Communication and context: collective tacit knowledge and knowing in Japan's workplace *ba*

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In contrast to Schumpeter's "perennial gale of creative destruction" (Schumpeter 1976: 84), government-coordinated economic development in post-1945 Japan has owed more to informal (but binding) "rules of the game" (North 1990) that situate working, learning and innovation within the spaces delineated by tightly bounded company-as-family workplace organisations or '*ba*' (which roughly means 'place' or 'interaction field'). Horizontal *keiretsu* groupings, together with fixed trading-patterns in supply and distribution chains, continue to support an interlocking 'steady state' economic structure in which new technologies tend to emerge from existing organisations. Shared experience within workplace *ba* generates tacit knowledge that is held in common by colleagues and retained as a potent tool for shaping future practice. It plays a vital role in facilitating 'friction free' communication amongst insiders, who can act as a group to ostracise and retaliate against agents who break their code. Long-term obligations link salaried male employees to their workplace *ba*. Consequently, autonomous boundary-spanning communities of practice, together with industry-university collaboration and other transient associations with outsiders, lack legitimacy. Cook and Brown's (1999) pluralist epistemology is used to compare Western interpretations of Mode 1 and Mode 2 knowledge[1] (Gibbons et al 1994) with the privileged role that Japan's workplace *ba* accord to insider collective-tacit knowledge, which is tentatively called 'Mode 3' knowledge.

Introduction

Much of the Western literature on national systems of innovation treats knowledge as if it were, ultimately, all of one kind and can be moved – in an unproblematic way – from one context to another. Similarly, the recent enthusiasm for Knowledge Management (KM) as a fashionable weapon in the unequal struggle with information (Scarbrough and Swan 2001), often presupposes that all relevant knowledge can be represented in explicit terms and 'managed'. Although Nonaka and Takeuchi's (1995) landmark study of Japan's knowledge-creating companies drew Western attention to the importance of tacit knowledge, their focus on tacit-explicit "knowledge conversion" is often associated with a monist epistemology that somehow 'captures' tacit knowledge by making it explicit. But the process of 'getting things done' in the course of purposeful activity (hereafter referred to as 'practice') depends on many types of knowledge – such as intuition, emotion, judgement and skilled action – that are situated in specific contexts and cannot be objectified in a scientific sense (Spender 2001). As Michael Polanyi famously observed, "*we can know more than we can tell*" (Polanyi 1967: 4, emphasis in the original), but tacit knowledge (which, by

[1] Mode 1 knowledge production is conducted according to the disciplinary structure associated with traditional universities, whereas Mode 2 knowledge involves the reflexive production of trans-disciplinary knowledge to solve problems framed in "the context of application" (Gibbons et al 1994).

definition, cannot be explained in explicit terms) is revealed in practice. By moving from a view of 'knowledge as an object', to a consideration of the processes by which practice is situated in particular contexts, it is possible to consider how explicit knowledge (held by individuals and groups) and tacit knowledge (held by individuals and groups) mutually enable practice.

Whereas Western cultures have tended to accord a privileged status to individual thinkers and the scientific method, practice in Japanese society is heavily mediated by collectively held tacit knowledge. Although the ontological status of the group remains controversial, we adopt the stance that not every action by a human collective can be usefully or meaningfully reduced to the to actions taken by individuals within them (Cook and Brown 1999). In part, the limited attention devoted to group tacit-knowledge stems from expectations about hiring individual agents to do specific jobs. This is especially apparent in Anglo-Saxon business cultures, which routinely assume that any suitably qualified person could do a job. If the person fails, immediate options might include more training, more instructions, or the introduction of an individual who can rise to task in hand.[2] Although the notion of knowledge held in common by a collective is sometimes sensed – for example when a team surprises itself with good performance in a crisis or when new staff make old mistakes – a failure to recognise what is being sensed can be frustrating.

> "If TI only knew what TI knows" – Jerry Junkins, when CEO of Texas Instruments
> "I wish we knew what we know at HP" – Lew Platt, chairman of Hewlett Packard
> (O'Dell and Grayson 1998: 154)

In contrast, Japan's workplace organisations typically 'know they know' or, to be more precise, have a collective sense of what might be achieved in practice.

Implicit expectations about a long-term mutually binding links between upper-level employers and their salaried male employees are reinforced by a residual stigma against job-hopping and the lack of a significant labour market for specialists. Minimal labour mobility supports the ability of Japan's workplace *ba* to act as leak-proof 'social containers' for collective tacit knowledge, which we refer to as 'Mode 3' knowledge. This is a "free resource" (Penrose 1995: 78)[3] that can be reused and strengthened, without extra cost, to enable economically significant practices. Although Japan leads the world in per capita R&D, most of this takes place in private companies, which represent largely self-contained spaces for continuous incremental innovation and collective learning as the corporate team collective conquers new challenges (such as in the shift from camera to photocopier technologies). Workplace insiders (*us*) deal with outsiders (*them*) *as a collective* and boundary spanning communities of practice initiated by individuals lack legitimacy. The ba's

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[2] Herbert Simon took the extreme view that: "All learning takes place inside individual human heads; an organization learns in only two ways: (a) by the learning of its members, or (b) by ingesting new members who have knowledge the organisation didn't previously have" (Herbert Simon 1990: 125).

[3] The resource is 'free' to those who hold it in common, but it cannot be traded with outsiders. In this sense, Mode 3 knowledge equates to Spender's (1998) notion of a "public good" in a bounded context. Its value lies in enabling insiders to interpret the public good's meaning as a tool of purposeful activity.

dealings with the outside world instead focus on appropriate interfaces, such as maintaining the customer-supplier relationship. University-industry research collaborations are similarly problematic; as Michael Porter once noted, "University research is limited, and interchange between companies and universities is modest compared to a number of other nations" (Porter 1990: 397). A decade later, it appears that this is unlikely to change quickly. Mode 1 knowledge and the role of Japan's university teaching and research do not equate to common assumptions in Japan's Western counterparts.

The implicit conventions that bind core knowledge generating practitioners to their workplace *ba* also act against Mode 2 knowledge-production. Within the *ba*, intra-organisational communities of practice or micro-*ba* emerge and collide in a process of generative churning. This helps to prevent ossification, while organisational boundaries contain the energy of emergent micro *ba* and reflect it back into the generative churning process.

Like Mode 1 knowledge, Mode 3 knowledge is 'remembered' from the past. But the processes by which it acquires legitimacy, is retained and interacts with Mode 2 practice are wholly different. Whereas Mode 1 knowledge is carefully validated by peer review and might be used later (if indeed, it is ever used) by others, Mode 3 knowledge is generated by shared experience and an emergent 'common sense' about how to the read the actions of others and act accordingly. Mode 3 knowledge is preconscious; tacit knowledge cannot be consciously 'turned off'. Although distractions or attention paid to other activities might interfere with intuition, emotion, judgement, and skilled action, tacit knowledge has an ever-present 'here and now' quality. It kicks in automatically and in the case of Japan's workplace ba it kicks in automatically to facilitate collective working, learning and innovation. Far from being an oxymoron (Weick and Westley 1996), the Japanese learning organisation is a way of life. But why should practice and hence emergent Mode 3 knowledge be so effectively situated in workplace ba?

In Japan, institutions – defined as "rules of the game" or humanly devised constraints that create order and reduce uncertainty in exchange (North 1990) – tend to situate the careers of salaried male practitioners in tightly bounded company-as-family workplace *ba*, which represents a unified context for working, learning and innovation. Whereas these closely related forms of human activity are conventionally thought to conflict with each other in Anglo-Saxon contexts (Brown and Duguid 1991: 40), they are intertwined in Japan's workplace *ba*, privileging relationships amongst insiders (*us*) at the expense of dealings with outsiders (*them*). Everyone in a Japanese organisation is on the same side and shares a common interest in the organisation's long-term success. This is not simply a matter of company unions, age-based promotion, and expectations of long-term employment for male salaried workers; rather the ties that bind are rendered legitimate by implicit rules that give Japanese society its coherence. The principal-agent conflict interface (Jensen and Meckling 1976) is effectively displaced from the workplace *ba* by Japan's institutional framework. More generally, everyone in Japan is on the same side; the discontinuity is between Japanese insiders and outside people.[4]

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[4] The differences between *inside* and *outside*, along with related dichotomies represented by differences between the *public façade* and *true feelings* or *outward appearance* and *inner reality* are deeply ingrained in Japan's language and social behaviour

As North argued, institutions comprise informal constraints (sanctions, taboos, customs, traditions, codes of conduct) and formal rules (constitutions, laws, property rights). Although Japan has an American-style constitution (imposed by the Allied Occupation) and a legal framework that appears to guarantee individual rights, recourse to the law remains rare; there are few lawyers[5] and a collective reluctance to acknowledge failures in the implicit code. Japan's low crime rate and methods of doing business typically owe more to tacit conventions about how to read the intentions of others and act accordingly. These implicit rules are comprehensive (there is an established etiquette for dealing with every recurring aspect of daily life), highly aligned (a common set of values ensures that the Japanese are rarely surprised by each other's interpretation of the moral code) and binding (third-party enforcement is superfluous where repeated in-group interactions ensure that 'the nail that sticks out gets hammered down'). Moreover, these implicit rules operate with minimal recourse to explicit discussion; practices kick-in automatically and pre-empt the evolution of new practices. The default option is to maintain the status quo according to context-specific collectively held tacit constraints.

Advocates of global convergence, who cite advances in information communication technologies to support the idea that no formal organisation need or should come between the empowered individual and Marshall McLuhan's "global village" (Brown and Duguid 1998: 90), often fail to acknowledge the nature and significance of Japan's informal constraints. In some ways, the problem resembles trying to look through a slightly imperfect two-way mirror from the wrong side; outsiders might perceive that Japan is somehow different but, overwhelmed by their own reflections, dismiss this as merely exotic or quaint. Possibly, many of the Westerners who once rushed to discover the secrets of Japan's miracle growth, were bewildered by a society that does not conform to Anglo-Saxon expectations about objectivity, individual accountability and explicit reasoning. Japan's social etiquette stresses the subtle art of indirect communication, ritualised understatement about one's own achievements, and the significance of what is not said. Consequently, access to good translators does not necessarily provide visitors with access to meaningful conversations. Hard-hitting questions from outsiders – and especially the desire to know 'why?' – are typically countered by a polite search for more neutral topics of conversation.

Solace for the new army of confused Japan watchers started to emerge in the early 1990s, when the country's miracle growth faltered, just as the United States began to recover. Suddenly, it no longer seemed to matter that Japan's differences remained largely incomprehensible and concerns that the country had perfected a superior form of capitalism gave ground to Anglo-Saxon triumphalism; its recovery would depend on becoming 'more like us'. But the normative, teleological view of history as a march towards the market-rational ideals of individualism, impersonal market dealings and entrepreneurial innovation, is not consistent with the Japanese context. Japan is the only G-7 economy whose traditional social values owe almost nothing to Mediterranean origins; the others share Judaeo-Graeco-Roman traditions and differences amongst them appear less pronounced when they are

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(Doi 1986). The Chinese characters used to write the popular Japanese term for foreigner (*gaijin*), literally mean 'outside person'.

[5] In 1999, Japan had 16,800 licensed lawyers compared to 900,000 in United States.

compared to Japan (Dore 1973: 419). Throughout its government-coordinated 150-year transition from late-feudalism to economic superpower, Japan has been effective at learning from abroad and re-engineering Western science and technology according to Japanese precepts; but it has done so without allowing Western institutions to interfere with a distinctly Japanese way of doing things.

After reviewing the evolution of Japan's steady state post-war economic development and the concept of *ba* as a way of interpreting Japan's workplace practices, subsequent sections consider the distinctive nature of Japanese universities and Japan's Mode 1 knowledge production. Finally, we adapt Cook and Brown's (1999) pluralist approach to reinterpret the Mode 1 and Mode 2 debate. While acknowledging that the ontological status of the group remains controversial, we follow Cook and Brown's argument that not every action by a human collective can be meaningfully or usefully reduced to an account of actions taken by individuals in them. By combining epistemological pluralism and practice, it is possible to reveal Mode 3 knowledge, which is often undervalued or ignored in Anglo-Saxon market-rational capitalism.

A different industrial history

During the era when Anglo-Saxon market-rational capitalism led the world into an industrial age, Japan was isolated from the international community. In 1603, the Tokugawa Shogunate established a government in Edo (now Tokyo) and in 1639 closed the country. Thereafter, it presided over a stable social order, without serious opposition, until 1853, when Commodore Matthew Perry delivered US demands for trade relations. The threat of military superiority implied by Perry's 'black ships' (which have since become ingrained in Japan's collective psyche as a potent icon of unjustified foreign interference) precipitated events that led, in 1868, to the Meiji Restoration, which many take to mark the birth of modern Japan. But this was neither a Norman Conquest nor a French Revolution; dominant groups in the old regime weakened, while subordinate or similar elements moved into their place (Mason and Caiger 1972: 217). Under the slogan, 'rich nation, strong army' (*fukoku kyôhei*), the Meiji government sought to build a prosperous nation that remained free from colonisation by a Western power. It took the initiative in almost every major industry; wasteful parallel investment was minimised and government control over the economy became automatic (van Wolferen 1990: 493). From the outset, Japan's industrialisation was "plan rational" (Johnson 1992); instead of simply setting the rules of play – as in the case of market-rational Anglo-Saxon economies – the Japanese government has been intimately involved with shaping the structure of industry and setting goals for innovation.

In the early days of Japan's industrialisation, there was a high rate of labour mobility amongst factory workers. But hire-and-fire contractual arrangements ran against Japanese taken-for-granted rules about desirable levels of trust. Employers started to strengthen links with employees – providing various welfare benefits, company houses at nominal rent, and other payments in kind. By the end of the First World War, large companies had established a system of taking on boys leaving school each spring. Such recruits exhibited the cherished qualities of loyalty and a willingness to accept the workplace rules. In the 1920s and 1930s, uniforms for workers appeared along with badges and insignia denoting rank. The war machine responsible for military expansionism accentuated the trend. It also pushed small and medium sized enterprises towards particular *zaibatsu*, thereby curtailing

much of their freedom to negotiate business arrangements (Miyashita and Russell 1996: 117) as they became locked into fixed supply and distribution chains. After the Second World War, the Allied Occupation removed Japan's military interests and unwittingly strengthened its ability to operate as a "plan-rational" state by freeing the civilian bureaucracy from its greatest rival (Johnson 1995: 29). When the occupation ended in 1952, the Ministry of International Trade and Industry was able to engineer the reformation of the military-era *zaibatsu* groups of companies (each of which had been owned by a single family) as bank-based *keiretsu*.

Collective learning is also an essential part of maintaining the workplace *ba*'s collective identity and stable relationships with other workplace *ba*; a form of "learning to stay the same" (Yanow 2000: 256). Top-tier firms have supply and distribution chains (in which each firm is dependent on the one above for orders) that evolve in concert with the their top-tier company's emerging requirements, while horizontal keiretsu groupings of top-tier companies provide a wider field of shared meaning supported by cross-shareholdings, interlocking directorates, intra-group trade, and periodic meetings of member company presidents. Meanwhile, government co-ordination is an embedded part of the process by which the economic structure as a whole develops en masse. Like a fixed formation of swimmers treading water, members of each workplace *ba* can work harder, to improve their fitness, but the organisation cannot shift its relative position. Government policies can raise the water level to take the structure as a whole to higher levels of achievement.

Since James Abegglen coined the term "lifetime employment" in the1950s – but later suggested would be better described as "career employment" or "social contract" – it has emerged as one of the most misunderstood aspects of Japanese business practice. Many in the West have been apt to dismiss Japan's lifetime employment as a luxury for ineffective workers or a threat to managerial efficiency that can no longer be afforded; but this misrepresents obligations that do not translate into the logic of hire-and-fire market rational economies (Fingleton 1995, 1997). To be sure, not everybody in Japan *works for life.* Most women remain peripheral to core business conducted in the workplace *ba*. A decade after the introduction of legislation to guarantee equal employment opportunities for women, Lorriman and Kenjo (1996: 74) reported that women occupied less than 1 per cent of managerial posts, compared to 35 per cent in the United States. Japanese employers also rely on various categories of temporary employees who might, for example, work full-time alongside regular employers on a *de facto* permanent basis, but with lower status and pay. Nevertheless, the long-term employer-employee implicit commitment does apply to regular male workers in upper-level organisations who would only be dismissed in extreme circumstances. During the first few years of a permanent job, it might be possible to 'start again' on the bottom rung of another firm's salary ladder (despite much talk of merit-based careers, the number of years served continue to shape remuneration and promotion for most male salaried workers). But after a few years, even the most promising workers find it difficult to negotiate comparable employment with another Japanese organisation. Notwithstanding the recent increase in labour mobility from a very low base, it is difficult to sustain the position that Japan's traditional values are about to melt down and be recast in the hire-and-fire image of Silicon Valley or similar icons of market-rational entrepreneurship.

The concept of *ba*

Although the Chinese character representing '*ba*' roughly means 'place', the concept of *ba* is concerned with the interaction space (which might be real, virtual or a mixture of the two) within which purposeful activity is situated. The seeds of *ba* are derived from interaction amongst people who have something in common, together with an ability and willingness to communicate. Hence, Western notions of team spirit, camaraderie, esprit de corps – that arise when people interact with colleagues at work, communities of practitioners, or strike up a chance conversation with those who share a common hobby – are consistent with the Japanese sense of emergent *ba*.

Hiroyuki Itami (1992) has argued that *ba* comprise a bounded interaction field within which insiders develop their own "interpretation code" that gives meaning to information that might be conveyed by "information carriers" such as spoken language, documents, tone of voice or whatever. Hence, silent machines or excited engineers can become effective information carriers for those who share the necessary "interpretation code". And in a Japan's workplace *ba*, much of this interpretation code relies on tacit knowledge that is held in common by organisational insiders. The Japanese anthropologist, Chie Nakane (1970: 4), argued that English words such as 'company' or 'enterprise' do not convey the meaning that the corresponding Japanese word '*kaisha*' has for Japanese.

> In an extreme case, a company may have a common grave for its employees, similar to the household grave. With group consciousness so highly developed there is almost no social life outside the particular group on which an individual's major economic life depends. The individual's every problem must be solved within the frame. Thus group participation is simple and unitary. It follows then that each group or institution develops a high degree of independence and closeness, with its own internal law which is totally binding on members (Nakane 1970: 10).

Nakane proposed that a *kaisha*'s bounded frame-of-reference could be understood in terms of a *ba*, which may be a locality, an institution or a particular relationship that binds a set of individuals into one group: "in all cases it indicates a criterion which sets a boundary and gives a common basis to a set of individuals who are located or involved in it" (Nakane 1970: 1).

Recently, Ikujiro Nonaka and his colleagues have adopted *ba* as the basis for a unified model of knowledge creation in Japanese organisations. Despite writing three decades after Nakane and in an entirely different genre, Nonaka et al's use of *ba*, as a frame-of-reference or "internal law" for interpreting the workplace-world echoes similar sentiments.

> ... ba sets binding conditions for the participants by limiting the way in which the participants view the world. And yet it provides participants with a higher viewpoint than their own (Nonaka, Toyama and Konno, 2000:15).

People in any culture appreciate 'like minded' companions who have an intuitive understanding of their thoughts. Most stable marriages do not need explicit rules about who puts the dog out. Likewise, Japanese employees – for the most part – do not have to be told what to do; they understand it implicitly because of the organisation's ability to retain collectively held tacit knowledge. The workplace *ba* encapsulates a bounded sense of joint

enterprise and mutual engagement that is forged through years of shared experience. Japan's long hours and after hours socialising amongst colleagues foster the possibility of exploiting telepathy (*ishin denshin*) as an effective management tool. Within the bounded collective of insiders, the barest nuance of body language might convey more than strings of emails bounced amongst comparative strangers. In recollecting his experiences of being beaten by a Japanese team in a race to build an identical chemical plant, Harvey-Jones observed that:

> … the Japanese plant built by a team which shared a single large office and lived, worked and dreamt together, twelve hours or more a day, during the whole time of the development and planning of the plant. They were each in each other's minds and did not have to send a memo, or make a telephone call, to check the effects of, for example, locating a valve somewhere else. Any one of them could cover for anybody else …
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> … exactly the same team which had done the designing were also involved in the construction. There was no hand over, no communication problems – the thing just flowed (Harvey-Jones 1993: 178).

Achieving the effect of working and dreaming together embodies both the predisposition to act in a certain way and the ability to interpret the slightest of signals in a meaningful manner, which represents a highly developed and sensitive "interpretation code". To the extent that past events provide guideposts for the future, Japanese management is automatic and (as long as levels of uncertainty remain within absorbable levels) collectively held tacit knowledge integrates the collective efforts and enables colleagues to read each other's intentions and provide information that might be of value in the event of problems. As Nonaka and Takeuchi (1995) argued, middle-up-down management integrates the exploitation of useful knowledge generated in every part of the organisation.

Within Japanese organisations, age-based promotion enables managers to share information with colleagues without fear of being overtaken by subordinates. Age-related hierarchy contributes to a mental map of who should be treated with what degree of respect. This map guides the evolution of mutual understanding between senior managers and their understudies. Over time the latter develop an instinctive sense of what finds favour with their boss and, by presenting him with a range of options, it is possible to execute his 'instructions' without anyone being told to do anything. The workplace *ba*'s collective sense of intention (we are all in this together) and 'friction-free' communication (facilitated by the insider's near-perfect interpretation code) underpin many of Japanese management's virtues. The challenge for Japanese management arises when wholly unexpected happens and, in the absence of consensus, practice is frozen by a fear of doing the wrong thing.

Mode 1 Knowledge in Japan

The Western traditions that established Mode 1 positivist science as a superior form of knowledge are not commensurate with developments in Japan. By European standards, Japan's higher education sector is a comparatively recent innovation. It began with the establishment of the University of Tokyo in 1877, which was initially modelled along European lines, with a Faculty of Science and no separate Faculty of Engineering. But, by the early 1890s, it had developed a strong base in engineering and agriculture. The

formation of new universities replicated this emphasis on applied subjects, rather than science. However, these universities were essentially agencies for training bureaucrats and not equipped for research (Itakura and Yagi 1974: 166).

Since the Second World War, the number of universities in Japan has increased by an order of magnitude and well over 40 per cent of 18-year-olds enter higher education (Barker 1996). But the idea that Japanese universities are Ivory Towers that underpin Japan's networked basic research activities is problematic (Ray 1998). The higher-ranking universities have harder entrance exams and thereby select the country's male elite for careers shaped by on the job training. Graduation is assured to those who pass the entrance exams, with the result that quality of teaching and research is not immediately relevant to a university's status.

> ... Japan's universities are not places conducive to doing profound basic research. Most have rigid, hierarchical structures. Elderly faculty heads dominate the research programmes and publishing process. Intellectual dissent is discouraged. And in addition to having their ideas stifled, younger researchers often find themselves carrying out the grunt work that is done in America or Europe by technicians. Lack of money for support staff means that many people who would be better employed doing experiments are doing the washing up instead (*The Economist* 1996: 102).

Writing after a decade of faltering economic growth, Michael Porter, together with Japanese co-authors Hirotaka Takeuchi and Mariko Sakakibara, posed the previously unimaginable question "Can Japan Compete?" and lent their voice to calls for significant reforms in Japan's university system.

> Japan's advanced education system has long left much to be desired. Not only is university and graduate-level training uneven in quality, but Japanese universities also fail to produce enough students in important disciplines, such as computer software and biotechnology. The number of Japanese college graduates who majored in biology-related subjects was 1,875 in 1996, versus 62,081 in the United States. The number of graduate students per 1,000 population was 1.3 students for Japan in 1996 compared with 7.7 in the United States (1994) and 3.5 in France (1995). The percentage of graduate students relative to undergraduate students in the same year was 6.9% in Japan, 16.4% in the United States, 21.3% in the United Kingdom, and 17.7% in France. (Porter, Takeuchi and Sakakibara 2000: 144)

The authors argue that a vibrant university research system is fundamental to a nation's research and comment that some signs of change are just beginning to appear. But the emergence of a research driven higher education sector and Mode 1 achievements of the type reflected in Nobel prizes remains limited.

From the point of view of male graduates, the chance of securing a permanent job with a prestigious employer can be undermined by years spent attending graduate school. The possible career trajectories of permanent employees are largely predetermined the status of the university where they gained their first degree, while salaries are matter of years served with the organisation. A specialist skill does not command a premium salary; in the course of a career, employees will do many jobs and the ability to be a long-term team

player is more important than a skill that might, in any case, be eclipsed by events as the group collectively conquers the ability to master new competencies. Despite having less than half the population of Japan, the United Kingdom produces about eight-times as many science doctorates per year. In social science, which is by far the largest single category of British doctorates, Japan's output is negligible. Although Japan's higher education profile is changing, as illustrated by rapid recent increases in MBA education (Okazaki-Ward 2001), this is not being accompanied by the emergence of labour-market that is capable of translating these qualifications into propellants for Western-style job-hopping and building a career by moving between organisations.

Much of Japan's success with the exploitation of Mode 1 knowledge been achieved by exploiting collective judgements in consensus-building exercises aimed at targeting exploitable areas of Mode 1 knowledge. When a desirable research goal looks possible, Japan's coordinated policy process is typically able to ensure that resources are hanging in wait to exploit the possibilities. Although it takes time to build a consensus, extensive consultation makes it relatively easy to implement policies once they have been agreed. The consensus has value precisely because it is a consensus; powerful forces would act against any subsequent attempts to highjack or destroy the consensus. Certainty the decision by the United States Congress not to construct a super-conducting super-collider after such a flagship project was underway would be difficult to envisage in a Japanese context.

During the early twentieth-century, the rise of the US electrical and German chemical industries focussed Japan's attention on the need to develop an indigenous capability in these areas. In 1917, the Institute of Physical and Chemical Research or 'RIKEN' (which is an abbreviation its Japanese title *Rikagaku Kenkyû-jo*) was established as Japan's first research institute. Despite a chequered history, RIKEN has emerged as Japan's premier centre for basic research. In 1992, Nature referred to RIKEN as Japan's leading light and a "remarkably dynamic research organisation that is fast becoming a truly international centre of excellence" (Nature 1992: 578). RIKEN has been at the vanguard of Japan's efforts to increase public sector basic research. RIKEN's history incorporates domestic links that span private companies and the university sector, while its reputation as a centre of excellence that contributes to international progress in basic research[6] underpins its ability to act as an effective gate-keeper organisation for Japanese science. Its intimate connections with policy-making processes provide a space for pragmatic judgements from scientific, bureaucratic, and political circles to intermingle and shape policy. Meanwhile, RIKEN has expanded its original base in physics and chemistry to include engineering, biology, and medical sciences and – amid concerns about Japan's ageing population – a Brain Science Institute was added in 1997. Throughout Japan's so-called 'lost decade' of economic downturn, public sector research expenditure has continued to increase dramatically and, in the second half of the 1990s, it doubled. The total now represents about 1 per cent of GDP, which is on a par with allocations in Europe and the United States (Goto 2000: 107). But Mode 1 knowledge-production in Japan has emerged in tandem with practice according to agendas that are shaped by the need to add a new dimension of understanding to specific areas of practitioner experience.

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[6] RIKEN has constructed major research facilities in the UK and US. It has concluded research collaboration agreements with institutes across the world and in 1999 was host to some 600 overseas scientists who spent an average of one-year at the institute.

Pluralist Epistemology

While the scientific method and objective knowledge can be intellectually and materially productive, JC Spender (1998) has developed the idea of pluralist epistemology as valuable way of recognising that we know things in many different ways.

> … visual, spatial, musical, kinesthetic, emotional, moral, erotic, spiritual, carnal, empathic, psychic, etc. – more than positivism, or any other philosophy that argues for a monist epistemology, dare admit (Spender 1998: 237).

Writing in a similar vein, Cook and Brown (1999) have argued persuasively that different types of knowledge can be divided into four distinct types, on two intersecting dimensions, namely tacit (as opposed to explicit) and group (as opposed to individual) – see Figure 1 (a). They contend that each of the four categories is distinct and stands on an equal footing – "none is subordinate to or made up of any other" (1999: 382) – but these different knowledge types can be "mutually enabling" is the "active process of knowing" or practice. New knowledge is produced in a "generative dance" between knowledge tools that are possessed by individuals and groups (as indicated by, but not limited to, the examples in each of the quadrants) and the active process of knowing.

Figure 1 about here

Cook and Brown illustrate their vocabulary of concepts by re-interpreting and strengthening the insights contained in Nonaka and Takeuchi's (1995) case study of bread making. For present purposes, we borrow three points from Cook and Brown's complex argument: (1) tacit knowledge is distinct from explicit knowledge, "it is not possible, under any circumstances, for tacit knowledge to become explicit (or vice versa)" (Cook and Brown 1999: 397)[7]; (2) knowledge held by an individual is distinct from knowledge held in common by a group and; (3) all four types of knowledge in Cook and Brown's typology interact to enable practice and, in the process, generate new knowledge.

Whereas Nonaka and Takeuchi propose that tacit knowledge is something that "cannot be articulated very easily"(1995: 8), Cook and Brown (1999: 397) remain faithful to Polanyi's idea that it cannot be expressed at all: "it is not possible, under any circumstances, for tacit knowledge to become explicit (or vice versa)" (Cook and Brown 1999: 397). For example, the tacit knowledge required to ride a bicycle can be used, in practice, without any sense of tacit knowledge becoming explicit. An emergency stop can be initiated before the driver is conscious of seeing a child running into the road; waiting for tacit-explicit "knowledge conversion" would imply a higher accident rate. Tacit knowledge acts directly on practice in a pre-conscious way; it cannot be consciously turned off, nor can it be captured in KM-style 'knowledge audits'. Tacit knowledge kicks-in automatically and its existence is only revealed by the inexplicable aspects of practice. An orchestra might retain

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[7] Each type of knowledge does work that the other cannot, but neither is consumed or diminished by its use, as might be implied by 'conversion' (for example, converting pounds into dollars consumes pounds). Knowledge is *generated* through purposeful activity, as connoted by the metaphor 'practice makes perfect'.

the collectively held tacit knowledge to play to a certain standard when all of its members are asleep, but an indication of what they have remembered is only revealed when they play.

Cook and Brown's recognition of the ontological status of the group also contrasts with Nonaka and Takeuchi's idea that "knowledge is created only by individuals" (1995: 239). In Nonaka and Takeuchi's model of a knowledge creating "spiral", modes of tacit-explicit knowledge conversion involve a growing number of individuals: "… organizational knowledge creation is a spiral process, starting at the individual level and moving up through expanding communities of interaction that crosses sectional, departmental, divisional, and organisational boundaries" (1995: 72). This they posit an ontological continuum from the individual to the wider community, with the implication that – given sufficient effort – different types of knowledge can converted into a common currency and moved from one context to another. But what about the "interpretation code" (Itami 1992) that renders information comprehensible and meaningful *in a particular context*? Japan's group-oriented society encourages a highly developed awareness about who is *inside* and who is *outside* each of its myriad nesting and overlapping collectives. And as Nakane (1970) argued, the boundaries of the workplace organisation or *kaisha* are especially formidable in a Japanese context. But Nonaka and Takeuchi's spiral metaphor implies that knowledge generation spans boundaries as if they were a seamless continuum. Thus, they appear to assume away (1) the role that Japan's institutional framework plays in situating knowledge-generating practice inside Japan's workplace *ba* and (2) the possibility that (through a complex dialectical process) groups influence the personal knowledge created by their members. Although Nonaka and his colleagues subsequently adopted *ba* as a platform for knowledge creation, they retained a spiral-style approach that does not engage with Japan's wider institutional context as a factor in delineating insider-outsider boundaries.

> … the knowledge creating process is not confined within the boundaries of a single company. The market, where the knowledge held by companies interacts with that held by customers, is also a place for knowledge creation. It is also possible for groups of companies to create knowledge. If we further raise the level of analysis, we arrive at a discussion of how so-called national systems of innovation can be built. For the immediate future, it will be important to examine how companies, government and universities can work together to make knowledge creation possible (Nonaka, Toyama and Konno 2000: 30).

As we have discussed, Japanese firms, governmental processes and university sector operate in a way that differs from other G-7 countries; but understand why this is the case, it is important to consider the institutional context in which Japanese firms, universities and firms are situated.

Figure 1(b) illustrates how the Mode 1 and Mode 2 debate might relate to Cook and Brown's typology. While Mode 1 knowledge can be understood and used individuals, its validity is determined by peer review according to a collective understanding of the scientific method (and could be seen as a rather special form of "story"). The ability to use an aspect of a science does not privatise that knowledge, although it might leverage personal "concepts" in the privacy of an individual personal thought processes.

In "the active process of knowing" or Mode 2 practice, different types of knowledge mutual enable practitioners to solve problems framed "in the context of application" (Gibbons et al 1994) and generate new knowledge. But in Western contexts the types of new knowledge that tend to be valued lie in the explicit quadrants (depicted by darker shading in Figure 1). Many KM techniques aim at representing different types of knowledge coherent in terms of an explicit story that carries across contexts. Indeed the use of stories to explain one thing in terms of another is receiving considerable attention as a springboard to leverage communication that is more effective (Denning 2001). Clearly, story telling or any other communication process relies on tacit knowledge, but this contribution is often misrepresented as 'knowledge conversion' or 'knowledge capture'. Moreover, the particular case of Mode 3 (or group-tacit) knowledge – Figure 1(c) – is often disregarded or assumed away in favour of an ontological continuum or spiral model. However, as Nakane (1970) and Itami (1992) have argued, boundaries are an intrinsic part of *ba*. And, in the case of Japan's workplace *ba*, boundaries contain the 'living space' for Mode 3 knowledge.

While Mode 3 knowledge emerges in Western communities of practice and, across any bounded collective that is in regular communication, it is overshadowed by the explicit components of "common knowledge"[8]. Wenger (2000: 228) argued that communities of practice are social containers for a *shared repertoire* of communal resources – language, routines, sensibilities, artefacts, tools, stories, styles and so on (Wenger 2000: 228). Cook and Brown have pointed out that repertoire embrace group-explicit and group-tacit knowledge as mutually tools of collective knowing. Our argument is that Japan's workplace ba are especially effective at retaining and re-using group-tacit (or Mode 3) knowledge.

Conclusion

This paper has considered some simple ideas that have far-reaching implications. At the core of the argument is the proposition that Japanese knowledge generating activities that underpin management and innovation are situated in workplace *ba* by Japan's informal institutions, which (by virtue of their tacit nature) are not readily apparent to outsiders. Although not everyone works for life within the same organisation, Japan's implicit rules of the game have effectively redefined the principal-agent relationship for permanent male employees. There is neither an alternative (in the form of a labour market for specialists) nor signs that such an alternative is about to emerge on a significant scale. A disgruntled agent might act against the implied contract during the first few years of employment to start again elsewhere, this is an action with consequences. After a few years, the opportunities dwindle and the consequences become more severe. Meanwhile, colleagues in the workplace *ba* can expect levels of commitment that would be difficult to imagine in a Western context. If levels of uncertainty remain within acceptable limits – and Mode 3 knowledge holders can interpret events easily and imagine appropriate courses of action – Japanese management is spectacularly flexible. As Harvey-Jones noted, employees appear as if they "are in each other's minds". In this respect, Japan's workplace *ba* provide an insight into knowledge

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8 JC Spender (2001) uses the term "common knowledge" to refer to the type of collective understanding that emerges from the interaction between the firm's parts and its context. While this understanding is neither exclusively tacit nor exclusively explicit, it is sensed by an ability to get jobs done or a failure to comprehend the way things are done in a particular context.

generating contexts that contrast with Anglo-Saxon assumptions about the type of knowledge that are privileged as tools for enabling practice.

This paper has also sought to combine Cook and Brown's (1999) arguments about knowledge and knowing with Gibbons et al's study of Mode 1 knowledge tools and Mode 2 practice. It seeks to reveal the importance of collectively held tacit knowledge – Mode 3 Knowledge – and reasons why this is particularly important in Japan's steady-state approach to knowledge generation. Whereas Westerners might imagine that an insightful individual will develop Mode 1 knowledge by leaping onto the shoulders of an 'intellectual giant', Japan's group based approach requires considerable reconnaissance to ascertain the potential view from the giant's shoulders. Has the team selected the best available giant? Can the team co-ordinate leap before the giant moves? Will another giant appear whose shoulders offer an altogether more promising view? Preparatory work might appear endless, but once the decision to leap is made, it is typically executed with a commitment and smoothness that astounds Western scientists. Mode 3 knowledge integrates and shapes group practice. Group-think might limit the emerging agenda, but it concurrently guards against the possibility of losing relevant information because of inadequacies in the interpretation code.

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