FIFTH INTERNATIONAL CONFERENCE ON HRD RESEARCH AND PRACTICE ACROSS EUROPE 2004

International, Comparative and Cross-Cultural Dimensions of HRD
Thursday 27th and Friday 28 May 2004

University of Limerick, Republic of Ireland

Refereed Track: Perspectives on HRD.

Researching knowledge productivity

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Abstract

This paper takes as its context organisations operating in an emerging knowledge economy. It is concerned with how to research ways in which such organisations can develop the capability to regularly generate and apply new knowledge to continuous improvement and radical innovation in work processes, products and services and to customer relationships. In the paper, this capability is termed 'knowledge productivity'.

It is argued in the paper that evolving notions of knowledge in such organisations pose new research questions that require a fresh conceptual research framework and innovative research strategies. The purpose of the paper is to identify some of those questions, propose a relevant framework, and suggest three strategies that have emerged from recent studies, some utilising that framework. The strategies focus on reconstruction, development and description of improvement and innovation processes through time. It is concluded that their integrated use can reveal emerging principles for knowledge productivity in unconventional organisational forms.

Researching Knowledge Productivity

Introduction
In an economic environment where knowledge is becoming the main organisational currency, firms must be able to learn fast, respond to recurrent unfamiliar challenges, and ensure that their workers can construct and share strategically valuable knowledge as well as acquire technical and interactive skill. Competitive advantage relies increasingly on capability to regularly generate and apply new knowledge to continuous improvement and radical innovation in work processes, products and services and to co-create value with customers (Brooks, 1997; Leonard-Barton, 1995; Prahalad & Ramaswamy, 2002). Elsewhere, we have conceptualised this capability as 'knowledge productivity' (Harrison & Kessels, 2004).

For researchers in this domain the key issues are to do with research questions, conceptual frameworks, and strategies that will help them to explore relationships between learning, organisational characteristics and knowledge productivity. The purpose of this paper is to identify and explore relevant research questions and to suggest an initial conceptual framework and some research strategies to aid research in this field.

Changing notions of knowledge
One of the most enduring notions of knowledge in management theory since it emerged at the start of the twentieth century from the canons of 'Scientific Management' and classical administrative theory is that of knowledge as control. In this view, 'knowledge' represents a body of facts that, once captured and recorded at the organisation's peak, becomes the means whereby to ensure an impersonal and durable regulatory system.

The notion rests on the assumption that all organisational members can become bound together in a shared commitment to corporate goals. It takes for granted a unitary frame of reference, yet that frame pays insufficient attention to the plurality of stakeholder interests and goals in today's complex organisations. The re-emergence in an increasingly knowledge-based economy of the old model of the organisation as machine on which it rests is disturbingly evident in the use in knowledge management literature of terms like 'mining', digging' and 'extracting' to describe quite widespread practice in organisations (Swan, 1999:6).

A related notion – of knowledge as commodity – conceives of knowledge as a resource to which the organisation has proprietary rights. This notion too had a powerful influence on corporate policy-making and the managerial role throughout most of the twentieth century (Eisenhardt & Santos, 2002). That influence remains powerful today. It creates problems for organisations that need to innovate as well as continuously improve, since a preoccupation with knowledge as commodity can lead to an excessive concentration on explicit knowledge - that is, knowledge that is codified, readily observable, measurable and portable (Scarbrough et al. 1999). Such a preoccupation manifests itself in an over-reliance on information systems driven by new technology to share explicit knowledge, to combine different kinds of explicit knowledge, and to surface tacit knowledge (knowledge that is deeply embedded in the culture of the workplace and can be shared among organisational members without having to be made

explicit) in order to codify it, thereby losing its unique value. This kind of focus confuses the holistic process of knowledge creation with mere information processing (Scarbrough et al. 1999: 24.25).

Contrast these two notions with that of knowledge as a process strongly shaped by workplace relationships. This relational view highlights the learning that is situated in workplace communities of practice, seen as the vital source of organisational knowledge (Knowles, 1970; Kolb, 1984; Brown & Duguid, 1991; Lave & Wenger, 1991). The relational notion of knowledge stems from a perception of the world as a socially constructed state where both reality and knowledge are socially created and sustained (Vygotsky, 1978; Daft & Weick, 1984; Von Krogh & Roos, 1995; Von Krogh et al. 1998).

In the relational notion, new knowledge follows a historical curve as it evolves through the replication and recombination of current knowledge and organisational routines, encoding inferences from history and guiding individual and group behaviour (Kogut & Zander, 1992). The firm in this sense is a 'repository of knowledge' (Nelson & Winter, 1982) whose past and present ways of organising and managing stimulate or inhibit knowledge creation. The main shapers of context emerge as corporate vision, values and leadership, management actions, and human resource strategies and practices (Ghoshal & Bartlett, 1994; Terry & Purcell, 1997; Hutchinson & Purcell, 2003).

The relational notion has been expanded to include institutional relationships (Huff, 1982; Scott, 1995). However, both internal and external communities of practice can inhibit the creation and sharing of knowledge across their boundaries when they are not held together by a strong collective purpose and where historical routines, myths, norms and beliefs reinforce current practices and culture. The relational process of knowledge requires a workplace culture that encourages a spirit of enquiry and of challenges to established ideas and customary ways of doing and behaving (Nonaka & Takeuchi, 1995). Research into knowledge-intensive organisations (Swart et al. 2003) provides further support for an emphasis that is less on devising management systems to 'control' learning or to 'manage' knowledge, more on finding 'new ways to encourage people to think creatively and feed their thoughts back into the organisation' (Russell & Parsons, 1996: 32). This presupposes a facilitative rather than a controlling role for managers – one where those in front line team leadership positions especially have a major responsibility to stimulate and support the kind of workplace learning that leads to continuous improvement and radical innovation (Purcell et al, 2003).

Key questions for researchers

In the literature relating to ways of organising to create and utilise knowledge for the benefit of the organisation, some fundamental assumptions remain relatively untested. Notably, the assumption that knowledge is the most important competitive resource rests on little if any empirical evidence. Reviewing a broad body of research Eisenhardt and Santos (2002:159) found no significant use of actual measures of performance that can yield insights into the nature of the competitive advantage that 'knowledge' might bestow, the source of that advantage, or indeed whether that advantage exists at all. The conceptualisation and measurement of knowledge also proved inconsistent across studies.

Research studies further reveal that not all knowledge is strategically valuable, and that the returns on the generation of new knowledge sometimes go to the individual not to the firm. It is still unclear what constitutes organisationally-valuable knowledge, when to transfer it, or whether extensive internal knowledge transfer is strategically wise or sufficiently worthwhile by other criteria, given its costs to the organisation compared to the uncertainty of its outcomes (Eisenhardt & Santos, 2002:152).

Findings from studies in the IT sector (Brown & Eisenhardt, 1998; Hansen, 1999; Scarbrough & Swan, 1999; Swart et al, 2003) document the negative impact on knowledge-sharing of treating knowledge primarily as a commodity rather than as a process of knowing where the organisation is viewed as a complex activity system of knowledge emergence and application. Organisational researchers frequently express concerns at a failure in the field to recognise the organisation as a complex social institution and at the consequent lack of integrative approaches to many knowledge-creation initiatives (Scarbrough, 1998). Eisenhardt and Santos (2002) are far from alone in urging more research into organisational context and its influence on knowledge flows.

Such findings, coupled with reflections on the notion of knowledge as a relational process as discussed above, point to some key research questions for those studying knowledge productivity. These include the following:

- How does external context shape internal organisational context? And what are the features of internal context that relate most directly to knowledge productivity?

- How do knowledge productivity, improvement and innovation of processes, products and services interrelate?

- How can personally stimulating yet knowledge-productive work environments be created, together with the mutual support systems needed to sustain them?

- If the traditional management model is ill-suited to the domain of knowledge construction, what new model should replace it and what kind of changed skills and disposition does this infer?

- What are the most appropriate strategies for researchers studying the field of knowledge productivity, and what are their practical implications?

A Conceptual Framework for researching knowledge-productive organisations

Our concept of knowledge productivity emphasises the ability of a team to gather information that forms the basis of the development of new competencies to apply to the gradual improvement and radical innovation of work processes, products, services and customer relationships. An initial conceptual framework to express the process of knowledge productivity is reproduced here as Figure 1.
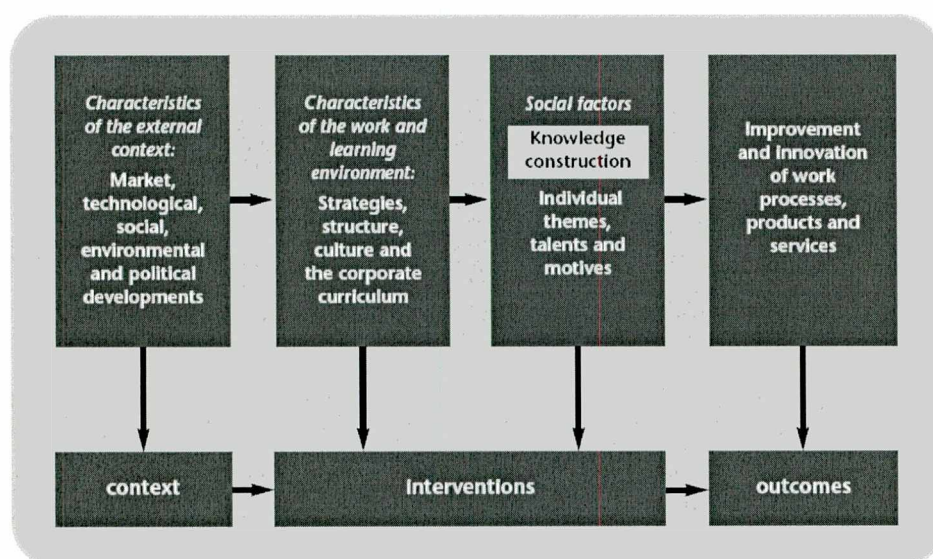

Figure 1: A conceptual framework of knowledge productivity (Harrison & Kessels, 2004: 176)

This framework presents a number of interrelated factors that have a key influence on the process of knowledge production and its application in improvements and innovation:

Characteristics of the external context: These refer to the triggers for investing in improvement or innovation that come primarily from outside the organisation (e.g. market, technological, social, environmental, political developments). They help to shape the organisation's internal context which is also influenced by internal challenges and ambitions (e.g. problems in work processes, worker satisfaction, retention, change in vision and ambition).

Characteristics of the work environment: These refer to those conditions in the work environment that research indicates are conducive to the social process of knowledge development. Strategies, structures and culture have an impact on the organisation's plan for learning – what we term its 'corporate curriculum'. It is that curriculum that provides the subject matter expertise, problem-solving capabilities, reflective skills, communication skills, self-regulating capabilities of motivation, affinities and emotions, peace and stability, creative turmoil and practical wisdom that are needed in order to

promote and sustain collective learning and knowledge productivity (Harrison & Kessels, 2004).

Social factors: In a knowledge economy organisational performance mainly depends on the development and utilisation of the knowledge that is needed to realise the desired improvements and innovations (e.g. Leonard-Barton, 1995). Here, social factors, individual concerns, ambitions, motives and talents play an important role. In this (learning) process, we distinguish three individual and collective competencies:

1. to identify, gather, exchange and interpret relevant information

2. to use this information to develop new competencies

3. to apply these competencies to improve and radically innovate.
(Kessels, 2001; Nonaka, Toyama & Byosière, 2001)

This means that knowledge productivity not only comprises producing (creating) knowledge, but also making knowledge productive (application).

Interventions: An important challenge, particularly for those with learning and development roles in an organisation, is to design and promote interventions that act on the conditions in the work environment as well on team learning and individual learning in ways that facilitate knowledge productivity.

Organisational outcomes: The assumption on which this paper rests, as we stated at its start, is that in order to achieve long-term success in a knowledge economy, an organisation needs to continuously improve and from time to time radically innovate its products, services and work processes (Drucker, 1993; Nonaka & Takeuchi, 1995). Gradual improvement elaborates on what is already present and leads to additional refinement and specialization. Radical innovation is based on breaking with the past and creating new opportunities by deviating from tradition. Therefore, the outcomes of knowledge productivity should be measured in terms of improvement and innovation of products, services and processes.

Using the Framework

Scholars have for some time expressed concerns about the methodologies of research into the knowledge process, criticising its emphasis on qualitative rather than on quantitative studies, the use of unstructured and semi-structured interviews, and some key studies that are of an anecdotal and small scale nature (Hodgkinson, 1996; Scarbrough, 1998).

A series of studies into knowledge-productive organisations have recently been conducted, some of which utilise the initial conceptual framework described in the previous section, and others of which produce new insights related to that framework. The results reported below, based on a meta analysis, offer considerable empirical support for proposals concerning mechanisms conducive to knowledge productivity in organisations. However we emphasise that the studies are exploratory, and that the research questions and methodologies used differ from one study to the next. We see

their greatest value to lie in the cumulative insights they yield, and in their crossover with studies being undertaken in the wider learning and development field. Taken together, studies like these are already identifying areas where there is considerable consistency in findings, and others where major research questions remain unanswered. They are also suggesting research strategies appropriate to the study of knowledge-productive organisations and those aspiring to that status.

The research studies

Researching features of workplace learning conducive to knowledge productivity
In a series of studies in 48 institutions in the Health and Welfare sector in the Netherlands has been reported by Van Lakerveld et al. (2000), 271 respondents were professional workers and 110 more were either managers or held staff positions responsible for quality management or training. The main findings to emerge were that:

- the corporate curriculum's learning functions of *subject matter expertise, problem solving, reflective skills, interaction and communication,* and *self-regulation* described different sets of learning characteristics, but they related sufficiently positively to one another to justify their combination in the overarching corporate curriculum concept.

- all five learning functions related positively to improvement and innovation of work processes and services in the Health and Welfare sector. However, those supporting *reflection, interaction* and *self-regulation* seemed to be the most powerful in bringing about improvement and innovation.

- *Reflection* was the function most often mentioned as being adversely affected by lack of time. However, it emerged as the single most crucial function for developing capability to improve and innovate in the day to day work environment.

Although this research focused on learning as it occurred in the workplace, the responses showed that participants most closely associated the concept of 'learning' with formal instruction. They tended to attribute more learning outcomes to the traditional mode of participating in courses and less to workplace processes like work-related meetings, cross-organisational co-operation, and research activities. Most felt that their work situation could to a large extent be considered a learning environment, but their instinctive definitions and beliefs about learning were most often related to classroom activities (Kessels et al, 1998; Van Lakerveld et al, 2000).

Researching self-regulated knowledge development
Another series of studies investigated issues relating specifically to *self-regulation of work and learning* (Van der Waals, 2001; Van der Waals et al, 2002). Here, developmental research was conducted into a facilitated employee-driven Human Resource Development (HRD) research project. The aim was to produce more significant improvements and innovations, substantially increased outcomes of customer satisfaction, employee satisfaction and productivity.

It is central to the concept of self-regulated learning and development that management does not set the goals or determine the direction of employees' development. The main principles underpinning the concept of self-regulated knowledge development are self-direction and self-organisation, the integration of working and learning, a coaching style of leadership, collaboration, and knowledge development that has the potential to lead to improvement and innovation of products and services.

This research project consisted of three main studies. The first (a reconstruction study) comprised the analysis of the design and development process of a management-driven HRD policy in ABP, the largest pension firm in the Netherlands. The second (also a reconstruction study) was a replication study with five other pension firms. The third study (a development study), concerned an *Insight into Client* programme that resulted in new competencies, increased co-operation, improved processes, product innovations and system innovations. The employee-driven approach to learning and development that the programme involved appeared to lead to a significant increase in customer satisfaction, employee satisfaction and productivity. Results indicated that self-regulated learning and development fitted better with organisational context than imposed employee training and development, and produced more significant improvements and innovations.

Researching interventions for knowledge productivity
The difficulty of motivating individuals to adopt a self-regulated approach to learning was demonstrated in a study undertaken by Kwakman and Kessels (2003) with participants from HRD professional qualifying programme at the University of Twente in the Netherlands. The majority of students preparing to take on HRD roles proved to be uncomfortable with process-oriented tasks and with the need to establish a partnership approach in their relations with clients. They preferred the security of traditional and clear-cut training roles. Similar insights relating to established trainers and HRD professionals were reported by a European team researching 'learning-oriented organisations', defined as those striving to enhance opportunities for employee learning with the aim of evolving towards a learning organisation (Tjepkema et al, 2002). The researchers found that HRD roles and strategies were generally seen and treated from the classical training perspective instead of from a learning perspective.

International Comparison of knowledge productivity and innovation
A series of 16 case studies has been conducted in Western Europe and Asia. The main goal was investigating the various components of the conceptual framework as depicted in Figure 1. These studies revealed characteristics of the learning climate of work environments that were successful in producing incremental improvement and radical innovations (Keursten et al, 2004; Zhou, 2003). The main conclusions are summarised as follows:

- *The work environment*: Innovation is likely to occur in teams that develop sufficient learning skills, pleasant working relationships and positive values and believes. Innovative teams are supported by encouraging leadership, a flexible organisation structure and abundant autonomy.

- *The corporate curriculum*: Creative turmoil seems to drive the innovation and improvement process. The urgency participants feel to develop something new,

often caused by external pressure, creates the motivation to start and continue. At the same time, room for experimenting with new ways of working and problem solving offers energy and new perspectives.

- *Innovation:* The substance of the innovation process is provided by the subject matter expertise. Subject matter development was at the heart of most of the studied innovation processes.

- *Teamwork:* The autonomy and responsibility given to teams that are involved in a process of improvement or innovation, was crucial for the process to succeed. Participants needed the room to make their own choices and to decide on their own way of working. The communicative skills needed for doing this successfully, appeared to be of great importance but definitely not self-evident. Team members needed support in order to develop these communicative skills.

- *Reflection:* Participants need to take time to reflect upon the process they are going through. This not only benefited the decision making process on what next steps to take but also the reflection upon the supporting learning process.

- *Social interaction:* The social context for knowledge productivity is provided by the cross-functional personal contacts, care and respect, and tolerance for mistakes. The personal theme's, motives and passion leading to curiosity, the drive to work towards concrete results, in combination with reward and recognition, serve as important reasons for people to put an effort in joined knowledge development. The organisation and its management have an important role in supporting these innovation processes. This happens through inviting and encouraging staff members to engage in the learning and innovation process. It appeared to be impossible to manage the processes of knowledge productivity in a traditional fashion of command and control.

Discussion

The links between the findings from the studies reported here and those from research into learning and development in organisations more widely suggest the utility of the conceptual framework identified in Figure 1 as an initial framework to explore features of knowledge productivity in organisations. They provide support for its key elements. However they leave some fundamental research questions unanswered. Clearly experimentation in research strategies and methodologies is required in order to ensure 'honest probing' into this novel terrain. We suggest that future research should focus particularly on the following questions:

- How should we conceptualise the social process of knowing as it occurs in organisations? Shared subject matter expertise and domain specific information undoubtedly play an important role. However, related factors such as learning skills, reflection, pleasant working relationships, positive values and believes, curiosity, passion, trust, respect and recognition, also seem to have an impact on the knowledge development process.

- What role should management play in the domain of knowledge productivity? Inspiring leadership appeared to be conducive to the innovation process. However, imposed hierarchy, enforced obedience and traditional command and control structures seem to hamper the required autonomy and self-directedness of knowledge workers. How can the necessary shift in structures and in management values and actions be achieved?

- How can a work environment be created that is experienced as a powerful learning environment? Although it is generally acknowledged that learning plays a decisive role in processes of improvement and innovation, most participants in the reported studies, even HRD professionals, primarily associate learning with formal training and classroom activities.

- Consistent answers or al least plausible indications for the aforementioned questions are needed to address the remaining questions: What HRD interventions support and facilitate the social process of knowing, knowledge productivity, leadership capability and a learning orientation of the workplace? And what new roles and values for HRD professionals do such interventions require?

Insights from the studies reported here coincide with an increasing attention in organisations operating in a globalising knowledge economy to the relational implications of collaborative structures, of cross-boundary linkages within and beyond the organisation, and of innovations in workplace learning stimulated by the introduction of high-performance working practices (Clegg et al. 1999; CIPD, 2001; Volberda & Elfring, 2001; Pettigrew et al. 2002; Whittington & Mayer, 2002). The studies have shown the supreme importance, in the conceptual framework in Figure 1, of internal organisational context. Without the support of organisational leadership, vision and value, of appropriate management actions and of effective human resource strategies and practices, attempts to build a knowledge-productive environment within the organisation seem doomed to failure.

Major research reported on more recently by Hutchinson and Purcell (2003) and by Purcell et al. (2003) emphasises the centrality of line management actions in implementing the vision and values of the organisation and its HR strategies and practices. A growing body of analysis and of empirical research suggests that knowledge-productive organisations thrive on 'emancipated' learners who participate in relatively self-controlled workplace communities of practice. This calls for training, learning and management approaches that are informed by concern for an ethical approach, build on diverse value systems and on a variety of personal motivations and interests, and stimulate self-regulated learning. However, while there are direct implications here for line managers there are just as important warnings for HRD professionals. A disturbing number of research findings are now casting doubt on the extent to which those schooled in 'training' and familiar in their organisation for their 'training' role are promoting such a learning perspective. As one of the studies reported on here explains, research across Europe has revealed that many trainers are not taking on, or seeking out, genuine HRD roles in their organisations. This is leaving them ill-equipped to stimulate such a transformation or to facilitate a new learning climate in the workplace (Tjepkema et al, 2002; Harrison & Kessels, 2004).

Finally, analysis of the studies reported in this paper leads us to propose three types of research activity that can be particularly helpful in exploring the relationship between the characteristics of the work environment and the capability to bring about improvements and innovations of work processes, products and services:

The reconstruction of the process of knowledge development that leads to improvements and innovations in companies.
Here the researcher focuses on the reconstruction of the major events, conditions and interventions that took place and that were linked to the emergence of improvements and innovations. In reconstruction studies central units of analysis are the components of the conceptual framework relating improvement and innovation to processes of knowledge creation and to the quality of the learning climate in the workplace.

Development research that is geared to the design and implementation of specific interventions that facilitate knowledge development.
Here, the researcher plays an active part in the knowledge construction process by designing interventions that strengthen the social and individual learning functions in the daily work environment. 'Development' or 'action-based' research is focused on gradually improving learning environments through the systematic alteration of the interplay between design, evaluation, reflection and improvement. Pioneers in this field are Richey and Nelson (1996) and Van den Akker (1999). Replication of development studies offers a basis for improved selection and application of specific interventions to stimulate knowledge productivity.

Descriptive research that investigates the processes of improvement and innovation as they actually take place in organisations.
Here, the researcher is an outside observer who records over time events as they take place in order to track the course of improvement and innovation and identify its causes. Information is collected on the external environment of the firm and on its internal context. There is particular reference to its strategies, structure and culture, the quality

of its learning environment and the involvement of its individuals and teams in activities that eventually lead to improvement and innovation.

Conclusion

The purpose of this paper has been to identify and explore research questions related to the identification and exploration of organisations in a knowledge economy that are involved in continuous improvement and radical innovation; and to suggest an initial conceptual framework and some research strategies to aid research in this field.

We have suggested that changing notions of knowledge require a fresh conceptual research framework. The research questions that we have proposed therefore take into account the novelty and complexity of this field. We have not sought to detail any specific research framework or methodology. The conceptual framework that we have produced is initial only; it needs to be developed further. We also see a need to emphasise the importance, as in the relatively early stages of developing new theories in any emergent and debated field, for innovative research strategies. We have identified a cluster that focus on reconstruction, development and description of improvement and innovation processes over time that could provide the lens suited to such probing

A tentative and broad-based research approach seems particularly apt when studying organisations that operate in a knowledge economy where competitive advantage is 'a function of an organisation's ability to continually navigate its way into realms of the unknown and concurrently develop requisite new expertise' (Venkatraman & Subramaniam, 2002: 471). Studies of such organisations have revealed no certain principles to guide the organising process, no 'typical forms' on which to base prescriptions (Whittington & Mayer, 2002). Whittington (2002:125) advises researchers to focus their attention on pioneering firms rather than on the mass of those that reflect organisations more generally, and to find methodologies that will reveal what is really happening within the firm through time and its effects on firm performance. Apparently conventional structures can mask what is in reality unconventional. We believe that the research questions, the conceptual construct and the research strategies proposed in this paper could reveal emerging principles for knowledge productivity in unconventional organisational forms.

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