The Knowing Nation: A Framework for Public Policy in a Post-industrial Knowledge Economy

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ABSTRACT *As the global economy becomes more knowledge intensive and the wealth of nations more dependent on their knowledge assets being harnessed, it is essential for policy makers to have frameworks for the development and utilisation of national knowledge assets. This article argues that a policy framework can be developed through which policy initiatives in a range of policy areas can be filtered in order to meet the challenges of the knowledge economy. We have developed an approach that has previously been applied to managing intellectual capital in firms and adapted it to the public policy arena. In doing so we question policy orthodoxies such as the assumption that free trade automatically facilitates international knowledge flows, that participation in a global knowledge economy necessarily challenges national sovereignty, and that online delivery of education is necessarily a progressive strategy.*

Keywords: knowledge policy, knowledge management, intellectual capital.

Introduction

Making public policy in a post-industrial environment requires us to move debate away from a policy-making framework that is based on the economics of the industrial era. The new fundamental emphasis in policy making must be to shift from a framework that focuses on investment in a nation's tangible infrastructure to one that focuses on marshalling intangible assets. The key intangible asset in the post-industrial age is knowledge. Indeed, according to Peter Drucker, raising productivity levels of knowledge and service workers is the single greatest economic and social challenge we face today.[1] Furthermore, Porter argues that the first nation to meet this challenge will dominate the twenty-first century economically and those that do not will face increasing social tensions.[2]

The Organisation for Economic Co-operation and Development (OECD)[3] and others[4] have begun to investigate issues in relation to knowledge policy. Among this literature there is much discussion of measurement of knowledge, educational reform, technology, labour markets, and so on. What is missing is an overriding policy framework to enable the coordinated formulation of policy making across all these areas. The important question is: how do nations develop knowledge policy initiatives across their economies in a coherent and effective fashion? To this end, we argue for the early recognition of the sheer complexity of the task by not advocating simplistic policy formulations and merely managing the symptoms of national knowledge deficiencies. Rather, developing an openness and capacity to learn from the external environment which facilitates receptivity to information and knowledge, connectivity (knowledge

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networks) and an ability to process codified knowledge should be seen as exemplary of fundamental issues.

Conspicuous by its relative absence is discussion about a strategic policy approach that considers whether or not we need a knowledge policy that exists in addition to education, communication, cultural, trade, industry, and science and technology policies. We argue that nations do not need another policy—a knowledge policy—but rather they need to filter those other policy areas through a knowledge-policy matrix. Indeed, just as most policy can be seen as 'information policy in disguise',[5] most policy should be aimed at capitalising on underlying knowledge resources. Knowledge exists in every facet of human activity and attempts to disaggregate it or decontextualise it from its natural state are fraught, particularly if the aim is to coordinate or enhance national stocks of knowledge. It would appear counterproductive to anticipate that dealing with knowledge as a single policy concern will bring much gain. Rather, a system-wide approach to the knowledge network which adjusts, or self-organises, so that the whole system evolves without compromising the necessary complexity of linkages and synergies is preferable.

Understanding Knowledge in the Management Domain

Information economists have long been treating information and knowledge explicitly as resources. Such a perspective takes account of the basic economic characteristics of information and knowledge and seeks to bring within economic calculation their value and cost.[6] Much of the detailed empirical research that has emerged recently from economics and accounting scholars has tended to concentrate on measuring intellectual capital.[7] It quite rightly has paid considerable attention to the important and difficult problems associated with quantifying knowledge via proxy measures. In doing so it has tended to focus on developing ways of identifying knowledge and describing its role in the economy. The importance of this task is amplified by the fact that measuring intangibles can only ever be done indirectly, which means great sophistication in dealing with the relevant issues is called for. Without this sophistication it is likely that the proxy measures will be of little practical value. Although measurement and description are important strands of investigation, we seek, in this paper, to move the focus to management at public policy level. Progressing thought on how to manage knowledge in an economy is important because of the difficulties of managing something that cannot always be confidently measured. Furthermore, advances made in managing may also resonate positively in relation to the development of sophisticated thought on measurement and description.

Knowledge management is focused on developing strategies and tactics for nurturing and exploiting knowledge in its usage domain. This approach is about dealing with what Babe sees as the important aspect of knowledge, its context.[8] However, before we move on to discuss a knowledge policy framework it is necessary to outline briefly how we view the context within which knowledge is situated. This is necessary because if knowledge is not usefully understood as an abstraction removed from its environment, the basis of a knowledge policy framework must be founded in a sound understanding of what knowledge is and what the conditions of its environment are. In other words, we have to understand its ecology. What we are interested in presenting here is a rich, non-reductionist view of the context, not an oversimplified, reductionist sketch of it.

Unfortunately knowledge is not just one thing; it is changeable and multi-dimensional rather than static and monolithic; therefore, one item of knowledge can be treated in different ways by different people or differently by the same people in different contexts. There are, therefore, 'multiple and contradictory view points' of and about knowledge

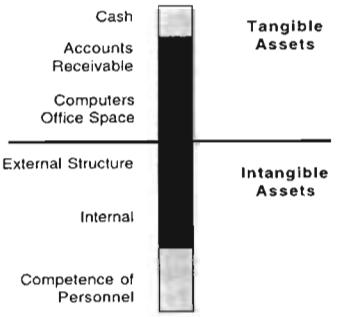

Figure 1. Tangible and Intangible Assets.
Source: Adapted from Sveiby, 1997, p. 11.

within this complex environment,[9] which we call a socio-epistemological system. The nature of a socio-epistemological system is such that we need to develop a dynamic understanding—rather than a static definition—of knowledge which embraces and allows us to work with its complexity and changeability.

The level of complexity, diversity and the potential for unpredictable changes which are inherent in a socio-epistemological system make predicting the future difficult and might tend to push managers and policy makers to either give up forecasting or to become impotent and reactive. Neither of these scenarios is very attractive and the alternative is to seek out anticipatory modes of management. Arthur warns that five-year plans are impotent today and that constant reorganising and repositioning is necessary in an ongoing process of adaptation.[10] What we have labelled Just Anticipating Management is the underlying policy management process that is needed. Just Anticipating Management is focused on problem solving rather than on control, is not overdependent on information, distinguishes between information and knowledge, puts less emphasis on best practice, seeks to have available multiple analyses, places more emphasis on creativity and self-organisation, is not mechanistic, and is less certain about the future. In short, it is about a recursive exercise of informed judgement which recognises the dynamic nature of a socio-epistemological system, avoids the trap of merely being reactive and resists the equally troublesome trap of unreliable long-term prediction. The following discussion is based on this kind of strategic thinking placed on a policy-making agenda.

Knowledge Policy Framework

Sveiby notes that analysis of many companies listed on the stock exchange reveals that the value placed on them by the market (which is reflected in the share price) is often many times greater than the value of the businesses' physical capital—the book value.[11] The difference between the book value and the market value is a proxy for the intellectual capital of the firm. The importance to this paper of Sveiby's work is that he has placed a framework over the otherwise amorphous nature of intellectual capital by targeting the usage domains of intellectual capital in firms. The intellectual assets of a firm can be divided into three usage domains: (1) external structure, (2) internal structure and (3) competence of personnel (or individual competence) (Figure 1).

External structures of a firm are made up of the relationships with its customers, suppliers, competitors and so on. They also include other intangibles such as trademarks, brand names and the firm's reputation. Internal structures include the administrative

systems, communication network, procedures, culture and manuals. In some firms it includes patents and copyrights. Employee competence is vested in the people working in the firm. It is not owned by the firm but is rented. Here we include the experience, education and knowledge that can be utilised to add value to the firm.

We know that the worth of a nation is more than is shown in the national accounts. For example, national accounts do not shed much light on issues such as quality of life, standards of literacy, quality of social infrastructure, the extent of a nation's international relations and so on. Importantly, each of these key qualitative national characteristics can fit within Sveiby's intangible assets framework when translated to the macro level. Given that in addition to the national accounts, nations have complex internal structures and complex external structures and need to be able to leverage the competencies of individuals within them, it is, therefore, plausible to use the above model to develop a knowledge policy framework. Thus we move now to discuss each of Sveiby's three classes of intellectual capital in the light of knowledge policy making.

External Structure

Macdonald argues that the learning-organisation research agenda has too often ignored the fact that the value of an organisation's ability to learn from outsiders is profound.[12] Thus, inwardly focused organisations are in danger of being hampered in their ability to learn and, therefore, to adapt to environmental change. Indeed, Arthur has found that 'in a knowledge-based world, players compete not by locking in a product on their own but by building *webs*—loose alliances of companies organised around a mini-ecology—that amplify positive feedbacks'.[13] Adding to this, firms must learn from all their external partners—customers, suppliers, competitors.[14] Furthermore, he argues that we must not just learn about what they want, what they can do and what we can do together, but also we must teach them about ourselves. This is a process of developing deep understandings of each other, common languages, more efficient lines of communication, and insights into the strengths and weaknesses of each other. A case in point is Australia's irresistible tendency to trade heavily with countries it has understood best—such as Britain, the US and New Zealand—for at least the last 100 years.[15] Stewart offers the term 'relationship capital' to express this concept.[16] If relationship capital is sufficiently strong then our engagement with the rest of the world is likely to be more sophisticated, become better established and be richer. The economic development literature shows a clear link between an outward, international orientation and the process of economic growth and development. When nations have moved towards autarky, growth slows; towards internationalisation, growth quickens. The economic histories of Japan, India and China illustrate this well.

To achieve growth and development outcomes at a national level a knowledge policy framework needs to establish a sophisticated focus on internationalisation. Brought into this focus is the issue of developing sufficient international exposure in trade. This is not simply a call for reducing tariff barriers and a rush into export drives. A national economy must use international trade as an opportunity to learn and profit. International exposure must be conceived as a means of sustaining and growing domestic industry in a complex environment with an appropriately sophisticated grasp of what this entails. If the focus is on the flow of money between nations then a one-dimensional and brittle set of relationships will develop. The underlying emphasis should be on communication and knowledge transfer rather than the current emphasis on price-based competitiveness. As Marceau, Manley and Sicklen argue, competition based on low price will eventually

set up a negative feedback loop which drives the economy into a low-technology, low-knowledge, low-wage and low-profit mire which serves no good purpose.[17]

All-or-nothing trade liberalisation policies which have characterised much of the debate over the last decade or more are just not sophisticated enough to reap any sustainable rewards for the community.[18] For example, trade liberalisation policies have been in vogue in Australia since 1973, yet if the trajectory of 'pre-reform' trends in the trade balance for manufactured goods had continued until 1997 a trade surplus of 4% of GDP would now be enjoyed. Instead an 8.5% deficit on manufactured goods has been achieved despite a decline of nearly 50% in the exchange rate.[19] According to neo-classical economic theory, which is based on the redundant characteristics of industrial economics, this marked deterioration in Australia's position should not have happened. An explanation for how this situation arose is that there has been an absence of knowledge creation and learning from the wider world. It is an example of industrial-age policy not working in a post-industrial environment. The position looks worse if we examine the case history of radio production in Australia, which had achieved high degrees of sophistication, share of the domestic market and self-sufficiency before World War II. The value of domestic production of radios in Australia declined rapidly from the 1960s onwards because of the lack of ability in Australian radio production plants to produce transistorised consumer electrical goods.[20] Germany, the US, Japan and others had been making large investments in industrial research and development (IR&D) while Australia had been complacent and was out of touch with the knowledge needed in global markets. In addition, Rooney shows that one of the central characteristics of Australia's international trade since the war has been the very narrow geopolitical focus it has had. This is an example primarily of a failure in knowledge transfer; the later reductions in tariff protection only drove the final nail into the coffin.

Talk of free trade and openness invites the temptation for cavalier policy constructs which relinquish knowledge management to market forces. It is easy to conjecture, as Engelbrecht has, that we may have to place more emphasis on free-trade scenarios to improve international knowledge flows.[21] Yet, free trade is merely a proxy for international knowledge flows, and, as Engelbrecht has also noted, international knowledge diffusion (spill-over) does not occur equally across global markets: he notes Australia's curious resistance to such diffusion despite the rush to trade liberalisation in that country. Here we see both market inefficiency and why the danger of managing the proxy rather than the knowledge must be kept in mind. The logic that says that you are managing the knowledge if you are managing the proxy is as dangerous as it is flawed, especially in the case, as it is here, where the proxy is known to be somewhat unreliable.

Adding further complication to the issue, Engelbrecht warns that it is not a nation's connectivity (say, international trade linkages) which is necessarily most important but its receptivity to information and knowledge.[22] Thus, it is not the act of trading but the ability to learn from the activity—which may not be proportional to the scale of international trading, as it appears to be in Australia—which may be the key policy issue. This is put in focus by Lamberton's Sisyphus model of knowledge.[23] Here the management of codified versus tacit knowledge at the knowledge usage domain becomes important. Lamberton argues that care has also to be taken to ensure that our receptivity to and stocks of codified knowledge are complimented by our ability to process it. The ability to do this rests on the accumulation of tacit knowledge and how well it is mobilised. Goods traded is effectively a proxy of codified knowledge, but has little to say in relation to tacit knowledge. Capacity to use information and knowledge effectively, therefore, includes a prior investment in appropriate tacit knowledge ahead of any immediate market concerns.

What is perhaps most disturbing about the free-trade model though is its underlying assumption of perfect knowledge. If markets depend on perfect knowledge to work 'properly' then goods traded, which embodies codified knowledge, must logically be met with a symmetrical or complementary (perfect) inventory of tacit knowledge. In other words, to have perfect knowledge one must have perfect tacit and perfect codified knowledge. The achievement of perfect tacit knowledge is by definition impossible; therefore, any model of knowledge management which must rely on the perfect-knowledge assumption to work effectively instantly crumbles. The case for managing knowledge rather than its proxy and for sophisticated policy analyses of the dynamics of knowledge is, therefore, convincing.

The levels of policy sophistication which could have helped Australia walk the fine line between sufficient protectionism and maintaining an adequate level of competitive engagement with the rest of the world were not achieved, but more importantly the failure of knowledge acquisition and creation must be placed at the centre of analysis. Policy aimed at trade liberalisation needs to be informed by a broader range of policy variables than just narrow economic ones. Education, including, for example, business education and foreign language training, basic research and development (R&D) and IR&D, and telecommunications infrastructure are all examples of key variables that need to be factored into analysis. We need to be able to understand the incoming knowledge and be able to make sense of that knowledge in applying it in the local environment.

If we take the view that a nation is engaged in a global socio-epistemological system the kinds of variables mentioned above need to be factored in because they represent the foundations that facilitate the ability to contribute to the process of global knowledge interchange. These external knowledge structure related variables include the knowledge-capturing mechanisms, the methods of disseminating knowledge to the rest of the world—including having the appropriate communication tools—and the ways of processing knowledge that can make international engagement profitable and sustainable.

What are more likely to be missed in a casual glance at the external knowledge structures are the roles of variables like languages, multiculturalism, cultural policy, immigration policy, ability to produce media content. and intellectual development. These types of variables are important because they empower nations to be sophisticated in their (and their industries') international relationships. Cultural policy that sustains local culture in the global environment is essential too. Central to this claim is the fact that cultural diversity provides nations with the stuff for successful adaptation to a changing environment. Cultural diversity provides the players in the global economy with a palate of options for maintaining sustainability and developing understanding of global markets. Multiculturalism empowers nations with a range of cultural tools that can assist in doing foreign business; the observance of moral codes, religious values and business customs, along with language skills are essential skills.

Being part of this global socio-epistemological system also requires that individual countries contribute to the micro-diversity rather than becoming part of a pallid global popular culture. This assertion, of course, seems to run counter to the claims of others that globalisation automatically necessitates the surrender of national cultural sovereignty and vigour. However, if local culture is seen as valuable within the global context and there is a sensitivity to fostering it in policy-making circles there is no reason why it cannot flourish. Local media content production is, for example, part of this diversity obligation. Multimedia content has been a focus in many countries but the focus need not be that narrow. Knowledge about whatever is special or different about a country—its food, its music, its environment—is potentially important to exchange with the world. A knowledge policy framework needs to be sure that cultural diversity and uniqueness

are maintained and that the conduits (telecommunications networks, etc.) for this interchange are put in place. We will come back to this discussion in the next section on internal knowledge structure.

Openness to and capacity to learn from the world is, therefore, a crucial attribute of any country in a post-industrial environment. The flow of knowledge into a nation will only ever be as good as the level of its engagement with the global environment. This means that a nation must also have its internal knowledge structures set in place to enable it to make the best of this engagement. If this is achieved, learning and the creation of knowledge from the international knowledge transfer will follow more quickly.

Internal Structure

Internal knowledge structures are fabrics of cohesion and organisation within a nation. The legal system, the bureaucracy, government policy, the education system, the telecommunications infrastructure and national cultures are all part of this structure. Together these elements of a society form part of the socio-epistemological system. In view of the complexity of the internal structure we can regard nations as complex, self-organising systems, that is, systems that rely on spontaneous communication between all their component parts which facilitate the knowledge creation necessary for each to be able to function as a coherent system.[24] This implies that no one part of the system runs the whole thing; the system requires that all parts operate in concert. Thus the internal structure has an almost organic life of its own.

The concept of self-organisation, however, is not to imply that the role of government is diminished. In this scenario, recognising the crucial role of government is more important that ever. Having a coherent knowledge policy framework for the nation to work with becomes indispensable if a nation is to prosper in a knowledge-intensive global economy. What is important to recognise in this systemic view of a nation's knowledge enterprise is that industrialism, capitalism and the state are inseparable. Indeed, a realistic view of this system under a non-reductionist analytical framework requires that they are not separated from each other in analysis. Therefore, just as Sheilds and Samarajiva argue that the dynamics of social change in relation to computer and information technology (CIT) require a complete integration of the institutional forms that surround them,[25] we argue that the whole nation—individuals, government, bureaucracy and industry—needs to work towards the creation, dissemination, acquisition and processing of knowledge.

Furthermore, the complexity of the environment is accentuated by the 'information society' with its rich interconnections, and compression of time and space which have tended to flow from the growing pervasiveness of the intensive use of information technology.[26] The interconnections and compressions have led, among other things, to the speeding up of learning cycles. The faster learning cycles (or knowledge creation cycles) make the development of a knowledge policy framework more important because it goes to the heart of a nation's ability to be responsive to change.

However, it is not useful, as Melody suggests has become popular among policy makers, to develop undisciplined views of the future and the societal benefits of the information economy.[27] The view that CIT will automatically lead to the accumulation of societal benefits is naive. Strong policy, proactive management of the technology and constant re-evaluation of strategies count among the key issues that need to be addressed for the benefits of CIT to be extracted. In short, there is a lot of hard work associated with gaining societal gains from CIT. Similar caveats should hold true for the

knowledge economy. It is, therefore, not enough to have knowledge or the potential for knowledge; it has to be managed to achieve organisational or community aims.

Nonaka and Takeuchi, in their book on knowledge creation in Japanese firms, argue that a new model of management is required.[28] They show that a 'middle-up-down' model of management is the best way for knowledge creation to proceed. This model shows that simple bottom-up or top-down management models which tend to dominate discourse are inappropriate for dealing with knowledge-based systems. Strategists, policy makers, implementers/managers and those working at the front line must all be brought into the process and valued for their diverse knowledge perspectives. For government, this means better incorporation of all aspects of the national system into the decision-making process. In effect it means learning from the community.

Taking the middle-up-down model further, government must listen to various voices—marginalised and dissenting voices included. Barnett argues that strategic planning requires managers to look 'under the radar'.[29] Those at the top have very different experiences and processes of knowledge creation to those in different positions. Women, the economically disadvantaged, migrants and the young are among those who could be included in the planning process because they have different perspectives and ways of knowing. At a national level this diversity of views is more important.[30] The simple fact is that we do not necessarily know what skills and abilities will be needed in the future and there is nothing to suggest that the appropriate skills for the future will be those that are currently successful or just orthodox. The ability to adapt to a changing environment requires that we have many alternative responses that can be made.

Another way of approaching the issue of diversity is to adapt the concept of whole-of-brain management groups.[31] In this process the concept of 'creative abrasion' is seen as positive. Creative abrasion results from groups in which conflicting views are put forward with a view to coming up with innovative and more relevant solutions to problems. If planning is done with the aid of a range of people with different cognitive styles—intuitive, analytical, disinterested, passionate, pragmatic, theoretical, etc.—and socio-economic backgrounds, a more intellectually holistic group will result. Positive results are dependent on group members recognising and respecting their differences and being prepared to listen openly. Homogenous planning groups tend to arrive at plans that are predictable, comfortable, safe and not very effective in a turbulent environment that produces uncomfortable, challenging and unpredictable futures.

It is important though in a knowledge policy framework not to focus only on the construction of the policy-making team or on the diversity of the voices it listens to. The channels of information and knowledge transfer are important too. For example, concentration of media ownership contributes significantly to the suppression of alternative voices. Media ownership should not be seen only in terms of mergers and acquisitions or political affiliation but as part of the internal (and external) knowledge structure. The questions that could be asked in the face of a decision about concentration of media ownership are: how will it affect a nation's ability to provide avenues for the voicing of marginalised views? how will it affect the nation's ability to self-organise? and how will it add to the creation of knowledge about the distinctive qualities of the nation?

In relation to education for knowledge transfer and creation, Sveiby makes the distinction between transfer by information and transfer by tradition: by formal (classroom) and informal (non-classroom) education.[32] The transfer of information in the textbook is important but so too is the transfer of tacit knowledge which is hard to codify in books. The learning by prestigious imitation in the master–apprentice relationship or a lifetime experience of things which 'you won't find in a text book' are important policy issues.[33] There is much knowledge that is difficult to write down but which must still be

passed on. Knowledge transfer, or the 'process-of-knowing', is better seen as a tradition rather than as an information flow.[34] Thus privileging the formal and rather more easily transferred and quantified information transfer model over the dynamic, less tangible and difficult transfer of knowledge through tradition is dangerous.

At issue here is the difference between information and knowledge. Information is data organised in the form of text, statistics, patents and so on and can be placed, for example, in books or transmitted through the Internet. Information is relatively static and has an existence outside pure intellectual abstraction. Knowledge is a more profound and human entity. Knowledge is the result of the processing or analysis in the mind of information. Creativity, innovation and invention are examples of the processes-of-knowing. Thus knowledge is dynamic intellectual abstraction and is not necessarily easily or adequately captured in books or other media. In this conceptualisation information is potentially more easily codified whereas knowledge is much more tacit or reliant on personal cognitive processing.[35] Therefore, policy aimed at digitising the education system, going online with virtual classrooms and removing students and teachers from direct contact with each other can be seen as counterproductive. This is not to say that there is no place for an online element in education but that an important aspect of education is the direct relationship between students and teachers and between fellow students. Many of the difficult things to learn and teach can be taught only through direct interpersonal communication, and human relationships based on learning through tradition cannot be simulated or digitised. More generally, the above discussion points to a need for more emphasis on the soft infrastructure that will enable effective use of CIT hardware.

What is also important is the fact that the education system can do only some of the teaching; much of the traditional knowledge transfer has to be done outside of school. From a knowledge policy perspective it is, for example, not good enough for employers to foist all responsibility for education onto the education system. Doing so is symptomatic of unsophisticated, cost-focused businesses which can conceptualise competition only in terms of price. Likewise, governments should not be so undiscriminating as to seek to utilise the higher education system for overly vocational education when so much vocational know-how can best be transferred on the job. Rather, an emphasis of the higher education system should be on developing critical analytical skills, research skills and other basic skills within an action-learning context. Policy should help employers to shoulder their responsibilities in education that cannot be taught in an institutional setting.

National innovation systems (NIS) and the institutional structures that support them have been subjected to considerable investigation in recent years. However, the bulk of this work has been rather narrowly focussed on R&D.[36] This work ignores, for example, innovation in the service sector, which does not do much R&D as traditionally defined. Instead, service industries innovate via learning-by-doing and increasingly by a process of adopting CIT and adapting it to produce new products and services. Furthermore, we must recognise that the NIS is a carrier of history and in doing so plays a large role in determining our future by carrying the economic and cultural characteristics which in the future may or may not be repeated and amplified.[37] A goal of this paper is to extend the policy debate from a traditional NIS approach to a broader knowledge-based view of innovation, learning and applying knowledge.

Learning organisations are institutions critical to national economic success in a globalised world. Therefore, governments need to consider how they can best lend support to encouraging and facilitating learning organisations. Research into organisational learning has been divided into four categories: (1) organisational adaptation to the

changing environment by solving problems and adjusting goals—decision making; (2) assumption and values sharing—organisational culture; (3) development of knowledge—knowledge creation; and (4) institutionalised experience through bureaucracies, tradition and experience.[38] This framework suggests that governments can apply their support to helping firms and individuals to be adaptable and comfortable with change; to cooperate and share knowledge with each other; to develop critical analytical skills and to do R&D; and to capture experience and learning for use in the future. Thus, a better synchronisation of government and non-government organisations is vital.

In their review of the Australian Bureau of Industry Economics (BIE) data, Marceau, Manley and Sicklen argue that where Australian firms are experimenting with cooperative arrangements significant rewards have already been won. Australian Bureau of Industry Economics surveys show that 88% of firms engaged in cooperative arrangements reported benefits in profits/sales, 60% reported an 'increase' in customer service, and 75% 'major' or 'critical' benefits.[39] Pooled resources, shared costs and shared risks are important contributors to these outcomes but so too are shared knowledge and experience. It must be noted that the BIE showed that the facilitating role of government and industry associations was reported to be closely associated with this success.

It is important to recognise an economic characteristic of knowledge: it grows through sharing.[40] That is, knowledge is expandable—it can grow and evolve.[41] Knowledge grows with use and can enhance its social value through dissemination. The value of knowledge can be amplified indefinitely and synergistically by addition of new knowledge to existing knowledge. Knowledge does not disappear from a firm's inventory when it is sold or otherwise exchanged. In fact, through the communication processes involved in sharing the knowledge it is most likely that the sharer has learned something new from the person they have shared it with. Another economic characteristic of knowledge—that the cost of producing knowledge is independent of the scale on which it is used—further emphasises advantage in sharing, and in using knowledge as widely as possible.[42] Increasing returns to the use of knowledge can provide strong incentives for and considerable mutual advantage from the joint sharing of information by organisations.

Dempsey has illustrated the sharing aspect of information by referring to Rosegger, who noted an apparent contradiction in firm behaviour when examining the acquisition of knowledge from other firms.[43] Conventional thinking suggests that since firms derive returns from proprietary knowledge, they should have little incentive to share such knowledge. In contrast, Rosegger observed a rapid growth of bilateral, cooperative arrangements (such as joint ventures and strategic alliances) and the occurrence of institutionalised information exchange in a widening range of areas. Dempsey argues that a key aspect of the incentive to cooperate on information transfer is the need to bring complementary knowledge to bear on the solution of common problems. The increasingly important role of information exchange within the economy has considerable implications for the way we regard intellectual property legislation that seeks only to place restrictions on the diffusion of information, rather than to facilitate its sharing.[44]

For many smaller nations the opportunity to flourish in global markets is only possible if some economies of scale, financial/investment security and non-price competitive attributes are first found at home. Consequently, policy-makers need to recognise that cooperation, alliances and sharing are key ingredients for achieving these attributes.

Therefore, within the knowledge policy framework an acknowledgment of the sound economics of cooperation must also be made.

Things like creativity, learning and cooperation are not just the province of organisations, because it is individuals who actually do knowledge work. Knowledge creation is after all essentially a human activity rather than simply organisational or narrowly defined economic activity. Therefore, we move now to discuss the third element of the knowledge management framework—that which concentrates on the individual.

Individual Competence

Nations are about people, economies are about people, and knowledge is a product of people. Hence it is necessary to think about the intellectual characteristics and needs of individual people and the ways in which their intellectual attributes can be utilised for the benefit of the individual and the community. The following discussion will consider individual competencies—skill, experience, value judgements, social networks, expertise[45] and even wisdom—within a knowledge policy framework.

Before we talk about the individual competencies that can be utilised we must first discuss the problem of competence that is unused. Unemployment is one measure of individual knowledge assets, or competencies, that are largely unused by the community. It is an under-utilisation of an asset that could be used for the benefit of the whole community. Policy needs to push employers away from the outdated concept of human resources, which unreasonably focus on the employee as a cost (which must be minimised), to a view that sees employees as assets that create value and who should be treated more like customers. After all, organisations only rent the competencies of their staff: they can never own their competencies because they can only ever exist within the individual. A characteristic of knowledge which we should keep in mind is that if it is unused, knowledge deteriorates. In other words, we tend to forget things. This is not simply under-utilisation but the more serious problem of depreciation. Therefore, within a knowledge policy framework high levels of unemployment must be seen as counterproductive and so must the view of employees as costs rather than value-adding assets. There is more than a straight unemployment question to be considered here though. The transition into this new era of knowledge-based economics is characterised by skills mismatches and occupational confusion in a way reminiscent of the Industrial Revolution.[46] Individuals caught in this gap cannot be expected to offer much hope of providing their best until such time as they are better placed in relation to their skills and occupation. The rapid resolution of much of this mismatch and confusion through lifelong learning and clarification of just what the education system should be providing is necessary to resolve these issues.

Low levels of education can also lead to under-utilisation of knowledge or knowledge potential. Karpin has argued that in Australia low managerial competence and the generally low levels of educational achievement of managers have a positive correlation to poor economic performance.[47] There is no suggestion that Australia has any more or less potential to manage than any other nation, but Karpin is indicating that Australia has a lower capacity to tap its potential. Another interesting point made by Karpin is the anti-intellectual streak found within Australian business circles. Our conjecture is that anti-intellectualism is a sign of mistrust of new knowledge. The mistrust comes from a lack of intellectual confidence, which, in turn, is founded on misunderstandings of the formal intellectual process, limited ability to understand the language of research, poorly developed critical skill and an inhibited ability to convert research findings into everyday

usage. The case for empowering people through education to be able to do all these things with a good level of competence is very strong if it can make a significant contribution to the wealth of a community.

The issue of education is more complex than saying more education is better. Diversity of educational background, intellectual leadership, lifelong learning and creativity all have to be factored into the discussion too. For example, investing in people with the knowledge and wisdom that will be needed in the future and people who can lead us down new pathways is critical. However, we have no way of predicting who these people are and exactly what they will know. Graduate recruiting that focuses on the safe options of people with business, commerce, economics, finance or law qualifications is dangerous. Equally dangerous is an education system that privileges strictly vocational study at the expense of disciplines that encourage alternative worldviews.[48] There are many reasons why the knowledge and wisdom accumulated by anthropologists, historians or philosophers could make direct economic contributions, especially in a world where the value of interdisciplinarity is well recognised. Within a knowledge policy framework individuals must, therefore, be educationally empowered and not feel economically restricted in their choice of discipline.

Balancing knowledge management has been put forward as an important consideration by Graham and Pizzo.[49] They argue for some form of discipline to be imposed on the knowledge creation process so that it becomes efficient and timely. They do not argue for a stifling bureaucratic approach but just enough control without a paralysis of the creative processes. From a knowledge policy perspective this requires that individuals be given a wide range of choice in the ways and kinds of knowledge they can collect to prepare them to contribute to the community. It also means that lifelong learning for updating competencies is essential. Therefore ease of access (of entry and re-entry) to various types of education is essential.

Communities of practice—networks of professionals who share commitment to solving common problems, or sharing common knowledge bases—are part of the micro-environments that knowledge workers inhabit.[50] It is important to note that the community of practice is not confined to the staff of the employer. They are venues or sites of knowledge transfer and innovation within and outside the firm. As many knowledge workers feel a stronger sense of association with their profession than their employer they must be recognised at the policy level. Because these communities tend to coalesce around such things as personal networks, professional associations and industry associations, their relationship with policy will be indirect. However, policy can encourage professionalism, networking, and professional associations by, for example, bringing the latter into the policy consultation process. Policy makers may find it useful to view communities of practice as 'virtual' institutions and thus recognise their roles as carriers of history in similar ways to the more tangible government and non-government institutions. They may also find it useful to regard them as wisdom-rich networks. Furthermore, these things flourish best in an open, free, democratic society.

Creativity and the prescience and courage to go against the crowd at the appropriate time are also valuable individual capacities.[51] Dissenters are always necessary; the best dissenters become known as visionaries because they manage to find new and more appropriate directions for us. In the past they have convinced us of the need to take care of the environment, to give women equal rights, and have proved that the world is not flat. When these ideas were first given public exposure they were met with much resistance and scepticism. Those resistances seem foolish today but similarly foolish resistances are no doubt afoot in the community now and it will be just as important to see that those dissenting views are preserved and allowed to come into the mainstream

and benefit the community in the future. Of course we do not know at this point which of the dissenting views will be the ones we need, so they must all be given the opportunity to flourish if the circumstances under which they become highly beneficial arise. We need, therefore, a stockpile of dissent to equip us for the future.

Policies that resist automatic standardisation of individual competencies are needed. Support for schools outside the normal school system, encouraging students to study in other countries with very different cultures, encouraging foreign students to visit, ensuring academic independence and even teaching Aboriginal ways of knowing in Australian, Canadian or New Zealand schools could be specific knowledge policy objectives. It may even be advisable for a variety of modes of assessment of students' work to become acceptable within normal accreditation processes. Standard assessment may not always capture the worth of unorthodox students and unorthodox ideas. Many lecturers have had the experience of students who are much more capable, stimulating or creative than their grade point average would suggest. A radical recommendation is, for example, to impose quotas for generalist graduates to be hired in graduate-recruiting programs so that demand for study in literature, philosophy, cultural studies, futures studies and so on is maintained, thus ensuring the supply of those kinds of knowledge for the community.

Conclusion

Because knowledge is context dependent, its construction and use are widely and idiosyncratically distributed throughout a society. This makes it difficult to pin down in a policy context because social contexts are global, local and personal. As a consequence a knowledge policy framework rather than a knowledge policy has been set out here. Although a specific knowledge policy may be achievable, what is more important is that all policy making be informed by national knowledge imperatives. The imperative arises because the global and national economies are no longer driven by industrial-age dynamics that were founded in traditional factor inputs; today knowledge is the critical asset. A wealth of knowledge rather than a wealth of tangible assets is the key determining factor for national competitiveness, and quality of life.

There is a need to go behind thinking about knowledge policy objectives and to develop an understanding of knowledge itself. This is necessary if a creative and adaptable policy creation process is to evolve, and if policy makers are to be empowered with the abilities to critique and analyse in appropriate ways at the macro level. We have used a systems approach to understanding knowledge in its context. The socio-epistemological system approach conceptualises the knowledge process in dynamic and richly contextual ways, and is, therefore, an appropriate way to deal with the underlying realities of the knowledge society. It is not an idealised or narrowly ideological view and is, although conceptually difficult, nevertheless a practical model to work with.

It is also important that an intellectual capital framework was imposed on the analysis. The intangible asset model further directed our attention to the mezzo level of analysis of knowledge. External and internal knowledge structures and individual competence provided a powerful method of moving beyond understanding the macro drivers of the socio-epistemological system to dealing with the specifics of the knowledge policy framework. This second model also imposes a discipline on the analyst to examine carefully the national engagement with the rest of the world, internal relationships and the individual within the context of knowledge. This analytical process is critical in keeping a balanced perspective on the practical issue of locating all the policy areas that can be put under the knowledge policy framework umbrella.

The framework sketched here seems to point in a promising direction. There remains plenty of scope for debate, refinement, focusing and application of the ideas in specific policy contexts—international, national, state or local.

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