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ABSTRACT

In the knowledge-based economy, universities are encountering dramatic changes. Their missions and functions are 'pragmatized' because of emerging new players and competing markets for knowledge production, the availability of higher education to a wider range of social classes and age groups, as well as the assimilation of information technology into the university environment. The dynamics and conduct of university research, in particular, has correspondingly become more sensitive to industry collaboration opportunities, commercial exploitation, and is increasingly transdisciplinary. This paper argues that knowledge management (KM) practices and tools can support universities in addressing these demands. Institutions of higher education can benefit from KM by creating and maintaining relevant knowledge repositories, improving knowledge access, enhancing the knowledge environment, and valuing knowledge. This is exemplified with reference to the Singapore Management University (SMU) where KM is increasingly being applied in the area of research.

KEYWORDS

Knowledge Management, Higher Education Institutions, University Research

1. Introduction: Universities and New Markets of Knowledge Production

The development and transmission of knowledge has traditionally been seen as a central governing role and responsibility of universities. German education reformer Wilhelm von Humboldt advocated the idea of *akademische freiheit* (academic freedom) as the traditional ideal of the German university. He believed that the freedom to pursue knowledge is a fundamental principle of democracy that defines the existence of universities. A university's pursuit of knowledge, according to Humboldt, is inexhaustible and tireless: "One unique feature of higher intellectual institutions is that they conceive of science and scholarship as dealing with ultimately inexhaustible tasks: this means that they are engaged in an unceasing process of inquiry" (Humboldt c.1970:243). Similarly in John Henry Newman's classic *The Idea of a University* on the philosophy of higher education, he argued that the pursuit of knowledge is an end in itself, and the university is a community of scholars, teachers and students devoted to the pursuit of truth. The "idea" which Newman referred to in his title work in 1851 was used in the sense of "ideal" – a focal point of how universities treated knowledge as an entity pursued for its own sake, regardless of cost or consequence. This ideal is most frequently exemplified by the university's role as 'critic and conscience of society'.

While many universities today still retain their role as the 'critic and conscience of society', the critical function of universities has increasingly taken on a more pragmatic role in terms of staying 'relevant' in a rapidly evolving techno-economic environment. We have often heard the lament that higher education is somewhat disconnected from society which it is supposed to serve, infamously represented by

the Socratic metaphor of the 'ivory tower' – a university perched on top of a hill amongst the clouds producing 'useless' knowledge irrelevant to disciples descending down to the real world. The push for higher education to become relevant to the changing needs of society was echoed by a series of reports by the World Bank (1998; Stiglitz 1999a, 1999b) as well as the Association of Commonwealth Universities (Gibbons 1998) in the late 1990s. This call for higher education relevance, or pragmatization, arose out of various drivers and trends in the transition towards a knowledge-based economy – the heterogeneity of knowledge production, massification and democratisation of higher education, and the integration and assimilation of information technology into the academic environment.

Heterogeneity of knowledge production. The transition from the old type of industrial society with its traditional dominance of manufacturing work and old industrial classes to an information and knowledge-based society has seen the emergence of knowledge as a factor of production that has grown in importance in relation to the other factors of labour and capital (Evers 2000a, 2000b). In a knowledge-based society, there are distinct epistemic cultures of knowledge production, i.e. "different practices of creating and warranting knowledge in different domains" (Knorr-Cetina 1999:246). Similarly Gibbons et al. (1994) have suggested that the trend of knowledge being produced in multiple sites has seen heterogeneity of knowledge production where knowledge is no longer produced solely in the university setting but is produced increasingly in many other institutions such as government laboratories, industries and think tanks (Gibbons et. al 1994; see also Etzkowitz & Leydesdorff 1997). He predicted that "universities…will comprise only a part, perhaps only a small part, of the knowledge producing sector" (Gibbons et al. 1994:85) in the 21st

century. In a study conducted by Godin and Gingras (1999) on the growth of non-university research in Canada, the authors found a visible trend in the diversification of the locus of science knowledge production between the years 1980 to 1995. While the rate of knowledge production of university research in the form of journal publications in those years has been stable, their study found a 68% growth of non-university contributions in relation to the total number of papers (see Figure 1).

[INSERT FIGURE 1 HERE]

Massification and democratisation of higher education. The second factor leading to the pragmatization of universities is the global massification and democratisation of higher education in the past two decades. The development of mass higher education in modern industrial societies after World War II exhibited a rapid growth of enrolments in part through the expansion of elite universities and the creation of non-university vocational institutions in response to increasing occupational demands for post-secondary qualifications (Gibbons 1998; Trow 2000; Muthesius 2001). In Europe, higher education access extended to almost a third or half of the population comprising mostly lower middle, middle and working class origins and, in recent decades, include increasing numbers of non-traditional students comprising matured, employed, part-time students and people aiming at employment in the rapidly growing semi-professions and knowledge-based service industries (Trow 2000; Warner & Palfreyman 2001).

Behind this great increase in participation in higher education were a number of more or less independent forces: the democratisation of politics and society that followed

World War II (Geiger 1993; Fuller 2002); the growth of the public sector that required more white collar workers (and university graduates); an expanding industrial economy that required more highly skilled and educated workers; and finally the widespread belief that further economic development is depended on a supply of educated manpower, especially scientists and engineers. Among the most significant effects of mass higher education, of special significance for the production and distribution of knowledge, is the great increase in the market for continuing education in response to life-long learning as well as training and retraining. Continuing adult education today has become a high-growth industry that is worth an estimated 6% of GNP in the United States. Other developed countries are rapidly reaching this figure (Drucker 2000) while the global executive education market offered by business schools is calculated to be worth in excess of $12 billion per annum (Crainer and Dearlove 1998:170).

Assimilation of information technology into the academic environment. The emergence and use of IT in higher education has led to an increasingly virtual education system (Hailes & Hazemi 1998; Jones & Pritchard 1999; Rada 2001; Tschang 2001). A variety of Internet-based or World-Wide-Web-based distance-learning courses, such as Stanford's online master's degree in electrical engineering (developed in cooperation with Microsoft and Compaq Computer) are now part of the universities' curricula. Online courses are also offered by, among others, Washington State University, Oklahoma State University, the University of Colorado, Regents College (New York), and the University of California. The continuous change, advancement and introduction of new information technologies have also caused a destabilizing effect on traditional forms of higher education, and have put the survival

of research universities, especially, at risk (Daniel 1996). Trow (2000:14) noted that three American university presidents expressed that same view in almost identical words:

> "We cannot even be certain whether the university as we know it will survive at all, nor, if so, in what form…The existence of the university as it is now and as we know it is in doubt" (qtd. Muller 1998:222).

Members of the Association of European Universities (CRE) also stressed that:

> "It is not an exaggeration to say that the issue of new information and communication technologies questions the basic functions of the university" (qtd. Edwards 1998:25).

The above drivers and trends towards university pragmatization have implications for the dynamics and conduct of university research. In the past, recognition of competence to carry out research arose out of an intense socialisation into an academic discipline. Research was an elite activity conducted by people who themselves have had an elite higher education. The greater part of research still retains this character, but new patterns of research have emerged which involve collaboration with people from different industries and organizations who may not necessarily be researchers as evident in the "frequent interactions between [university based research scholars] and business people, venture capitalists, patent lawyers, production engineers, as well as research engineers and scientists located outside the university" (Gibbons 1998:13). This has accelerated the commercialization of research and

teaching in higher education, and the movement of both out of the tradition domain of higher education institutions.

Research results that were previously reported in peer-reviewed academic journals and conferences are increasingly confined to reports commissioned by commercial and industry sponsors. It may also involve shared use of academic and industrial facilities and technology, and is more likely to be transdisciplinary and multidisciplinary as a result of the heterogeneous social distribution of knowledge production. Specialised knowledge no longer remains the domain of academia, but is increasingly produced and co-produced by public organisations and industry. Accordingly different patterns of research funding are emerging, and they are less dependent on funding within the university, central government or non-profit foundations, and more on the firms, industries and social lobbies directly involved (Geuna 1999:18).

These developments imply that the conduct of contemporary research cannot remain easily within the confines of university departments or academic centres. This is prompting the emergence of a host of new institutional arrangements, linking government, industry, universities and private consultancy groups in different ways (Etzkowitz & Leydesdorff 1997; Mills & Pumo 1999; Peters 2002). While traditional university-based research may be threatened by the encroachment of industry and the mentality and values of profit-making, researchers in countries with traditions of non-university research, on the other hand, may feel the need to link their research institutions more closely with universities so as to be more open to innovation and intellectual competition.

From a societal perspective, this movement and distribution of knowledge production, from and within university and non-university institutions, has important implications for a country's development towards a knowledge society (Evers 2003a, b). There are nodal points where knowledge is produced and from where it is globally distributed. Research on Indonesia, for example, may be carried out mostly by foreign scholars, affiliated to universities or research institutions around the globe, rather then Indonesian nationals or scholars attached to its local institutions. This unequal production and distribution of knowledge is widening the knowledge gap between highly productive and less productive countries which raises the issue of which knowledge is produced locally for local needs? The International Rice Research Institute (IRRI) in Los Banos, Philippines comes to mind as an example of "best practice". Most knowledge about the developing world and the transition societies is, however, still produced outside the region to which it pertains. The capacity to benefit from knowledge of various fields has two basic elements: the ability to acquire and to apply knowledge that already exists, and the ability to produce new knowledge. It is not enough to transfer knowledge, e.g. knowledge embedded in a particular technology, from one country to another. Instead, in order to achieve a sustained development, in this case the development towards a knowledge-based economy, it is necessary for the knowledge importing country to be able to acquire (i.e. absorb the knowledge, to understand it, to interpret) and to adapt it to local needs, and subsequently to produce knowledge endogenously along the same line (Cohen & Levinthal 1990). Knowledge, therefore, has to be imported and adapted to local requirements, i.e. global knowledge has to be "localized". For any society and any nation state it will be crucial whether or not this will be achieved (Evers 1999, 2000a).

2. Knowledge Management in Universities and Research

Due to the appearance of new knowledge producers in the education sector, more and more universities are looking into the possibility of applying corporate knowledge management systems. Knowledge management can be defined as the task of developing and exploiting an organization's tangible and intangible knowledge resources (Menkhoff, Chay and Loh 2004). Tangible assets include the outputs of R&D teams, strategic information about customers, suppliers, products, competitors etc. Intangible assets include the competencies and knowledge resources of human capital within the organization. KM refers to the totality of organisational strategies aimed at creating an intelligent organisation, which is able to leverage upon its tangible and intangible assets, to learn from past experiences, whether successful or unsuccessful, and to create new knowledge. At the people level, KM centres on the competencies and learning abilities of individuals. At the organisational level, KM puts emphasis on the creation, utilization and development of an organisation's collective intelligence. In terms of technology, effective KM requires an efficiently organized and relevant communication and information infrastructure (e.g. intranet).

Organizations progress from simple KM activities such as capturing existing knowledge to more sophisticated and complex ones such as the continuous creation of new knowledge. Core business driven knowledge processes of the KM event chain include (i) locating and capturing knowledge; (ii) sharing knowledge and (iii) creating new knowledge (Figure 2).

[INSERT FIGURE 2 HERE]

Universities are major players in the knowledge business (Goddard 1998) and stand to benefit from knowledge management practices and solutions. An analysis of university mission statements, for example, shows that related aims and objectives are consistent with knowledge management principles: the discovery, acquisition or creation of knowledge (i.e. research), the transmission or dissemination of knowledge (teaching); the application of knowledge to human problems in the interests of public service; and the preservation of knowledge in libraries, museums and archives (Allen 1988:66).

From an organizational learning point of view (Senge 1990; Franklin et. al. 1998), a university seems to be well suited to the adoption of knowledge management /organizational learning practices as its environment puts a lot of emphasis on the exchange of ideas and knowledge sharing. The adoption of the scientific method of enquiry requires individuals within subject disciplines to be skeptical about one another's approaches and findings. With the common adoption of falsification as the dominant methodology both in the sciences and social sciences, we see a constant quest for new discoveries and advancement of knowledge (Franklin et. al. 1998:232). The sharing of this knowledge in conferences and academic journals is part of the knowledge culture of universities, a feature much less pronounced or even absent in business corporations. The division of university research into disciplines creates, however, boundaries that are difficult to transcend. Though it is well known that new

scientific discoveries are often made in areas between disciplines, interdisciplinary research is still difficult to institutionalize.

As universities today thrive to stay relevant in a knowledge society characterised by the emergence of new knowledge markets and the entrance of new market players, knowledge management in higher education is becoming a vital competitive weapon. Besides the application of knowledge management to intraorganisational processes and strategy (Pornchulee 2001), the university's research process represents a key area which can be enhanced through the application of knowledge management (Kidwell, Linde & Johnson 2000) (Table 1).

[INSERT TABLE 1 HERE]

However, to reap the benefits from the application of knowledge management, there are issues and challenges that need to be addressed. In a study assessing the challenges that higher education institutions face in implementing knowledge management, Rowley (2000) examined the characteristics and features of successful knowledge management projects (see Davenport et. al. 1998) and suggested that universities need to address four key KM objectives: (i) creating and maintaining knowledge repositories, (ii) improving knowledge access, (iii) enhancing the knowledge environment, and (iv) valuing knowledge.

In terms of *knowledge repositories*, Rowley found that universities abound in potential knowledge repositories, from the corporate financial databases and the marketing department's database of prospective students to the library and collections

of documents, both electronic and print, owned by individual tutors. These various databases provide access variously to internally generated data about the university's operations (such as student records, or catering supply orders), and external, published documents and databases, accessed through libraries, bookshops, and the Web and other on-line services. However, few universities have an integrated collection of knowledge, embedded either in one knowledge repository, or in a series of linked repositories. In order to facilitate the operation of a knowledge-based operation these need to encompass both internal and external knowledge, and explicit and elicited tacit knowledge. According to Rowley, universities are still a long way from a scenario in which each member of the community that is the university has access to the combined knowledge and wisdom of others in the organisation, and has access to that knowledge in a form that is packaged to suit their particular needs. While many institutions have taken the first step, and have created converged library and information systems departments, this restructuring is often more systems driven than knowledge driven.

In the area of *knowledge access*, Rowley found that universities have well-established access to published knowledge sources across and within the academic community. Internet connectivity has been an invaluable resource where researchers and academic staff have access to public knowledge including a host of electronic documents and electronic journals. Within universities, networks based on intranet technology have supported internal communication through e-mail, and access to databases and electronic documents. Most libraries in higher education also have a good coverage of selected sources of information, including databases, and lists of experts. In summary, universities have been proactive in the area of knowledge access, especially with

respect to explicit and public knowledge. Further improvements can encompass issues of security, and access rights for different categories of staff and students.

Thirdly, the creation of a *knowledge environment* in which knowledge management activities such as knowledge creation, transfer and use can strive have traditionally been embedded within the academic reward structure of research and scholarship. Rowley argues that rewards are a central element of higher education where high value on evidence of individual achievement in research and scholarship are key in the award of academic achievements such as the accolade of 'Professor'. Reputation, salary, and opportunities to participate in the further creation and dissemination of knowledge depend significantly upon individual performance. The transfer market for professors with international reputations suggests that the knowledge bases are integrally associated with individuals. While universities have traditionally been considered as the archetypal learning organisation or community where there is substantial knowledge sharing in terms of academic knowledge and expertise in the form of journal publications and teaching, these forms of knowledge sharing are paradoxically induced more by peer-competition than altruistic sharing. This has potential implications on the formation of KM groups such as communities of practice or interest groups where members are informally bound by a common interest (e.g. engaging in lunchtime discussions to solve difficult problems) and by what they have learned through their mutual engagement in these activities.

Finally, *valuing knowledge* is concerned with viewing knowledge as an asset. However, Rowley argues that universities have no experience of valuing their intellectual capital and entering those values on their balance sheets. The challenge of

such valuation and representation of intellectual capital is the current lack of an established methodology for assigning values to knowledge assets (Firer and Williams 2003). However, such valuation, when established, will have two valuable outcomes: enhanced and shared understanding of the role of knowledge in the university, and the opportunity to monitor the increases and decreases in the knowledge assets embedded in the organisation.

Although knowledge management has found much favour in knowledge-based organisations, there is one respect in which such organisations are very different from universities. Consultancy and other organisations that have embraced knowledge management are global organisations, and implicit in their global nature is the sense in which they constitute international communities, independent of state or national and cultural agendas. How might universities move from the collegially networked institutions, with some international student base, towards an era in which strategic alliances allow the creation of a shared, global knowledge base? Is it possible to create a global university? Quite apart from the role of the state in such an endeavour, and the implications for the sharing of knowledge and the basis for learning across national boundaries, there is a real challenge associated with the concept of a "university". Universities have traditionally been defined by their diversity and their role in relation to knowledge and learning across a range of different disciplines. Rowley suggests that such a lack of focus makes it difficult for universities to be at the leading edge in all areas of knowledge.

3. Applying KM in the Area of Research: The Case of the Singapore Management University (SMU)

In the following section we will illustrate how knowledge management principles have been put to practice in the area of research exemplified by the approach adopted by the Singapore Management University (SMU). Officially incorporated on 12 January 2000, SMU is the country's first private university funded by the government of Singapore. Modelled after the Wharton School of the University of Pennsylvania, America's top business school, SMU's curriculum aims to groom outstanding business leaders and creative entrepreneurs capable of excelling in a rapidly changing and dynamic world. SMU opened its doors to the pioneer intake of Business Management students in August 2000. The Accountancy programme began in August 2001, followed by a Bachelor of Economics and Social Sciences degree in 2002. Starting in August 2003, a fourth degree programme in Information Systems Management was instituted. All programmes adopt a flexible, multidisciplinary approach towards managing the increasingly complex demands of modern businesses, notably with an emphasis on computer literacy and technology, company internships, business visits and student exchange programmes. The objective is to deve lop well-rounded students with the ability to focus on specialised careers.

Research is of strategic importance at SMU as reflected in its mission to create and disseminate knowledge and aspirations to generate leading-edge research with global impact (see Appendix: *The Conduct and Advancement of Research in SMU*). In order to assess the achievements and challenges of embedding knowledge management in SMU's research agenda, we use Rowley's (2000) four types of knowledge

management objectives of higher education institutions as a lens through which to view SMU: (i) creating and maintaining knowledge repositories, (ii) improving knowledge access, (iii) enhancing the knowledge environment, and (iv) valuing knowledge. The illustrations and findings are based on a questionnaire survey (online) and focus group discussions conducted in 2003 as part of a SMU-funded research study entitled "Building An Intelligent Organization: A Knowledge Management Framework for the Singapore Management University (SMU)".

Creating and maintaining knowledge repositories in research. Technology has been exploited since SMU's started operations to build up the critical IT infrastructure, catering to more fundamental needs such as the availability of the communications infrastructure, ensuring the reliability, security and availability of computer hardware and software, setting up SMU's 'bread and butter systems', classrooms, etc. Data accumulated are mostly in the areas of student and corporate information. IT support services are centrally provided and are mostly operational. They are system driven rather than knowledge driven, something which has been highlighted by Rowley (2000) as a common inadequacy of educational institutions dealing with large amounts of accumulated data. While information has been readily captured in documents and databases through the various IT systems available, there have been less ready efforts to capture and disseminate knowledge, i.e. information combined with experience and judgement (Nonaka & Takeuchi 1995). Related issues and questions include: "Are people willing to share knowledge or do they hoard it?" "To what extent can experience-based knowledge be codified and how difficult is it to transfer?" Indeed, a survey on effective knowledge management practices within the university revealed that knowledge hoarding might cause members to be excluded

from information, negatively affecting their status and reputation, and difficulties in creating new knowledge (see Figure 3).

[INSERT FIGURE 3 HERE]

Know ledge sharing often stops at copyright. Often data and information are only accessible to authorised personnel, and it is not uncommon to hear remarks such as "our communication policy is based on a need to know basis" or to be confronted with terms such as "data owners", "privacy issues", "disclaimers" and the like.

In SMU work is in progress to create a repository of research results so that faculty can tap on information in the repository for combined efforts. Data from various applications such as the online 'Research Grant Application System' have been put in place and together with the 'Research Publication System' information on research done and works-in-progress will be readily made available to faculty. Information on what professors are doing can be made available and communities of researchers can be identified. This will benefit researchers by leveraging previous research and proposal efforts, as well as reduce the turnaround time for research to be completed. Another emerging repository is the Faculty Information System (FIS) which enables the coordination of sharing of academic IT strategies, innovations and solutions, cross faculty programs, as well as to facilitate research collaboration and provide faculty centric information for Faculty, Deans, Provost and the President.

Future KM-related projects in the area of research include (i) the creation of a central repository of research results and research efforts in SMU where contributions by faculty, students and staff are stored and accessed. The idea is to have a digitised archive of research efforts in SMU for reference and for future generations; (ii) constant evaluation and testing for cheaper, better and faster tools, both in terms of technological methods, hardware and software for research purposes in the various stages of the research processes.

Improving knowledge access. To enable the positioning of SMU research in the global arena, SMU provides every faculty member with internet / high-speed connectivity. Covered by a comprehensive wired and wireless network, SMU is linked via high-speed connectivity to next generation networks (based on Internet Protocols to carry all telecommunication services as opposed to legacy networks that are a collection of specialised networks overlaid on a circuit-switched PSTN) locally and internationally. This technology-enabled environment has benefited research in terms of high-speed connectivity to the research hubs of the world (See Figure 4). SMU is part of the Singapore Advanced Research and Education Network (SingaREN) which is a national initiative to create a high-speed broadband network platform to support and connect research and education (R&E) and advanced network technology development in Singapore to partners in US/Korea/global participating institutions, serving users from academia, research organizations and industry.

[INSERT FIGURE 4 HERE]

There is also a fair amount of workspace freedom, where users are given a fair degree of control on what they can store on their PCs. Faculty, staff and students have the freedom to make use of any other tools they feel that will increase their personal and research productivity, with some more productive than others as it often depends on the tools they use for daily work. SMU provides a standard suite of tools and software (e.g. Microsoft Office, Adobe Acrobat, SPSS, SAS, etc.) for effective and (inter)disciplinary research work. Various funding schemes such as research grants and the DART fund (a fund at the disposal of faculty to initiate research) may be drawn upon for encouraging research endeavours. In addition, faculty members can request for technical help and draw from a comprehensive and growing suite of research software that are relevant to their research needs (see Table 2).

[INSERT TABLE 2 HERE]

SMU constantly seeks to invest in information and infrastructure resources to foster the development of scholarly exchange (e.g. through SingaREN or collective activities where sustained relationships may be built). These centres as well as the use of collaborative tools, shared resources and communication channels are expected to position SMU as an internationally acclaimed institution.

Enhancing the knowledge environment & valuing knowledge. An effective knowledge culture is a key knowledge management enabler. While technology is important in facilitating knowledge management, it is the people who, if they are

willing to share and participate in various knowledge exchanges, can create an ideal environment and culture for knowledge and innovation to thrive. Our survey on effective knowledge management practices within the university revealed that engaging in knowledge sharing would help members to avoid costly mistakes, make innovation easier, save time by not 'reinventing the wheel', and make more informed decisions with the inputs from colleagues (see Figure 5).

[INSERT FIGURE 5 HERE]

SMU research is progressing well and more will be done in future to create a conducive environment for knowledge creation, and much more in terms of the valuation of knowledge. A headway towards this direction has been the creation of communities of interest or practice, defined as "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger et. al. 2002:4).

One example is SMU's "Knowledge Force", a newly formed community of interest comprising scholars from German and Singaporean institutions. The Knowledge Force is concerned with the development of theoretical knowledge management (KM) models and practical KM solutions through research and collaboration with other KM specialists and industry partners. Besides conducting theoretical and applied research studies on KM, its members are active in teaching and consultancy. The current

research work of Knowledge Force concentrates on topics such as knowledge society, k-leadership, change management practices in private and public sector organizations, and, the development of collaborative culture for results-oriented knowledge sharing.

It is envisioned that more of these communities of interest will be formed in the future. Other routine measures aimed at building a culture of knowledge sharing in the area of research include the organisation of regular research workshops and seminars as platforms for the discussion of research findings as well as regular information sharing sessions, e.g. with a focus on new research software and tools.

Within SMU, the Centre for Academic Computing (CAC) has been tasked to advance university research through information technology (see Appendix: *The Conduct and Advancement of Research in SMU*) and to provide faculty research support throughout the entire research process. Drawing information from various CAC support systems and past experiences, CAC classified SMU's faculty in relation to their research support needs and types. The respective classification was termed *faculty group mix* and is being used to draft concrete support plans. With information on its clients, CAC is able to map its strategic plans more effectively and to provide relevant and needs-based research resources and support. There are some faculty segments (e.g. new researchers who work quantitatively or those with a cross-disciplinary orientation) that need "personalized help" from CAC staff who are familiar with their specific type of work and requirements. To minimise the problem of over-dependency on particular CAC experts, CAC is in the process of setting-up a knowledge base that contains case histories and solved problem-logs so that other members in CAC can help faculty members whenever their "preferred" support staff is absent.

As Figure 4 indicates, CAC provides research support throughout the entire research process. During the start-up phase of a new research initiative, for example, it provides matchmaking services to link researchers with similar interests as well as training in statistics. During the preparation phase, the 'Research Grant System Website' enables online research grant applications. The site also enables users to track the status of applications, to submit reimbursements and claims, to monitor approved budgets and to upload research output. The actual research work of researchers is supported by the provision of various online survey, library and other services (Figure 6).

[INSERT FIGURE 6 HERE]

CAC's approach is to understand the aspirations and motivations of research faculty and to customize solutions. The mentality of tenure track faculty is often influenced by the 'publish or perish syndrome'. CAC conducts needs surveys to establish what each faculty requires throughout the research process so as to produce good results. CAC's strategy is to be a strong advocate for IT-enabled, 'smart' research as well as respective needs. Its support includes:

1. Setting up and supporting a good research IT architecture including resources for numerically intensive computing, large databases, standard compilers, subroutine libraries and other software applications.

2. Sourcing, directing and informing research faculty for/to/about available resources in SMU, offering support services in general consulting, code clinics, training classes, technology searches and reviews.
3. "Jump starting" younger faculty members and returning Faculty Development Scheme (FDS) members as these are the ones that require most help as they have an urgency to publish so as to achieve tenure.
4. Providing certain levels of commitment to IT support and the technologies available for un-sponsored or self-sponsored research.
5. Assisting faculty to publish their work, e.g. in SMU's online working paper series etc.

If SMU is to produce research of the highest quality and to compete effectively in an increasingly competitive funding environment, administrative or support deficiencies that might hinder faculty to do research have to be minimized. Another key ingredient is the development of a supportive research culture.

A recent brainstorming session about this topic with a focus group of selected members of SMU's faculty produced some concrete KM suggestions and measures that could enhance the quality and conduct of research in SMU. Domains such as leadership, strategy, culture, rewards, technology and processes were identified as key enablers of KM in research (Table 4). Two common themes surfaced during the focus group session: (i) the importance of trust and support from both peers and top management, and (ii) the need to promote regular knowledge sharing activities such as informal / formal gatherings, workshops and tea / coffee breaks in an attractive environment so as to intensify communication and research-related dialogues both

within and beyond the SMU community. The latter included suggestions to appoint internal mentors/referees/reviewers for researchers and potential journal contributions before research outputs are submitted to premier journals. It was argued that this would eventually lead to a better understanding of the international review process, the fostering of a culture of peer-review knowledge sharing and impressive publication records.

[INSERT TABLE 2 HERE]

4. Conclusion

Universities are (still) part and parcel of the thriving knowledge business as their core activities are associated with knowledge creation, dissemination and learning. Unlike Rowley (2000), Drucker and others who have predicted that the brick and mortar institutions of higher education will cease to exist in the future due to their inability to reinvent themselves and to catch up with more intelligent, knowledge-creating organisations such as professional consulting firms, we are confident that universities will live up to the challenge and become 'smart(er)' organisations with the help of KM. In this paper, we endeavoured to illustrate the applicability of knowledge management to higher education institutions with special reference to university research. Based on the case of the Singapore Management University, we argued that knowledge management concepts and tools can indeed benefit and have the potential to advance the cause of research in the university. Based on Rowley's (2000) typology of knowledge management objectives in universities, we found that KM-led activities and tools in the areas of knowledge repositories and knowledge access have

been sufficiently addressed to advance research in SMU. In tandem with the rapid expansion of SMU, more emphasis will be put on the cultivation of a knowledge-sharing environment and knowledge valuation. To become a KM-enabled organization and to implement a KM-led research focus, following results will have to be achieved:

Firstly, SMU will continue to promote and cultivate a knowledge-sharing culture amongst its members so as to enable and support the exchange of tacit knowledge between individuals and groups/teams, not just at the level of sharing of research results but also with regard to know how of producing desired end-results such as tier 1 publications. As the story of SMU's Knowledge Force suggests, it might be worthwhile to hatch more communities of interest so that more individuals and groups can create synergies, share knowledge and achieve results. SMU's supportive knowledge-sharing culture will allow its members to share information and knowledge openly, to learn from each other and the past, to act as mentors and to grow professionally.

Ideally, internal knowledge-sharing should be proclaimed as a corporate value by universities that is recognised by senior members of the university administration, including board members. Barriers and challenges that need to be addressed in this area include how tacit knowledge can be captured and shared for the good of the university – e.g. to do things, better, faster and cheaper (the know-how). The sharing of know-how plays a key role in many strategic activities and processes such as recruitment and training. As the complexity of SMU's knowledge base increases, the need to cooperate, coordinate and share experience-based knowledge between

organizational units will further increase. Eventually this might lead to the need to transfer best practices quickly from one unit to another, a standard KM tool in large organisations. Indirectly, CAC is already heavily involved in such best practice transfer activities as it constantly is on the look out for "tricks and tips" to share with faculty. Once CAC has "wind" of a useful tool, it evaluates, secures, and shares it with faculty. One example is the recent dissemination of knowledge and competencies with regard to Endnotes, a bibliography software that helps to organise references and citations in the course of writing, through sharing and information sessions for faculty and research staff. Whether such activities should be formalised has to be discussed.

The need to share know-how effectively is of increasing importance in this era of globalization which brings about not only a vast increase of what we know, but an even greater amount of ignorance, i.e. of what we know that we don't know (Luhmann 1971; Lyotard 1984; Stichweh 1995; Evers 2003b; Evers & Menkhoff 2002). While knowledge is rapidly increasing, the knowledge about what we do not know is increasing at an even faster pace. The social ability to co-operate and communicate with different kinds of people and experts to share and create knowledge through informal learning and mutual engagement will become a key in the fostering of a knowledge-sharing culture in universities and organizations.

In many organisations a 'need to know culture' prevails that works against knowledge sharing and innovation. Competition in academia has made works-in-progress confidential and often inaccessible. Researchers are not rewarded based on the extent of internal knowledge sharing activities but rather based on the number of publications in internationally refereed top journals. Often there are little incentives

for university lecturers to share knowledge about effective research strategies and know how other than participating in research seminars and conferences. The knowledge of doing quality research is normally passed on via mentors/gurus/doctoral supervisors or within trusted informal groups (COI). One of the related challenges is to capture knowledge about best research practices (which usually comes in the form of tacit knowledge, learned through hours of painstaking efforts) and to share that amongst other organisational members. Overcoming such challenges requires appropriate incentives and recognition for knowledge sharing (e.g. during performance appraisals), mutual trust, suitable mechanisms (e.g. regular share fairs) and a caring organisation.

As knowledge no longer remains the domain of academia but increasingly is produced and co-produced by public organisations, industry and think tanks, universities are now confronted with very smart competitors who can generate knowledge quickly as well as the challenge of how to participate and accommodate "different practices of creating and warranting knowledge in different domains" (Knorr-Cetina 1999:246). As university research becomes increasingly an outcome of collaborative dialogues between researchers and the researcher's target audience and sponsors, there is a trend towards more participative research involving many actors and experts who move less according to the dynamics of their original disciplines and more according to problem and application interests (Gibbons 2000:41). Gibbons suggests that important intellectual problems are emerging in a 'context of application', and pursuing problem interests means that academics may be away from the university, working in teams, with experts from a wide range of intellectual backgrounds, in a variety of

organisational settings. Researchers must adopt a different set of research practices to participate in cross-industry collaborative knowledge sharing.

To sum up, the university community and its major stakeholders stand to gain through effective knowledge management and the further development of its knowledge sharing culture enabled by top management support and allocation of sufficient resources, suitable organisational structures (e.g. the appointment of a chief knowledge officer as head of a KM unit), a reward system which puts a premium on knowledge sharing and innovation rather than knowledge hoarding, top notch KM software solutions and effective KM processes.

Bibliography

Allen, P.A. (1988) **Missions of Colleges and Universities**. San Francisco: Jossey-Bass.

Bennis, W. (1973) **The Learning Ivory Tower**. San Francisco: Jossey-Bass.

Cohen, W. M. & Levinthal, D.A. (1990) Innovation and Learning: The Two Faces of R&D, **The Economic Journal**, 99, pp. 569-596.

Crainer, S. & Dearlove, D. (1998) **Gravy Training: Inside the Shadowy World of Business Schools**. United Kingdom: Capstone Publishing Limited.

Daniel, J. (1996) **Mega-Universities and Knowledge Media: Technology Strategies for Higher Education**. London: Kogan Page.

Davenport, T. H., DeLong, D.W. & Beers, M. C. (1998) Successful Knowledge Management Projects, **Sloan Management Review**, 39, 2, pp. 443-57.

Drucker, P. (2000) Into Knowledge, **Forbes Global**, 15 May 2000.

Edwards, K. (1998) **Restructuring the University: New Technologies for Teaching and Learning**. Paris: CRE Association of European Universities.

Etzkowitz, H. & Leydesdorff, L. (1997) **Universities and the Global Knowledge Economy: A Triple Helix of University-Industry-Government Relations**. London: Pinter.

Evers, H. D. (1999) The Global Context of Development Anthropology: Social and Cultural Dimensions of Market Expansion, **Development Anthropologist**, 17, 1, pp. 108-116.

Evers, H. D. (2000a) Globalisation, Local Knowledge and the Growth of Ignorance: The Epistemic Construction of Reality, **Southeast Asian Journal of Social Science**, 28, 1, pp. 13-22.

Evers, H. D. (2000b) Epistemic Cultures: Towards a New Sociology of Knowledge, **Department of Sociology Working Paper No. 151**. Singapore: National University of Singapore.

Evers, H. D. (2003a) Malaysian Knowledge Society and the Knowledge Gap, **Asian Journal of Social Science**, 31, 1, (in print).

Evers, H. D. (2003b) Transition towards a Knowledge Society: Malaysia and Indonesia in Comparative Perspective, **Comparative Sociology**, 2, 2, pp. 355-373.

Evers, H. D. & Menkhoff, T. (2002) Selling Expert Knowledge: The Role of Consultants in Singapore's New Economy, **ZEF-Discussion Papers #50**. Bonn University, FRG: Centre for Development Research.

Firer, S. & Williams, S.L.M. (2003) Intellectual Capital and Traditional Measures of Corporate Performance, **Journal of Intellectual Capital**, 4, 3, pp. 348-360.

Franklin, P., Hodgkinson, M. & Stewart, J. (1998) Towards Universities as Learning Organizations, **The Learning Organization**, 5, 5, pp. 228-238.

Fuller, S. (2002) **Knowledge Management Foundations**. Boston & Oxford: Butterworth Heinemann.

Geiger, R. (1993) **Research and Relevant Knowledge: American Research Universities since World War II**. New York & Oxford: Oxford University Press.

Geuna, A. (1999) **The Economics of Knowledge Production: Funding and the Structure of University Research**. Cheltenham: Edward Elgar.

Gibbons, M. et. al. (1994) **The New Production of Knowledge: Science and Research in Contemporary Societies**. London: Sage.

Gibbons, M. (1998) Higher Education Relevance in the 21st Century, **World Bank Working Paper No. 19717**. Washington: World Bank Group.

Gibbons, M. (2000) Universities and the New Production of Knowledge: Some Policy Implications for Government, in: Kraak, A. (ed) **Changing Modes**. Cape Town: Human Sciences Research Council Publishing.

Goddard, A. (1998) Facing Up to Market Forces, **Times Higher Education Supplement**. 13 November 1998, pp. 6-7.

Godin, B. & Gingras, Y. (1999) The Place of Universities in the System of Knowledge Production, **Research Policy**, 28, 2, pp. 273-278.

Hailes, S. & Hazemi, R. (1998) Reinventing the Academy, in: Hazemi, R. et al. (eds) **The Digital University: Reinventing the Academy**. London: Springer.

Humboldt, W. (1970) On the Spirit and the Organizational Framework of Intellectual Institutions in Berlin, **Minerva**, 8, 2, pp. 242-250.

Jones, D. R. & Pritchard, A. L. (1999) Realizing the Virtual University, **Educational Technology**, 39, 5, pp. 56-59.

Kidwell, J., Linde, K. & Johnson, S. (2000) Applying Corporate Knowledge Management Practices in Higher Education, **Educause Quarterly**, 4, pp. 28-33.

Knorr-Cetina, K. (1999) **Epistemic Cultures: How Sciences Make Knowledge**. London: Harvard University Press.

Liebowitz, J. (2000) **Building Organizational Intelligence: A Knowledge Management Primer**. Boca Raton: CRC Press.

Luhmann, N. (1971) Die Weltgesellschaft, **Archiv für Rechts- und Sozialphilosophie**, 57, 1, pp. 1-35.

Lyotard, J. F. (1984) **The Postmodern Condition: A Report on Knowledge**. Manchester: Manchester University Press.

Menkhoff, T., Chay, Y.W. and Loh, B. (2004) Strategic Knowledge Management in Small Businesses: Issues and Challenges, **International Quarterly for Asian Studies**, Vol. 35, No. 1-2 (forthcoming).

Mills, Q. & Pumo, J. (1999) Managing Change in Higher Education, in: Oblinger, D. & Katz, R. (eds) **Renewing Administration: Preparing Colleges and Universities for the 21st Century**. Bolton, M.A.: Anker.

Muller, S. (1998) The Management of the Modern University, in: Muller-Boling et al. (eds) **University in Transition**. Guetersloh: Bertelsmann Foundation Publishers.

Muthesius, S. (2001) **The Post-War University: Utopianist Campus and College**. Boston, M.A.: Yale University Press.

Nonaka, I. & Takeuchi, H. (1995) **The Knowledge Creating Company**. New York: Oxford University Press.

OECD (2000) **Knowledge Management in the Learning Society**. Paris: OECD.

Peters, M. (2002) Education Policy in the Age of Knowledge Capitalism, **Keynote address to the World Comparative Education Forum on Economic Globalization and Education Reforms**, 14-16th October 2002, Beijing Normal University, China.

Pornchulee, A. A. (2001) Knowledge Management in Higher Education, **Proceedings of the 1st SEAMEO Education Congress**, Bangkok, March 2001, Thailand.

Rada, R. (2001) **Understanding Virtual Universities**. Bristol: Intellect.

Rowley, J. (2000) Is Higher Education Ready for Knowledge Management?, **The International Journal of Educational Management**, 14, 7, pp. 325-333.

Senge, P. M. (1990) **The Fifth Discipline: The Art and Practice of the Learning Organization**. New York: Doubleday/Currency.

Stichweh, R. (1995) Zur Theorie der Weltgesellschaft, **Soziale Systeme**, 1, 1, pp. 29-46.

Stiglitz, J. (1999a, April 3 – last update) Public Policy For a Knowledge Economy, **Remarks at the Department for Trade and Industry and Center for Economic Policy Research**, 27 January 1999, London, Available: http://www.worldbank.org/html/extdr/extme/jssp012799a.htm (Accessed 2003, April 3).

Stiglitz, J. (1999b, April 3 – last update) On Liberty, The Right To Know, and Public Discourse: The Role of Transparency in Public Life, **Oxford Amnesty Lecture**, 27 January 1999, Oxford, U.K., Available: http://www.worldbank.org/html/extdr/extme/jssp012799.htm (Accessed 2003, April 3).

Trow, M. (2000) From Mass Higher Education to Universal Access: The American Advantage, **Minerva**, 37, pp. 1-26.

Tschang, T. (2001) Virtual Universities and Learning Environments: Characterizing their Emergence and Design, in: Tschang, T. & Senta, D. (eds) **Access to Knowledge: New Information Technologies and the Emergence of the Virtual University**. Oxford: Pergamon.

Warner, D. & Palfreyman, D. (2001) **The State of UK Higher Education: Managing Change and Diversity**. Buckingham: SRHE/Open University Press.

World Bank, The (1998) **World Development Report: Knowledge For Development**. Oxford: Oxford University Press.

Appendix:

The Conduct & Advancement of Research in SMU

Based on a survey commissioned by SMU's president, Professor Ronald Frank, CAC investigated the IT needs and requirements of SMU's faculty. The subsequent report identified five primary areas as important to the conduct and advancement of research in SMU:

1. Long term institutional commitment for Faculty research;
2. The need for more open communication channels;
3. The need for standardization on policies, tools and standards;
4. The need to amplify IT infrastructure and tools for research;
5. Dedicated IT support for Faculty research.

The Center for Academic Computing (CAC) was created on 2 Jan 2002 to help address the above key areas in supporting research in SMU. In particular, CAC was tasked with the mission to provide dedicated IT support for faculty research and to support the individual schools in their specific IT needs. The results which this mission aims to achieve include giving prominence and attention to the university's academic computing agenda, allocating the necessary effort that is required in promoting and supporting academic computing, facilitating rapid co-generation and management of niche databases and resources, providing the academic technology oversight and planning function; and making accountability and the focus of responsibility for academic technology very clear.

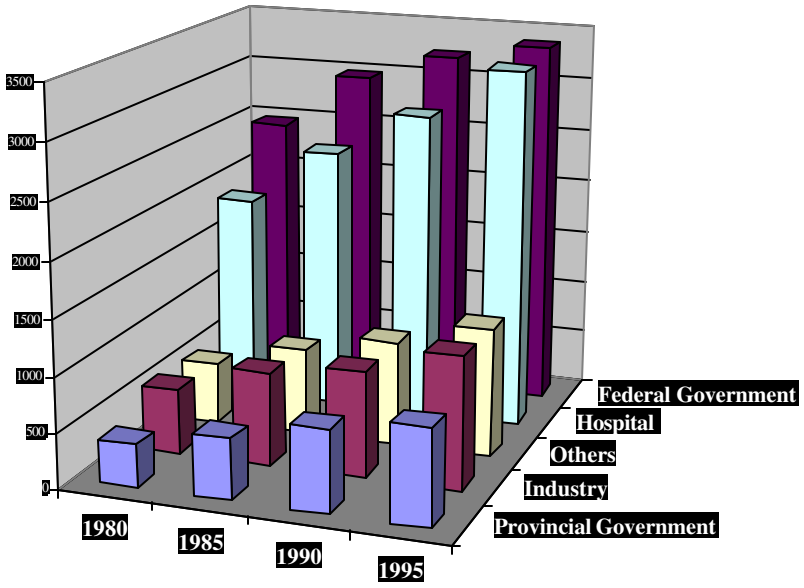
A number of key strategies form the cornerstones of CAC's implementation plan towards achieving the above goals. The strategies are: providing information resources for self-directed application, positioning SMU research in the global arena, continuous feedback and dialogue with faculty to ensure CAC stays relevant, the adoption of best-practices, and the implementation of basic research tools and standards. CAC's first strategy sought to exploit IT fully to enable users be able to self-help to the available information and to use the information to generate more information. To achieve this, access to information and resources will be made available without regard to physical or temporal boundaries to faculty, staff and students through capitalizing on the Internet and web-based technologies.

Thirdly, regular sessions with all faculty and quarterly meetings are planned with various faculty discipline groups to ensure that the CAC stays relevant. Faculty feedback is also solicited via online feedback forms. Requests and feedback is systematically reviewed and followed through. Responses will be made available to all through the Internet.

The adoption of best practices as CAC's forth strategy centres on the use of task forces around various initiatives, engaging in discussions with communities of interest, and adhering to a successful IT planning process that include an up-front period of education to help all key stakeholder groups understand IT trends and issues that may impact the institution.

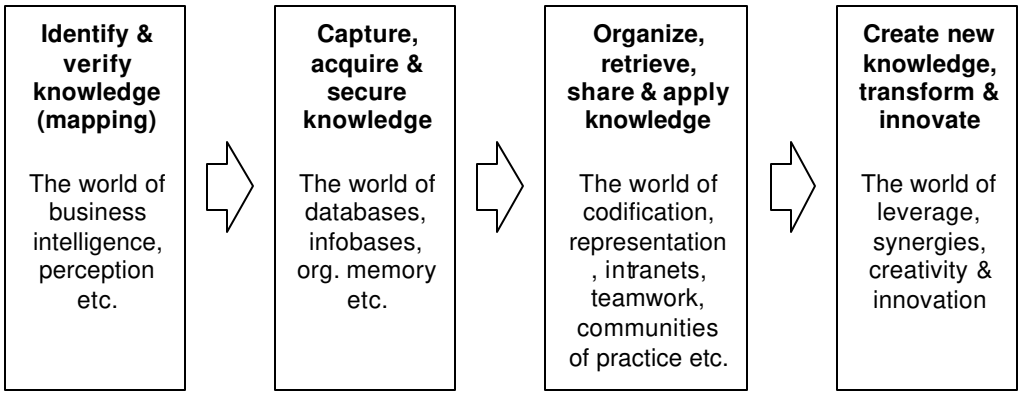
Finally the implementation and adoption of basic research tools and common applications is aimed at minimizing duplication and providing better upgrade and technical support. This standardization, wherever possible, is also envisioned to improve communications and information exchange across departments and schools.

Figure 1: Breakdown of Publications by Sectors (Canada), 1980-1995



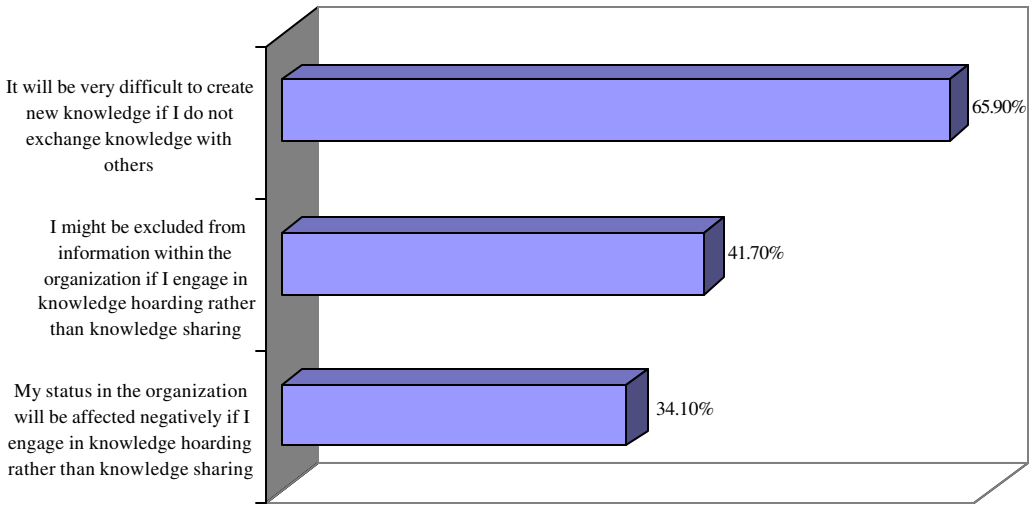
(Source: Godin & Gingras 1999:275)

Figure 2: The KM Event Chain



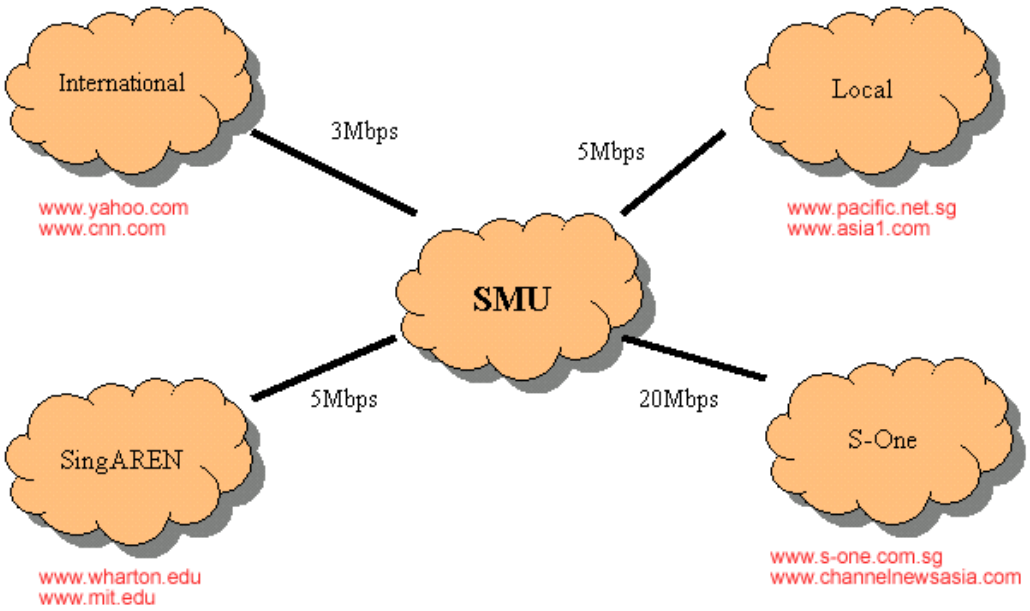
(Adapted from Liebowitz 2000:6)

Figure 3: Expected Costs of Knowledge Hoarding



* Multiple response question, n=132
(Source: SMU Survey)

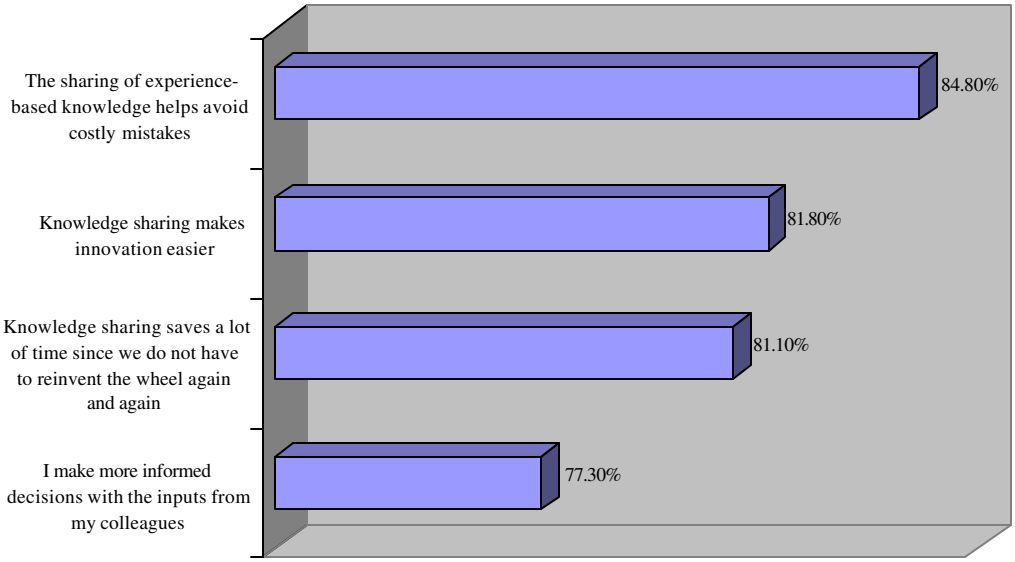
Figure 4: Linking SMU Locally and to Educational and Research Centres of the World



For research and academic oriented access, SMU is connected to Singapore Advanced Research and Education Network, or SingAREN. This in turn connects SMU to a multitude of next-generation Internet initiatives, including Internet2, vBNS and STAR TAPin the North American Continent.

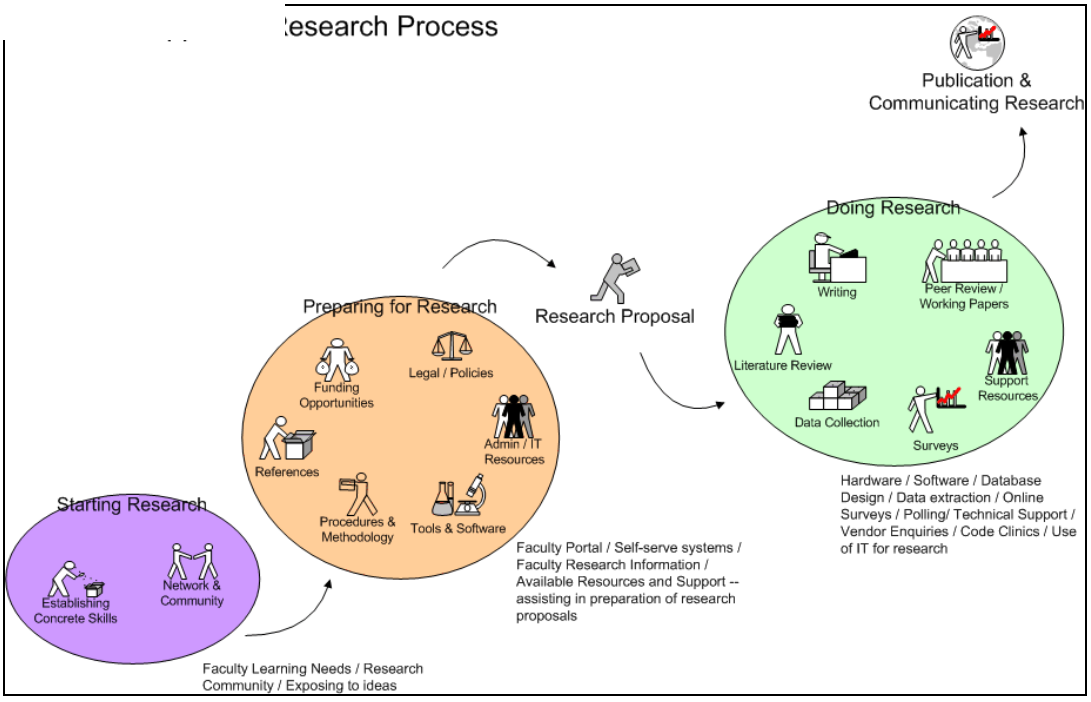
(Source: Office of Communications & IT, SMU Intranet 2002)

Figure 5: Expected Benefits of Knowledge Sharing



* Multiple response question, n=132
(Source: SMU Survey)

Figure 6: Research Support Services Provided by CAC



(Source: Center for Academic Computing, SMU Intranet 2003)

Table 1: Application and Benefits of KM for the Research Process

Knowledge Management Application	Benefits
A Repository of: • Research interests within an institution or affiliated institutions (potential subcontractors) • Research results (where possible) and funding organizations (federal agencies, foundations, and corporations) with easy search capabilities to facilitate interdisciplinary opportunities • Commercial opportunities for research results **A Portal for Research Administration Procedures and Best Practices related to:** • Funding opportunities • Pre-populated proposals, budgets, and protocols • Proposal-routing policies and procedures • Award notification, account set-up, and negotiation policies and procedures • Contract and grant management policies and procedures • Technical and financial report templates, policies, and procedures • Overview of internal services, resources, and staff	• Increased competitiveness and responsiveness for research grants, contracts, and commercial opportunities • Reduced turnaround time for research • Minimised devotion of research resources to administrative tasks • Facilitation of interdisciplinary research • Leveraging of previous research and proposal efforts • Improved internal and external services and effectiveness • Reduced administrative costs

(Source: Kidwell, Linde & Johnson 2000:32)

Table 2: Popular Research Software Available to SMU Researchers by Research Areas

Research Areas	Software		
Data Modeling	• AMOS • EQS • Glimmix • LIMDEP	• LISREL/Prelis • MATLAB • Mplus • NU*Dist Vivo	• EViews
Psychology	• EPRIME		
Programming	• Fortran • C++ • C#	• Visual Fortran • Visual Basic • Perl	• GNU C • GNU C++ • GNU awk
Mathematical and Statistical Software	• GAUSS • Mathematica • NAG	• SAS • Stata • SPSS	• R • Solas • Q-Sort
Bibliographical software	• Endnotes • Reference Manager		
Design & Drawing Software	• Visio		

Table 2: KM Initiatives to Enhance Research in SMU: Some Brainstorming Results

LEADERSHIP	STRATEGY	CULTURE	HRM/REWARDS	TECHNOLOGY	KM PROCESSES
• Ensure KM support from top management • Allow faculty to experiment and provide sufficient time for research • Find KM champions • Appoint internal referee for papers written by staff • Conduct peer review of research results 'internationally' before submission to top journals	• Formulate strategic research program / agenda to gain competitive advantage • Incorporate KM into school's research policy • Set up study groups (thematic research groups) in line with research strategy • Develop units/ cells that can stimulate interest groups using KM network • Draw visiting staff into SMU's research activities • Make ownership of research/output known explicitly and provide recognition	• Build a culture conducive to learning and research (e.g. through regular exchange of research results, seminars etc.). • Actively promote an epistemic culture of k-exchange • Build trust among colleagues for cohesiveness • Ensure social facilitation and social interaction • Institute a research-oriented mentor-mentee scheme (e.g. to produce 'quality' articles) • Enable coaching of junior staff by experienced (not necessarily senior) staff • Beef up faculty's KM skills and provide respective training • Conduct research workshops so as to share 'secrets' of how to conduct top quality research • Have more tea breaks to promote knowledge sharing in research	• Institute an effective reward structure for knowledge *sharing* and research collaboration / facilitation (e.g. coaching others)	• Streamline admin matters to allow researchers to focus on core activities (research) rather than the mundane (research admin) • Provide data-analysis services (e.g. stats) • Provide effective / state-of-the-art search engines • Provide info about specific research interests and knowledge of academic staff ? repository • Enable the sharing of individual KM/research systems ? best practice identification • Make effective use of IT so as to enable effective collaboration and to overcome distance • Build up and use a repository of cases to recycle, reuse and rebuild knowledge	• Provide an answer to the question: 'If we would only know what we know" • Capture research results • Share and disseminate research results / knowledge • Make effective use of existing "Rolodex" • Provide a top (thematic) research conference repository