified manner. This endeavour is in no way meant to diminish the depth and rigour of research that has been undertaken within the field of KM and its associated disciplines. Rather, the intention is to clarify the sorts of activities that are required to move from information to innovation and propose a set of terms that hold common meaning and are meaningful to both academia and the broader business community.

The nexus between innovation and knowledge

The idea that knowledge plays an important role in the economy is not new (Schumpeter, 1934; Skyrme, 1999) but it was through Romer's (1990) ''new growth theory'' where crucial importance was attributed to human capital and the production of new technologies, that knowledge moved to centre stage. A defining characteristic of today's knowledge-based economy is that it relies upon innovation and intellectual capital to generate economic value. This differs significantly to long-established economic theory that emphasises the production of hard goods to spawn economic growth (Drucker, 1993). In broad terms, innovation incorporates new products, processes, markets, raw materials, and new forms of organisation (Schumpeter, 1934). At an organisational level, a more recent definition of innovation is ''the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services'' (Luecke and Katz, 2003, p. 2). Thus the

"The knowledge-based economy is characterised by innovation, which is fundamentally linked to new knowledge."

knowledge-based economy is characterised by innovation, which is fundamentally linked to new knowledge.

Since the mid-1980s radical global changes have forced organisations to look towards means of harnessing and growing their intellectual capital to achieve competitive advantage and, in turn, long-term survival. The ways in which the intellectual capital, or knowledge held within an organisation is transformed into innovation is now a central concern to management and KM is crucial to the process (Wong and Aspinwall, 2006). The growth of KM over the past ten years has been impressive and while led by high tech sectors, a primary focus of government policy makers now is how to engage the broader business community, largely comprised of SMEs, to understand their role in a knowledge-based economy and adopt KM practices that will foster innovation.

The popularity of KM however, should not be seen as a measure of its success. In terms of improved performance, KM initiatives have met with mixed (if not limited) success (Malhotra, 2003), to the extent that many companies now avoid the use of the term ''knowledge management'', replacing it with ''benchmarks'', ''best practice'' (Call, 2005), or even replacing the word ''knowledge'' with ''insights'' to avoid getting caught up in the ''hype'' that surrounds the concept. The general theme within investigations into the failures of KM initiatives suggests that the key to effective KM is to maintain a balance between the individual, organisational, social, and technological factors that more or less influence the creation, dissemination, and utilisation of knowledge (Beesley, 2004; Call, 2005; Cooper, 2006) – KM failures could be attributed to an over-emphasis on technologies and insufficient acknowledgement of the ''humanness'' of knowledge. More recent work in KM is placing increasing emphasis on knowledge management through organisational cultures, structures, and systems that facilitate the flow of knowledge among people, with structures and systems supported by technologies, yet ironically, this has resulted in increasing confusion in how best to manage KM initiatives.

As an emerging science, KM has drawn from a wide range of established disciplines such as organisational learning (Senge, 1994), networking (Beeby and Booth, 2000, Powell, 1990), intellectual capital (Sullivan, 1999, Brooking, 1996, Bontis, 2001), social construction (Wilson, 1996; Innes, 1992), communities of practice (Lesser *et al.*, 2000; Wenger and Snyder, 2000; Coakes and Clarke, 2006; Verburg and Andriessen, 2006), and social interaction (Nonaka and Takeuchi, 1995; Sveiby, 1997; Barsade, 2002; Beesley, 2005). As a result, there is a multiplicity of terms being used interchangeably, often producing conflicting definitions (Hicks *et al.*, 2006). As Hicks *et al.* (2006) state:

> There is a consensus that data are discrete facts, but after that, consensus is lacking. The lack of consistent definitions for data, information, and knowledge make rigorous discussions of KM difficult (p. 19).

This paper argues that part of the reason for the confusion that surrounds KM is due to a lack of precision in terminology. This has exacerbated the poor understanding of KM practices in the broader business community. Consistent definitions of the building blocks of KM are lacking, and there is no real consensus on definitions that describe the activities that are required to transform information to knowledge, and then knowledge to innovation. This lack of consensus on the terms used to describe components of KM makes rigorous debate difficult in communities that are familiar with the concept of KM. If these communities find the terminology confusing, then the position is much worse for the broader business community who do not posses the same depth of understanding of the topic. In light of this it is argued

that the broader business community has lagged behind high-tech industries in understanding their role in a knowledge-based economy, and how they might best work within it. The following section highlights the economic importance of the broader business community and the reasons why it is necessary for them to fully engage in today's knowledge-based economy.

The broader business community in a knowledge-based economy

The broader business community is largely comprised of SMEs and makes significant contributions to a nation's economy. In OECD countries they account for over 95 per cent of enterprises, generate two-thirds of employment and are the main source of new jobs (OECD, 2005). The OECD (2005) define SMEs as enterprises with 250 employees or less, yet the dominance of small ($\leq$ 50 employees) or micro enterprises ($\leq$ 9 employees) characterise various sectors. For example, in Australia 70 per cent of tourism businesses have five or less employees (DITR, 2006). This is significant as limited resources (in both time and money) mean SMEs have little opportunity to engage in deliberate KM activities (such as in-house research and data collection) that would encourage innovation. Therefore, SMEs must seek out external sources for knowledge.

Recent research suggests that managers and employees of SMEs do engage in knowledge management practices, whether consciously or not, yet the type of external knowledge they seek is limited (Desouza and Awazu, 2006). Research has shown that managers of SMEs frequently lack the capacity (Robinson and Pearce, 1984; Glen and Weerawaradena, 1996) and often the inclination (Malone and Jenster, 1991) to utilise research to inform their management activities. SMEs remain reluctant to engage with the research community as a source of external knowledge and they rarely are in a position to utilise this knowledge in a deliberate fashion in strategic planning and management activities. This is despite several government policies that highlight the importance of establishing greater links with academia and industry, and science/higher education policies that demand greater interaction among academic and business communities (Etzkowitz *et al.*, 2000; Santoro and Bierly, 2006).

That SMEs do not characteristically engage with academic research is well documented and the gap between them often referred to as the ''cultural divide'' (Snow, 1959). There are signs that recent science/higher education policies have made advances towards the bridging of this ''divide'' (Rynes *et al.*, 2001; Santoro and Bierly, 2006) and indeed, that increased interaction among academia and industry may well have facilitated the popularisation of KM, yet this interaction has not resulted in a clear understanding of how to embrace the concept and embed it in to business practices. The following section presents a clarification of KM activities and a set of terminologies that might be used to describe them. Examples used throughout this section refer to the transfer of knowledge between academia and SMEs since it is this type of research that holds great potential in terms of increasing the level of innovation in SMEs, yet that which they are most hesitant to engage with in a deliberate fashion.

Knowledge as an activity

The terms ''knowledge creation'' and ''knowledge acquisition'' are often used interchangeably, as are the terms ''dissemination'', ''knowledge transfer'', and ''knowledge extension'', yet strictly speaking these are distinctly different activities. As each of these terms is described it will become apparent why knowledge should be viewed as an activity and how this perspective serves to enhance understanding of KM practices. Part of the confusion in the use of these terms may rest within the variations of context in which the term ''knowledge'' itself is used.

Defining knowledge

Trends in knowledge management research show an increasingly psychological (as opposed to technical) view of knowledge management (Brauner and Becker, 2006; Soekijad *et al.*, 2004; Hislop, 2003; Rowley, 2006; Schönström, 2005). In other words, knowledge is considered to be that which is embedded within individuals and occurs either as a result of

> **"Research suggests that KM failures could be attributed to an over-emphasis on technologies and insufficient acknowledgement of the 'humanness of knowledge'."**

experience, or is generated through thinking or reasoning; otherwise it remains as data or information (Brauner and Becker, 2006). From this perspective knowledge can be seen as an activity; data and information are objects.

This distinction is also pivotal because of the critical differences in access. Whereas data and information can be stored externally, accessed easily, and traded, knowledge (where knowledge is defined as information with meaning (Amidon, 1997)) can only be amassed within individual knowledge networks and can only be shared if those who have it are prepared to do so (Brauner and Becker, 2006). This definition impacts greatly upon how we view knowledge and research outputs. For example, research outcomes might be knowledge to those who created it, but once it is codified or expressed it immediately becomes information to others until they have applied thought or reasoning to it and incorporated it within existing individual knowledge networks. Knowledge creation, driven by curiosity or in response to a problem, refers to the deliberate and purposeful collation of observations, data, or facts to generate new or novel ways of understanding a particular phenomenon. On the other hand, knowledge acquisition refers to the successful transfer of extant knowledge to others. That is, a researcher may have created new knowledge, but the receiver will acquire it. Only when it has been processed and incorporated into existing knowledge frameworks can that information then be termed knowledge to the receiver, and it can be said that knowledge is acquired. However, even then it is not a given that the new knowledge incorporated within the receiver's knowledge network has been ''transferred'' with integrity. Therefore, knowledge may be disseminated (or diffused) but the degree to which it is ''transferred'' to others is largely dependent on the communication processes used, since the acquisition of new knowledge (i.e. the restructuring of existing knowledge networks) is primarily a communication process (Davila *et al.*, 2006).

Communication and knowledge transfer

Communication is crucial to knowledge transfer (Mahajan and Peterson, 1985) and, consistent with a psychological perspective of knowledge management, is the process by which individuals create and share information with each another so as to attain mutual understanding (Schuetz, 1964, 1967). Mutual understanding is a process through which an individual's store of knowledge is continually amended and reshaped as specialised knowledge is accumulated. The most likely conditions for knowledge transfer to take place are not necessarily through the establishment of social relationships, but through the interconnectivity of individual world-views, which become apparent through mutual understanding (Schuetz, 1964). Thus, social relationships within themselves are a necessary, but insufficient condition for knowledge transfer to take place. Social relationships act as conduits for knowledge transfer to take place, but it is the depth of understanding that transpires through two-way communications among individuals that leads to knowledge transfer.

Current communication of research output (publication of research, or presentations/conferences/seminars) are characterised by one-way (single-loop) learning strategies, referred to as the ''student-teacher'' paradigm (Halme, 2001). Although this seems to be the preferred medium through which to disseminate research outcomes, it fails to create feedback loops leading to two-way communication. One-way communication, at best, will result in adjustment of existing knowledge structures, and receptivity is limited by the strength of the intent to learn (Halme, 2001) and the subjective interpretation of the receiver. From a Barthesean perspective the essential meaning of a single-loop

communication depends on the impressions of the receiver – the integrity of the message lies not in its creator, but in its audience (Barthes, 1977). Conversely, double-loop learning (via practical exercises in workshop forums, for example) facilitates mutual understanding as shared communications serve to develop an appreciation of the Other's world-view and thought processes and then build and broaden their own. Knowledge acquisition then is not an ''all or none'' state. Elements of the incoming information may be acquired, while others may not. Double-loop learning, or two-way communications maximise the extent to which knowledge is acquired and the integrity of that which is transferred. Two-way communications also promote generative learning, a process in which the learner develops new concepts and attitudes, cognitively recodes existing classifications, and amends standards of judgment (Senge, 1994; Argyris, 1977).

Generative learning and knowledge adoption

Generative learning, or the degree to which individuals explore, extend, amend, and develop existing knowledge networks is strongly linked to the concept of creativity, yet the two remain distinctively different concepts. Creative thought refers to the emergence of new ideas through the original combination of common understandings, or the transformation of existing concepts through the reorganisation of existing knowledge networks (Boden, 1997). The degree to which generative learning takes place is dependent upon the extent to which an individual is able to explore, extend and develop their existing knowledge networks. Accordingly, generative learning (of which creativity is a part) can be seen as a function of the depth of cognitive processing that an individual will employ in the acquisition of knowledge. It could be argued that generative learning may serve to confirm that existing services, products, or processes are most appropriate, and indeed, there are some instances where this may happen. However, broad acceptance of this outcome negates the fundamental tenet of a knowledge-based economy – that new knowledge leads to innovation (Drucker, 1993). For the purpose of this discussion and in adherence with this key principle, generative learning is what defines knowledge adoption – knowledge may be transferred, but unless it leads to the generation of new ideas and concepts, then it has not been adopted.

Within the context of the broader business community, knowledge can then be said to have been adopted when the transfer of new information (research outputs) leads to the generation of new knowledge that in turn, allows individuals to identify new opportunities relating to products, services, markets, or processes. Generative learning however comprises two knowledge skills – procedural knowledge and contextual knowledge. Procedural knowledge involves the exploration of existing knowledge structures, and recognition of how those structures do or do not relate to new information. This exploratory process is necessary if an individual is to expand their knowledge base. Conversely, contextual knowledge is the awareness of one's environment, the issues emerging from it, and how they are embedded within it. Therefore, knowledge adoption requires both contextual and procedural knowledge. This implies that for knowledge to be adopted, it is not sufficient to merely make it available; it is necessary to present it in ways that help the receiver first consider the information and then explore its relevance.

Defining innovation

To further complicate this issue, knowledge adoption need not imply innovation incoming information may be reflected upon and ruminated over, and new ideas or concepts developed, but it may fail to be acted upon. While there are various meanings of term, it is the implementation of new ideas, the ''doing'' that defines innovation.

Although the terms are used interchangeably (Davila *et al.*, 2006), innovation differs from creativity. As discussed earlier, creativity is a component of generative learning, which within this discussion is what defines knowledge adoption, whereas innovation corresponds to the application of new and creative ideas and the implementation of inventions. Or, as Davila *et al.* (2006) suggest, ''creativity implies coming up with ideas, it's the 'bringing ideas to life' . . . that makes innovation the distinct undertaking it is'' (p. xvii). Additionally, ''innovation'' is commonly seen as synonymous to ''invention,'' or ''something new'' which further contributes to misunderstandings. Rather, innovation should be seen as the introduction

of something new (Nordfors, 2004). The framework for understanding knowledge management activities offered thus far is graphically portrayed in Figure 1.

This model displayed as Figure 1 proposes that knowledge is that which exists within individuals, and that once made explicit becomes information to others until it is incorporated into the receiver's existing knowledge structures. While individuals may incorporate new knowledge and it can be said that knowledge has been transferred, they may not draw upon it to generate new ideas or concepts, a process largely dependent on the application of both procedural and contextual knowledge skills. Therefore, within the context of the broader business community, knowledge is said to have been adopted when an individual identifies new opportunities relating to products, services, markets, or processes. Innovation is characterised by action and the implementation of these opportunities, and accordant with tenets underlying a knowledge-based economy, will lead to increased competitiveness (Drucker, 1993).

It is important to note that the process depicted in Figure 1 should not be seen as linear, nor should it be taken that progression to one point implies further progression to innovation. Rather, this model is offered as a clarification of terminologies used to describe KM activities within the broader business community and as such provides a platform from which to progress understanding of current KM practices. A summary of these terms is presented in Table I. At this point it is appropriate to acknowledge the factors that influence progression through the activities as described herein.

Relationships among knowledge activities

In this paper diffusion was defined as a communication process and has been identified as one of the five dominant factors that influence the acquisition, and subsequent utilisation of

Figure 1 Activities required to move from information to innovation

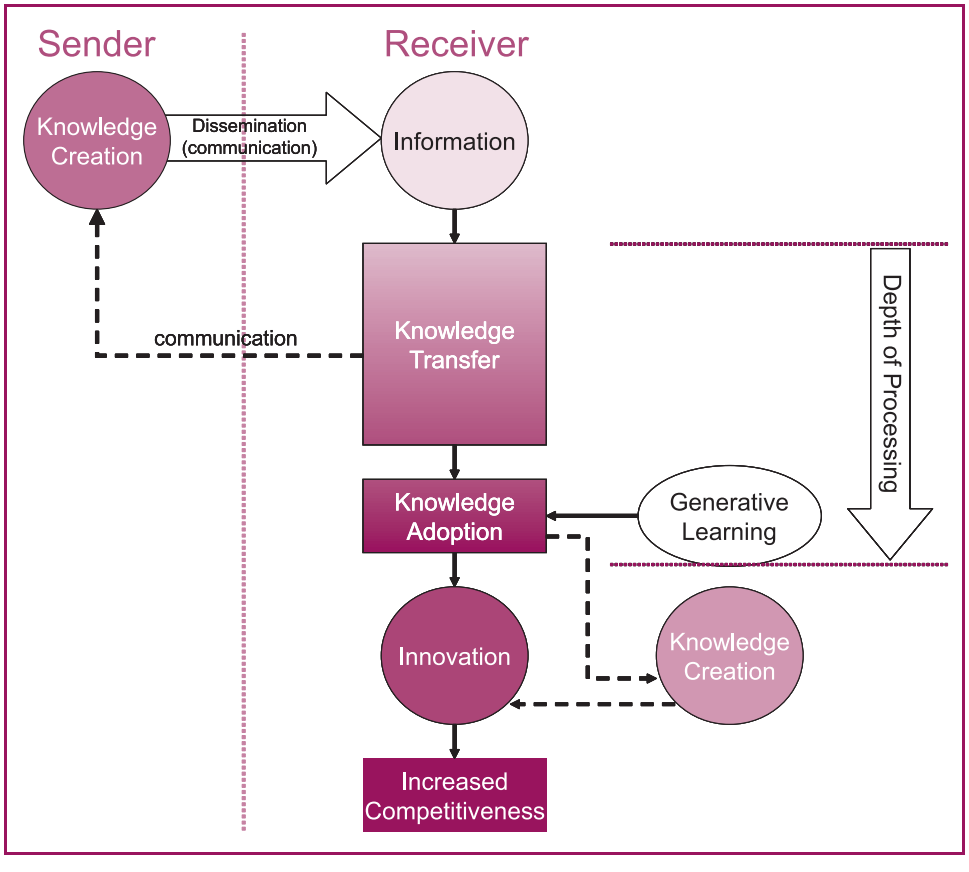


Table I Terms and definitions to describe activities required to move from information to innovation

Term	*Definition*
Knowledge creation	Driven by curiosity or in response to a problem, refers to the deliberate and purposeful collation of observations, data, or facts to generate new or novel ways of understanding a particular phenomenon
Information	Knowledge that has been made available to others
Knowledge	Information with meaning that exists within the individual
Dissemination	Communication of knowledge to others
Knowledge transfer	When information has been reasoned over and incorporated in to the receiver's existing knowledge structures
Knowledge acquisition	The result of successful knowledge transfer
Knowledge adoption	Identification of new products, services, markets, or processes
Innovation	The implementation of new systems, products, or services
Creativity	The emergence of new ideas through the original combination of common understandings, or the transformation of existing concepts through the reorganisation of existing knowledge networks
Generative learning	The degree to which individuals explore, extend, amend, and develop existing knowledge networks. Generative learning is comprised of procedural and contextual knowledge skills
Procedural knowledge	The exploration of existing knowledge structures, and recognition of how those structures do or do not relate to new information
Contextual knowledge	The awareness of one's environment, the issues emerging from it, and how they are embedded within it

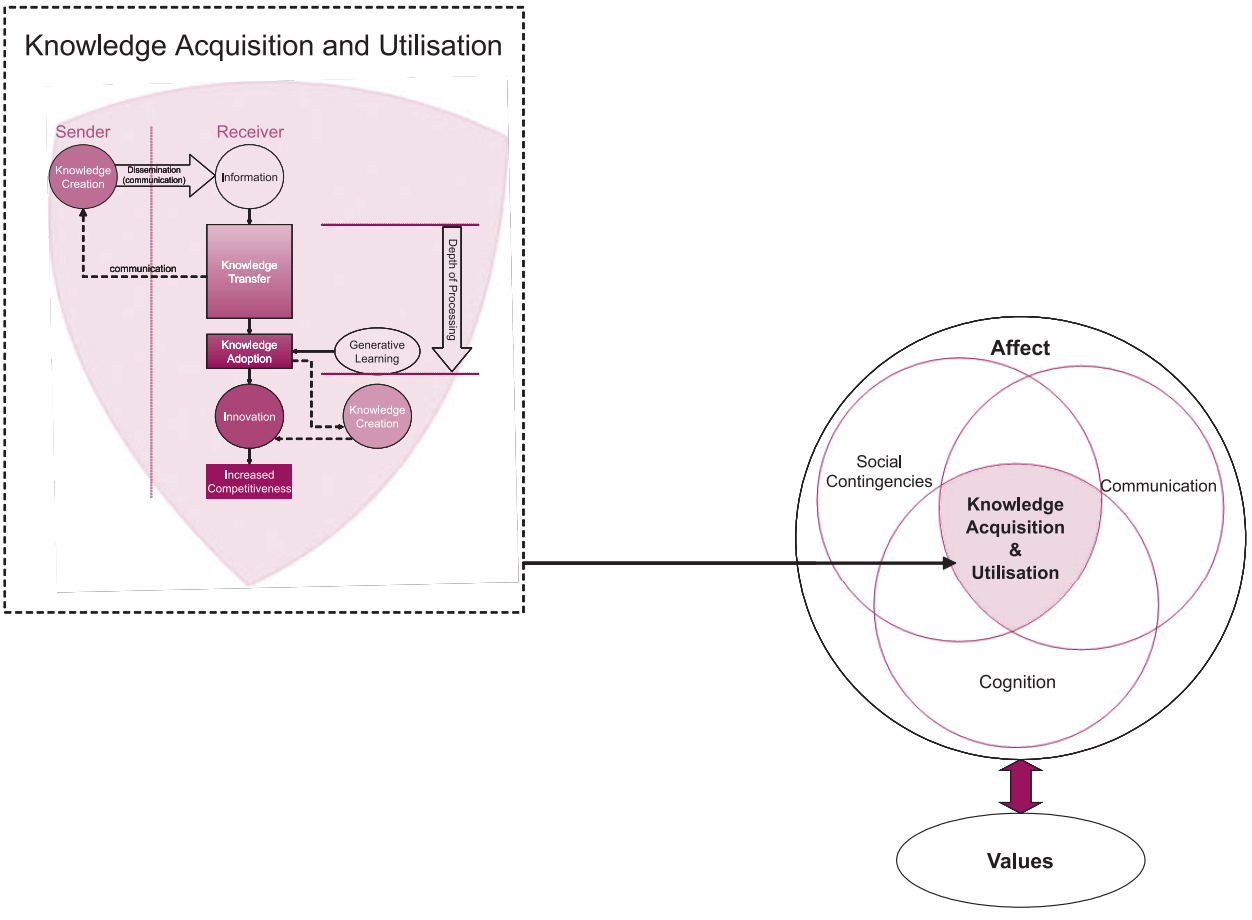
knowledge in research settings involving industry, government, and the academic research community (Beesley, 2005). The remaining factors relate to individual cognition, social contingencies, affect, and values. If knowledge is to drive innovation and economic growth optimally, it is important not just to identify these factors, but also the relationships among them. As shown in Figure 2, knowledge acquisition and subsequent utilisation are simultaneously influenced by cognitive, communication, and social factors.

In this instance, cognitive factors incorporate all the functionally different collectives of knowledge networks, as they operate in conjunction with personal experience and cognitive ability. This also includes existing knowledge structures, an individual's capacity to incorporate new knowledge drawing on contextual and procedural knowledge skills, and the preparedness, or lack thereof, to engage in deeper levels of cognitive processing.

Social contingencies encompass concerns such as relationship building, trust, social structures, status, leadership, power, and politics (for full review see Beesley, 2003a). The third helix displayed in this model represents communication issues. This includes not only dissemination efforts, in whatever forms that might take, but also communication of affective or emotional states and the attainment of mutual understanding. This is of particular relevance to academic research undertakings as the ''cultural divide'' between industry and academic researchers is a recognised impediment to knowledge transfers and efforts to bridge this gap continue to gain attention (DETYA, 1999; Leydesdorff, 2000; OECD, 1994).

The intersection of the three overlapping helices representing communication, cognition and social contingencies is where knowledge acquisition and eventual utilisation rests. It is only when the influence of these three factors is acknowledged and managed effectively that there exists the potential for maximum knowledge advancement. However, the degree to which knowledge is acquired is not only dependent upon these three factors. Figure 2 shows these three factors as nesting within affect. The role of emotions cannot be separated out from the analysis of human behaviour since it underpins our very existence (Zajonc, 1980; Forgas, 2000a). Consequently, it is recognised as a factor that permeates all others. It is of salient interest to note that although classic analysis of knowledge acquisition has not acknowledged the role of affect in cognitive functioning, recent research has started to investigate the interaction of cognition and emotion (Nussbaum, 2001; Barsade, 2002).

Figure 2 Relationships among the factors influencing knowledge and innovation



Since these interactions prevail almost constantly in everyday life it is necessary to recognise the role of affect in the cognitive processes mentioned thus far.

Research has shown that emotions are underpinned by values, attitudes, and belief systems (Forgas, 2000b). Therefore, if affect is said to be an expression of underlying attitudes and beliefs (Forgas and George, 2001), which are, in turn expressions of a set of values (McKnight and Sutton, 1994), then values underpin the acquisition and adoption of knowledge. From this viewpoint, positive or negative emotional responses influence the meanings that might be attributed to incoming information as a function of the degree to which it aligns or misaligns with underlying values, attitudes, and beliefs (Beesley, 2005). This attribution process can take place without the individual being aware of how or why these associations have formed. It is only through two-way communication processes that misattributed meanings have the opportunity to be amended and incoming information be transferred to others with integrity. It is not just knowledge transfer that is susceptible to the influences as portrayed in Figure 2 – each of the activities that bridge the movement from dissemination to innovation are equally exposed to such influences.

To illustrate the symbiotic nature of these five factors consider the case of 2005 Nobel Laureates for Medicine. Barry Marshall and Robin Warren discovered a bacterium that causes gastritis and stomach ulcers, a finding that contradicted the established ''truth'' that this medical condition was caused mainly by stress and lifestyle. Their work meant that antibiotics could cure peptic ulcers. Warren made initial discovery in 1979, but at that time the medical fraternity believed they knew the cause of ulcers was stress, and rejected his

findings. It was not until two years later that his work caught the attention of Barry Marshall, a registrar in the gastroenterology department, and the fruitful partnership that followed demonstrated clinical significance of the bacteria. The medical community remained sceptical, which led Barry Marshall to consume a glass of the bacteria in an attempt to prove his findings. He duly contracted gastritis, which he then cured with a course of antibiotics. It was only in 1994, 12 years after the Warren-Marshall discovery, that the US National Institutes of Health accepted the bacterial causation of peptic ulcers and recommended that patients with the condition should be treated with antibiotics. Two years later, in 1996, the US Food and Drug Administration approved the first antibiotic for the treatment of duodenal ulcer. Now the treatment is standard practice and their discovery has been described as ''the most revolutionary discovery in gastroenterology in the last quarter of a century'' (O'Donnell, 2005). Why was it though that the transfer of knowledge was blocked for so many years and that so many people, when confronted with the obvious sought to deflect it, using ''completely silly and inappropriate kinds of interpretations of information'' (Marshall, 2002; Williams, 2003)?

The communication channels used (publications and conference papers) could be considered appropriate for the audience, and that certainly, the audience had the necessary procedural and contextual knowledge skills needed to restructure existing knowledge networks, but why did it take so long for knowledge transfer and knowledge adoption to take place? Was it because Marshall was a registrar and demonstrated that a ''bread and butter'' operation performed routinely by respected surgeons was no longer correct, leading to influences of power, politics, and associated affective responses? Was it because of institutional dependence on existing treatment? There are several factors that contributed to the delayed transfer of knowledge (Marshall, 2002), and what transpired has been referred to as ''... the tragedy of information and information transfer ...'' (Williams, 2003). The Helicobacter story effectively demonstrates the significance of social influences and the role of affect and values in the transfer of knowledge.

Discussion

In combination, the two models offered here provide a concise framework from which to better understand the concept of KM. This framework presents a clear delineation between information and knowledge, knowledge creation and knowledge acquisition, and highlights characteristics of the cognitive activities that define knowledge transfer, knowledge adoption, and innovation. Furthermore, it identifies the sorts of activities throughout the process that are susceptible to varying influences of cognitive, social, and communication factors that are known to impact upon the degree to which research outputs are utilised (Beesley, 2005).

The value of this framework is that it brings clarity to a maligned process, and the establishment of a common vocabulary will enable academics and industry members alike to build interpretable KM systems. This commonality will enable scholars and practitioners to ''speak the same language'' and share information without the high cost of misunderstanding.

Implications for research communities

A common frame of reference within the field of KM should not be seen as something to limit the multidisciplinary nature of the discipline. In contrast it will enable increased dialogue among contributing disciplines as research builds on a shared framework, rather than the fragmented progression that currently characterises KM. Once the subtle (but profound) differences between knowledge creation, knowledge acquisition, knowledge transfer, knowledge adoption, and innovation are commonly understood, it is possible to more capably monitor the extent of innovations within various sectors and more aptly identify factors that more or less facilitate the transfer and adoption of knowledge in those who work within them. Common understanding of the activities that mediate dissemination and innovation means future research can more clearly identify which aspects of this process are or are not being handled capably by broader industry participants and /or researchers. This

will serve to give greater direction to the research undertaken and enhance its applicability to broader industry.

Current research suggests that SMEs are not as ''research averse'' as first thought (Desouza and Awazu, 2006), but that they are lacking in certain skills and abilities to work with and establish relevance to various forms of research outputs (Beesley, 2003b). This casts a different light on the way in which research outputs might be disseminated to broader industry. It was noted earlier that for knowledge to be adopted, it is not sufficient to merely make it available, but it is necessary to present it in ways that help the receiver first consider the information and then explore its relevance. While the limitations of one-way communication were acknowledged, the use of single-loop communications is prudent and resource effective, but there is a need to utilise this means of communication more effectively if procedural knowledge skills within broader industry are to be advanced. How might this be achieved? How might it be possible to deliver static information (e.g., industry specific newsletters) that encourages cognitive ''interactivity'' with the information being presented – that encourages the reader to apply deeper thought processes and establish contextual relevance of new information? What opportunities exist for the academic community to develop interactive communication tools to disseminate their knowledge to the broader business community in ways that prompt practitioners to start thinking about how they acquire knowledge? In what ways can research output be communicated so that the broader business community might engage in reflective thinking and work to identify factors that might enhance or inhibit their adoption of knowledge? How might communications from the academic community get practitioners to think in different ways about the industry they work within? Further research should seek to answer these questions, but a by-product of such efforts would be the diminishing divide between research and industry communities.

Implications for broader industry

Perhaps the greatest contribution of the framework presented here is that is will remove the veil of mystery that currently clouds KM. A greater understanding of the concept will encourage greater numbers within broader industry to adopt KM practices and embed them into organisational routines. Consistent with the tenets underlying a knowledge-based economy, increased use of KM practices will lead to increased innovation among a sector that has the potential to contribute so much more to today's knowledge-based economy. A common frame of reference for that activities that underpin KM will also facilitate clearer identification of the sorts of tasks and skill that individuals need to develop, and will help to identify the link between these activities and other factors such as organisational culture, climate, and structure. Commonality in KM terms would enable more effective training needs analysis, and the development of specific skills (be it cognitive, social, or communication) will facilitate broader uptake of KM practices. It will also help to more clearly identify the sorts of technologies required to support KM initiatives, thus emphasising the importance of individual KM skills and the supporting role of technologies, systems, and processes. Additionally, increased awareness of an individual's thought processes will increase opportunities for them to engage in reflective thought and increase awareness of the self and others – an outcome that will enhance communication efforts and the subsequent transfer and adoption of knowledge.

"Consistent definitions of the building blocks of KM are lacking, and there is no real consensus on definitions that describe the activities that are required to transform information to knowledge, and then knowledge to innovation."

Implications for educators

Finally, the consensus on the terms used to describe knowledge activities will present greater opportunities for educators to develop curriculum that develops awareness of the processes that are involved in a student's personal learning. Within higher education understanding how one learns is not made as explicit as perhaps it should. While students in Western universities are encouraged to engage in reflective thought, and the concept and its benefits are often explained to them, there is little acknowledgement of the range cognitive activities and the subsequent cognitive changes that take place through learning. Nor are students made sufficiently aware of the factors that influence the degree to which they absorb and work with new knowledge, and the relationships among these factors. To include these concepts into higher education curriculum would increase awareness of the self and others in learning experiences, and better prepare them to participate in a knowledge-based economy upon entry to the workplace.

Conclusion

SMEs contribute significantly to the world economy. Increased understanding of the ways in which broader industry manages knowledge holds great promise to further develop a sector that has still to embrace the fundamental tenets of a knowledge-based economy. This paper has presented a vocabulary of terms that clearly define the activities an individual undertakes as they acquire and subsequently utilise knowledge, and has highlighted several benefits and opportunities that exist with its adoption. It may be argued that instances where certain concepts do not hold the same meaning for all authors may reflect the fact that research in the field is not yet mature (Decelle, 2003) yet this paper argues that after more than a decade of research centred on KM, and if the research undertaken is to reap the espoused benefits of KM among the broader business community, it is time to move towards consensus on definitions.

References

Amidon, D. (1997), *Innovation Strategy for the Knowledge Economy: The Keen Awakening*, Butterworth-Heinemann, Boston, MA.

Argyris, C. (1977), ''Double-loop learning in organizations'', *Harvard Business Review*, Vol. 55 No. 5, pp. 115-25.

Barsade, S.G. (2002), ''The ripple effect: emotional contagion in groups'', *Administrative Science Quarterly*, Vol. 47 No. 4, pp. 644-75.

Barthes, R. (1977), *Image, Music, Text*, Fontana, London.

Beeby, M. and Booth, C. (2000), ''Networks and inter-organizational learning: a critical review'', *The Learning Organization*, Vol. 7 No. 2, pp. 75-88.

Beesley, L.G. (2003a), *The Challenge of Emotion Management in Cooperative Tourism Research Settings*, Council for Australian University Tourism and Hospitality Education (CAUTHE) National Research Conference, Southern Cross University, Coffs Harbour.

Beesley, L.G. (2003b), *Relationships among Knowledge Creation, Diffusion and Utilisation in Cooperative Research Settings*, School of Marketing and Management, Griffith University, Gold Coast.

Beesley, L.G. (2004), ''Multi-level complexity in the management of knowledge networks'', *Journal of Knowledge Management*, Vol. 8 No. 3, pp. 71-100.

Beesley, L.G. (2005), ''The management of emotion in collaborative tourism research settings'', *Tourism Management*, Vol. 26 No. 2, pp. 261-75.

Boden, M. (1997), ''Promise and achievement in cognitive science'', in Johnson, D.M. and Erneling, C.E. (Eds), *The Future of the Cognitive Revolution*, Oxford University Press, New York, NY.

Bontis, N. (2001), ''Assessing knowledge assets: a review of the models used to measure intellectual capital'', *International Journal of Management Reviews*, Vol. 3 No. 1, pp. 41-60.

Brauner, E. and Becker, A. (2006), ''Beyond knowledge sharing: the management of transactive knowledge systems'', *Knowledge and Process Management*, Vol. 13 No. 1, pp. 62-71.

Brooking, A. (1996), *An Introduction to Intellectual Capital*, The Knowledge Broker Ltd, Cambridge.

Call, D. (2005), ''Knowledge management – not rocket science'', *Journal of Knowledge Management*, Vol. 9 No. 2, pp. 19-30.

Chase, R. (2006), ''A decade of knowledge management'', *Journal of Knowledge Management*, Vol. 10 No. 1.

Coakes, E. and Clarke, S. (2006), *Encyclopedia of Communities of Practice in Information and Knowledge Management*, Idea Group Reference, Hershey, PA.

Cooper, C. (2006), ''Knowledge management and tourism'', *Annals of Tourism Research*, Vol. 33 No. 1, pp. 47-64.

DETYA (1999), *Knowledge and Innovation: A Policy Statement on Research and Research Training*, Department of Education, Training and Youth Affairs, Canberra.

Darroch, J. and McNaughton, R. (2002), ''Examining the link between knowledge management practices and types of innovation'', *Journal of Intellectual Capital*, Vol. 3 No. 3, pp. 210-22.

Davila, T.M., Epstein, J. and Shelton, R. (2006), *Making Innovation Work: How to Manage It, Measure It, and Profit from It*, Wharton School Publishing, Upper Saddle River, NJ.

Debbie, W. (2006), ''Sharing good practice: knowledge in action'', *Clinical Governance*, Vol. 11 No. 3, p. 253.

Decelle, X. (2003), ''A conceptual and dynamic approach to innovation in tourism'', paper presented at the Conference on Innovation and Growth in Tourism, Lugano.

Desouza, K. and Awazu, Y. (2006), ''Knowledge management at SMEs: five peculiarities'', *Journal of Knowledge Management*, Vol. 10 No. 1, pp. 32-43.

DITR (2006), *National Tourism Investment Strategy: Investing in Our Future*, Department of Industry Tourism and Resources, Canberra.

Drucker, P.F. (1993), *Post-capitalist Society*, Butterworth-Heinmann, Oxford.

Etzkowitz, H., Webster, A., Gebhardt, C. and Terra, B.R.C. (2000), ''The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm'', *Research Policy*, Vol. 29, pp. 313-30.

Forgas, J.P. (2000a), ''Feeling and thinking: summary and integration'', in Forgas, J. (Ed.), *Feeling and Thinking: The Role of Affect in Social Cognition*, Cambridge University Press, Cambridge.

Forgas, J.P. (2000b), ''Introduction: the role of affect in social cognition'', in Forgas, J. (Ed.), *Feeling and Thinking: The Role of Affect in Social Cognition*, Cambridge University Press, Cambridge.

Forgas, J.P. and George, J.M. (2001), ''Affective influences on judgments, decision making and behavior in organizations: an information processing perspective'', *Organizational Behavior and Human Decision Processes*, Vol. 86 No. 1, pp. 3-34.

Glen, W. and Weerawaradena, J. (1996), ''Strategic planning practices in small enterprises in Queensland'', *Small Enterprise Research*, Vol. 4 No. 3, pp. 5-16.

Halme, M. (2001), ''Learning for sustainable development in tourism networks'', *Business Strategy and the Environment*, Vol. 10, pp. 110-4.

Hicks, R., Dattero, R. and Galup, S. (2006), ''The five-tier knowledge management hierarchy'', *Journal of Knowledge Management*, Vol. 10 No. 1, pp. 19-31.

Hislop, D. (2003), ''Linking human resource management and knowledge management via commitment: a review and a research agenda'', *Employee Relations*, Vol. 25 No. 2, pp. 182-202.

Innes, J.E. (1992), ''Group processes, and the social construction of growth management: Florida, Vermont and New Jersey'', *Journal of the American Planning Association*, Vol. 58 No. 4, pp. 440-53.

Lesser, E.L., Fontaine, M.A. and Slusher, J.A. (2000), *Knowledge and Communities*, Butterworth-Heinemann, Boston, MA.

Leydesdorff, L. (2000), ''The triple helix: an evolutionary model of innovations'', *Research Policy*, Vol. 29, pp. 243-55.

Luecke, R. and Katz, R. (2003), *Managing Creativity and Innovation*, Harvard Business School Press, Boston, MA.

McKnight, J. and Sutton, J. (1994), *Social Psychology*, Prentice-Hall, Sydney.

Mahajan, V. and Peterson, R. (1985), *Models for Innovation Diffusion, Quantitative Applications in the Social Sciences*, SAGE University Paper, London.

Malhotra, Y. (2003), ''Measuring national knowledge assets of a nation: Knowledge systems for development (expert background paper)'', *Expanding Public Space for the Development of the Knowledge Society: Report of the Ad Hoc Expert Group Meeting on Knowledge Systems for Development*, Department of Economic and Social Affairs Division for Public Administration and Development Management, United Nations, New York, NY.

Malhotra, Y. (2005), ''Integrating knowledge management technologies in organizational business processes: getting real time enterprises to deliver real business performance'', *Journal of Knowledge Management*, Vol. 9 No. 1, pp. 7-28.

Malone, S. and Jenster, P. (1991), ''Resting on your laurels: the plateauing of the owner-manager'', *European Management Journal*, Vol. 9, pp. 412-8.

Marshall, B. (2002), *Helicobacter Pioneers: Firsthand Accounts From the Scientists who Discovered Helicobacters 1892-1982'*, Blackwell Scientific, Melbourne.

Nonaka, I. and Takeuchi, I. (1995), *The Knowledge Creating Company*, Oxford University Press, New York, NY.

Nordfors, D. (2004), ''The role of journalism in innovation systems'', *Innovation Journalism*, Vol. 1 No. 7, pp. 1-18.

Nussbaum, M. (2001), *Upheavals of Thought: The Intelligence of Emotions*, Cambridge University Press, Cambridge.

O'Donnell, M. (2005), ''Nobel Prize winners join élite group of Australians'', *The 7:30 Report*, Australian Broadcasting Corporation, Sydney.

OECD (1994), *Accessing and Expanding the Science and Technology Base*, OECD, Paris.

OECD (1996), *The Knowledge-based Economy*, OECD, Paris.

OECD (2000), *A New Economy? The Changing Role of Innovation and Information Technology in Growth*, OECD, Paris.

OECD (2005), *SME and Entrepreneurship Outlook*, OECD, Paris.

Polanyi, M. (1966), *The Tacit Dimension*, Routledge & Kegan Paul, Gloucester, MA.

Powell, W. (1990), ''Neither market nor hierarchy: networks forms of organization'', in Staw, B. and Cummings, L. (Eds), *Research in Organizational Behavior*, JAI, Greenwich, CT.

Raub, S. and Von Wittich, D. (2004), ''Implementing knowledge management: three strategies for effective CKOs'', *European Management Journal*, Vol. 22 No. 6, pp. 714-24.

Robinson, R. and Pearce, J. (1984), ''Research thrusts in small firm strategic planning'', *Academy of Management Review*, Vol. 9, pp. 128-37.

Romer, P.A. (1990), ''Endogenous technological change'', *Journal of Political Economy*, Vol. 98 No. 5, pp. 71-102.

Rowley, J. (2006), ''Where is the wisdom we have lost in knowledge?'', *Journal of Documentation*, Vol. 62 No. 2, pp. 251-70.

Rynes, S.L., Bartunek, J. and Daft, R. (2001), ''Across the great divide: knowledge creation and transfer between practitioners and academics'', *Academy of Management Journal*, Vol. 44, pp. 340-55.

Santoro, M.D. and Bierly, P.E. (2006), ''III Facilitators of knowledge transfer in university-industry collaborations: a knowledge-based perspective'', *IEEE Transactions on Engineering Management*, Vol. 53 No. 4, pp. 495-507.

Schönström, M. (2005), ''Creating knowledge networks: lessons from practice'', *Journal of Knowledge Management*, Vol. 9 No. 6, pp. 17-29.

Schuetz, A. (1964), ''The dimensions of the social world'', in Broderson, A. (Ed.), *Collected Papers II – Studies in Social Theory*, Martinus Nijhoff, The Hague.

Schuetz, A. (1967), *The Phenomenology of the Social World*, Northwestern University Press, Evanston, IL.

Schumpeter, J. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge, MA.

Senge, P. (1994), *The Fifth Discipline*, Doubleday, New York, NY.

Skyrme, D. (1999), *Knowledge Networking: Creating the Collaborative Enterprise*, Butterworth-Heinemann, Oxford.

Snow, C.P. (1959), *The Two Cultures*, Cambridge University Press, Cambridge.

Soekijad, M., Huis in 't Veld, M.A.A. and Enserink, B. (2004), ''Learning and knowledge processes in inter-organizational communities of practice'', *Knowledge and Process Management*, Vol. 11 No. 1, pp. 3-12.

Spender, J.C. (2006), ''Getting value from knowledge management'', *The TQM Magazine*, Vol. 18 No. 3, p. 238.

Sullivan, P. (1999), ''Profiting from intellectual capital'', *Journal of Knowledge Management*, Vol. 3 No. 2, pp. 132-42.

Sveiby, K. (1997), *The New Organizational Wealth: Managing and Measuring Knowledge-based Assets*, Berrett-Koehler, San Francisco, CA.

Verburg, R. and Andriessen, J. (2006), ''The assessment of communities of practice'', *Knowledge and Process Management*, Vol. 13 No. 1, pp. 13-25.

Wenger, E. and Snyder, W.M. (2000), ''Communities of practice: the organizational frontier'', *Harvard Business Review*, Vol. 78 No. 1, pp. 139-45.

Williams, R. (2003), ''The helicobacter story'', *The Science Show*, Radio National, Australian Broadcast Commission, Sydney.

Wilson, C. (1996), ''Instruments and ideologies: the social construction of knowledge and its critics'', *American Philosophical Quarterly*, Vol. 33 No. 2, pp. 167-78.

Wong, K.Y. and Aspinwall, E. (2006), ''Development of a knowledge management initiative and system: a case study'', *Expert Systems with Applications*, Vol. 30 No. 4, pp. 633-41.

Zajonc, R. (1980), ''Feeling and thinking: preferences need no inferences'', *American Psychologist*, Vol. 35, pp. 151-75.

Further reading

Eysenck, M.W. and Keane, M.T. (2000), *Cognitive Psychology: A Student's Handbook*, Lawrence Erlbaum, London.

Romer, P.A. (1994), ''The origins of endogenous growth'', *Journal of Economic Perspectives*, Vol. 8 No. 1, pp. 117-40.

About the authors

Lisa G.A. Beesley is a Senior Researcher at the School of Tourism at The University of Queensland, Australia. Lisa G.A. Beesley is the corresponding author and can be contacted at: l.beesley@uq.edu.au

Chris Cooper is Foundation Professor of Tourism Management and Head of the School of Tourism at The University of Queensland, Australia.