HRM and the Management of Knowledge Assets:
Evidence from Professional Service Firms

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Abstract

The purpose of this paper is to understand how HR practices can be used to manage knowledge assets. Firstly, we categorize knowledge assets into human (industry and firm-specific), social (entrepreneurial and co-operative) and organizational capital (mechanistic and organic). Secondly, we study the core-client interface processes of twelve professional services firms to examine the HR practices used to manage the three types of knowledge assets. Finally, we identify two bundles of HR practices (profession and organization focused) which can be used to manage specific combinations of knowledge assets.

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Introduction

Research indicates that HR practices can play a critical role in generating organizational performance (Paauwe, 2004; Boselie, et al., 2005; Purcell, et al., 2009). Much of this research refers to the importance of managing human capital as a central resource within the organization (Donnelly, 2008). At the same time the development of the knowledge economy has led to interest in the management of knowledge and of knowledge workers in the success of the firm (Alvesson, 2004; Hislop, 2009). These two strands of the literature sit beside one another and the assumption is often made that HR practices need to play a central role in the generation of performance within the knowledge economy. This assumption has limited empirical evidence to support it and to date we do not have a comprehensive knowledge-based HRM framework (Foss, 2007; Lopez et al., 2006).

There are good reasons for this. Firstly, there is an emerging body of research which informs our understanding of the role that HR practices can play in the management of human capital (Lepak et al., 2006; Lopez, et al., 2006; Minbaeva et al., 2009; Svetlik and Stayrou-Costea, 2007). This work is valuable in developing links between HRM and knowledge-based performance, however, it is often focused exclusively on the management of human capital or what is more popularly known as talent management (Collings and Mellahi, 2009; Jackson, Hitt and DeNisi, 2003) at the expense of understanding how human capital will be managed *with other complementary knowledge assets* such as social and organizational capital. Secondly, most of the previous research has looked at the design and implementation of individual practices with less emphasis on *how and why these practices are combined* in particular ways (Jackson et al., 2003: 424). The work that has looked at these combinations (Kang et al., 2007) has mostly involved the development of theoretical models with little empirical support (Kang and Snell, 2009: 86). This leaves us in a challenging position where we assume HRM can contribute to knowledge-based performance through human capital but we are less clear about the actual practices involved (Foss, 2007; Laursen and Mahnke, 2001; Dooreward and Meihuizen, 2000) in managing complementary knowledge resources.

In this paper we address this gap by examining the HR practices used to manage specific types of knowledge assets (Grant, 1996; Wright et al., 2001). We aim to develop a knowledge-based HRM framework by firstly defining which knowledge assets should be managed in an organization at both the individual and collective levels, i.e. human, social and organizational capital. Then we examine data collected in twelve Professional Services Firms (PSFs) to understand how HR practices are used to manage particular types of knowledge resources which are vital to their success. Finally, we identify two patterns of interaction between knowledge assets and HR practices, i.e. organization-focused and profession-focused.

Defining knowledge assets: The focus for the HRM-framework

We define knowledge assets as 'capital which is not financial or physical but is knowledge-based and creates outcomes which have value in the marketplace.' These knowledge assets are combined to create intellectual capital which takes the form of goods or services produced for clients, for example legal advice, software or marketing materials. One asset is the knowledge, skills and abilities of individuals, i.e. human capital which is central to the ability of PSFs to develop and deliver solutions to client problems (Alvesson, 2004). These firms must build up a stock of human capital to allow them to compete in the marketplace.

We distinguish between *industry-specific and firm-specific* human capital (Lepak and Snell, 1999; Swart, 2007). Industry-specific human capital involves multiple types of knowledge which can be transferred between firms within one industry because it is generic and explicit rather than tacit (Kang and Snell, 2009). Employees either invest in the costs of generic human capital development themselves or acquire support from their employer. Specialized firm-specific human capital, on the other hand, is often extremely valuable because the knowledge and skills held by employees provide the firm with a unique product or service and cannot easily be transferred to its competitors (Kim and Gong, 2009). Employers tend to bear the costs of developing firm-specific knowledge resources because employees become attached to the organization and sacrifice mobility opportunities (Swart, 2007).

However, these knowledge assets, by themselves, bring no guarantee of success because they migrate towards a norm and can be mimicked (Barney, 1991). Individuals not only use their own knowledge and skills but also rely on vibrant, creative and trusting relationships and require access to organizational systems in

order to produce valuable outputs. Thus the knowledge-based view suggests that the effects of HRM should encompass social relationships, which we define as *social capital* and organizational processes and systems, which we define as *organizational capital* (Wright et al., 2001; Swart, 2006). Social capital refers to the value created by leveraging knowledge that is embedded within social networks and interrelationships (Leana and van Buren, 1999). This form of capital is of particular importance if we are to develop a knowledge-based framework of HRM and it differs according to the nature of the social relationship (Taylor, 2007; Nahapiet and Ghoshal, 1998). The social capital would vary according to the type of network within which the relationships are situated and subsequent trust that would be associated with these relationships (Kang and Snell, 2009).

We can identify two types of social capital. *Entrepreneurial* social capital is based on loosely connected and structurally weak networks where the actors rely on direct contact and detailed knowledge of one another. For example, two scientists collaborating in a new research network based on an unfamiliar science park will rely on their strong person-to-person trust. *Co-operative* social capital involves tightly coupled, strong, dense networks, generalised or institutional trust and shared understanding of how knowledge is combined. For example, two management consultants working for the same organization will cooperate even though they may not know each other that well, i.e. their trust is based on the institution and its culturally derived practices. Organizational capital, defined as the institutionalized structures, processes and embedded routines (Bowman and Swart, 2007) in the organization will impact upon the relationships within and across social units as well as the functions that they fulfill. The literature identifies two types of organizational capital: *mechanistic* and *organic* (Youndt et al., 2004; Kang and Snell, 2009). The former is related to codified knowledge which is then leveraged through organizational structures, systems, databases, manuals and patents. Bontis (1998) argues that organizational capital resembles know-how which is situated within tacit organizational routines and focuses on the informal aspects of organizational life. This is the cultural dimension which Kang and Snell (2009: 70-71) refer to as *organic* organizational capital. In this context, culture is an important influencer of the content and process of communication which enables the achievement of shared objectives (Fairhurst, 2008).

The strength of the literature is that it has clear definitions of the types of assets on which knowledge intensive firms rely to generate high performance. However, there is relatively little research into the ways HR practices support these various forms of capital (Kang and Snell, 2009; Kang et al., 2007; Foss, 2007; Lopez et al., 2006). Research which has been carried out has begun to explore how HR can support the management of knowledge for strategic advantage. Within this body of work we can identify two clear themes: the micro- and strategic approaches.

Most of the research into HR practices and knowledge assets has adopted the micro-perspective which focuses on the management of human capital exclusively (Jackson et al., 2003; Lepak and Snell, 2009; Minbaeva et al., 2009; Svetlik and Stavrou-Costea, 2007). Studies of the acquisition of human capital include Pulakos et al., (2003) looking at recruiting 'stars' and Davis-Blake and Hui (2003) examining the use of contractors. The role of HR practices in knowledge transfer has focused on the training and development of staff (Kase et al., 2009) and the support for developing creative practitioners (Oldham, 2003). Lawler (2003) has examined the impact of managing and rewarding human capital. Other research has looked at the implementation of these practices, including Zupan and Kase (2007) who have examined the role of line managers. In summary, the micro-perspective recognizes the value of HR in knowledge-based organizations but tends to emphasize human capital, i.e. jobs and individuals (Lepak and Snell, 2003).

Jackson et al., (2003: 424) note that the strategic HR perspective recognizes that HR practices have their most powerful effect when they are used in combination, and that moreover these practices will be combined in different ways to serve the needs of particular types of knowledge assets. This approach recognizes that firms rely on different types of knowledge and knowledge workers and these workers need to be managed in different ways. This in turn builds on earlier work in the field of strategic HRM including Delery and Doty (1997) and Lepak and Snell (1999). Doorewaard and Meihuizen (2000) identified two knowledge based strategies (efficiency and expertise) and then charted how HR practices supported these drawing on empirical data. Shih and Chaing (2005) identified one type of connection between a cost minimization, a 'buy' HRM strategy and a codification strategy towards knowledge management and a second type between a differentiation, organic HRM strategy and a personalization approach to knowledge management.

More recent research (Kang et al., 2007; Kang and Snell, 2009) has looked at combinations of HR practices and a variety of knowledge assets. In particular they examined how development practices were linked with human capital, employee relations practices with social capital and performance controls with organizational capital. They identified two intellectual capital architectures: Refined Interpolation combined specialist human capital, co-operative social capital and organic organizational capital and Disciplined Extrapolation which combined generalist human capital, entrepreneurial social capital and mechanistic organizational capital. They also acknowledge (2009: 83) that there is 'limited empirical evidence to support ideal HR configurations that are equally effective under all conditions.'

In summary, current literature which seeks to develop our understanding of how HR practices are used to manage knowledge assets has two gaps:

(i) it emphasizes the management of human capital and pays less attention to organizational and social forms of capital and

(ii) it is focused on individual HR practices as opposed to the combination of HR practices.

In order to address these gaps we ask: 'How are HR practices used to manage knowledge assets?' We pay particular attention to the application of HR practices to knowledge at the individual (human capital) and collective (social and organizational capital) levels. In the next section we discuss how we address this research question.

Methodology

We used the multiple-case logic suggested by Eisenhardt (1989) which is commonly adopted to study knowledge-intensive processes (Sönderlund and Bredin, 2006) and in particular the role of HR architecture (Lepak and Snell, 1999; Kang et al., 2007) to study 12 PSFs (See Table 1 for further details).

(Insert Table 1)

The case organizations were particularly suited to a study of the way in which HR practices are used to managed knowledge assets because the PSFs are so reliant on these resources. That is, they do not sell physical products nor do physical forms of capital (such as machinery) dominate their service/production processes. The PSFs are knowledge-intensive in their resource base and they are knowledge-intensive in their outcomes. Most PSFs work very closely with their clients to convert their knowledge-asset base into client services via their core-client interface processes.

These are sophisticated knowledge conversion maps and procedures which can either exist loosely in the minds of the knowledge workers or they can be formally documented in the organization. Given the dominant focus of the core-client interface processes, i.e. these were the processes wherein the HRM systems had to connect directly with the firm's knowledge assets, we selected to use these as the unit of analysis in each case study. The unit of analysis (core-client-interface process) was held constant across all of the case studies. These units of analysis were identified in collaboration with each case study firm and typically represented the bidding process, consultancy project or creative-briefing process. We obtained variance in our sample according to the firm's degree of professional governance (Malhotra and Morris, 2009). The sample therefore included law firms, management consultancies, software houses and advertising agencies.

These data were collected during the period November 2004 to February 2006. In total 150 interviews were conducted and 48 observations carried out. The interviews lasted between 60-90 minutes and were recorded and transcribed. We adopted a stage-based approach to the collection of qualitative data in each case. Firstly, we conducted in-depth interviews with a representative sample of managing partners, directors, senior managers and HR staff at all levels. During these interviews we sought to understand the wider strategic challenges to the firm, the nature of each of the knowledge assets, how each category of knowledge asset was managed and the particular HR practices that were adopted. It was at this stage that we identified the dominant knowledge-process unit for further analysis.

At the second stage we interviewed a series of client-interface owners to confirm the various stages in the knowledge process and to identify the nature of the knowledge assets that had to be managed at each stage of the client-interface process. These interviews tended to be with a principal consultant, a practice manager or a Chief Knowledge Officer. In addition we observed some core client-interface processes.

In stage three we interviewed several knowledge-process owners and participants, e.g. line managers, lawyers, consultants and account handlers to understand the relationship between HRM and knowledge assets. We paid close attention to the specific references to human, social and organizational capital and how HR practices were used as strategic tools to manage each asset. For example, we asked which knowledge assets were relied upon mostly at the client-engagement

process. As a final means of completing our multiple-case logic (Eisenhardt, 1989) we studied secondary data such as in-house documents relating to HR strategy and practices as well as knowledge-based outputs such as advertising material and websites to validate the findings regarding the knowledge assets – HRM linkages. All our qualitative data were then examined using thematic analysis (Saldaña, 2009). At this stage we could identify the key themes which link HR practices to the types of knowledge assets. These findings were then fed back to each case study organisation in order to complete the data validation process (Braud, 1998).

Analysis: Towards a knowledge-based HRM framework

We now consider how HR practices are used to manage human, social and organizational capital and how these practices interact to provide a knowledge-based advantage. We discuss these practices by drawing on our empirical data within the theoretically derived framework on the knowledge assets of the firm as shown in Table 2.

(Insert Table 2)

Human Capital

The first set of HR practices that we identified relate to the resourcing processes within the PSF which have a direct impact on knowledge and skills in the firm (Alvesson and Robertson, 2006). This included: (i) recruitment and selection; (ii) job design and the (iii) resourcing of projects. The thematic analysis of our data identified two approaches to recruitment and selection: *expertise driven* and *potential driven*. The expertise driven approach emphasizes technical skill, ability to do a job immediately and sectoral knowledge which contribute towards the development of industry-specific human capital which may easily be transferred between organizations in one industry (Kang and Snell, 2009: 79-80). For example both 'Stonehenge' and 'Spider's Web' recruit staff from their clients and find their staff leave them to join their competitors. The potential driven approach sought to identify capacity for future development linked to a particular firm, focusing more on what the professional may become through training within the firm. This was well illustrated in 'High Trust' where one Partner said *'until you are five years qualified you are rubbish. A lot of my life is guiding younger ones. When I recruit I say, 'Are you proud? If you are proud go away because I will be correcting you for five years'.'*

Job design has a direct impact on human capital and can be traced back to the competitive strategy of the business and the consequent types of work involved. We can identify two key job design approaches: *narrow* and *broadly-focused* job designs. In firms such as 'Kaleidoscope' we found there were broadly designed jobs which facilitated the development of customized solutions that were innovative and creative. These jobs are likely to be in teams which have permeable boundaries and flexible membership. Firms which rely more on reusing standardized industry knowledge have more narrowly defined jobs and a fragmented structure with specialists embedded in each team. In both 'Stonehenge' and 'Spider's Web' we saw few opportunities to learn new skills or to be flexible and multi-skilled.

Decisions on the allocation of staff in project teams had a direct impact on the specificity of human capital and affected how employees move between project teams. The firms in our sample selected either a *deep expertise* or a *flexible skills-resourcing model* when allocating client work to project teams. The firms, such as 'Blueprint', opted for the flexible skills-resourcing model and rotated staff between client-projects so as to develop firm-specific skills and knowledge which were not easily transported to other organizations. This helped the firm to retain valuable human capital in the face of stiff competition for talent. It did however mean that professionals had to 'buy into' the values of the firm as their skills became less transportable across boundaries.

Other firms who pursued the deep expertise approach segmented work which involved keeping project teams together over long periods with very limited movement between them. The aim was to emphasize the development of professional and industry-specific knowledge and skills which are less specific to a particular firm and more easily transported across organizations, for example the movement of employment lawyers between law firms. In 'Stonehenge' the large and long projects demanded high levels of client and sectoral expertise, which was often developed via a previous career with the client. The knowledge is therefore specific to the service offered to clients and not to the organization.

Our data evidenced two key approaches to training and development: *profession-related* and *firm-specific*. The relative importance of profession-related training and development varies within PSFs. In law firms some practice groups, for example employment law and personal injury, rely on professional industry specific knowledge which tends to be communicated by formal training programmes and

stored in data management systems. Here industry standard knowledge is 'bought' rather than 'made' and the emphasis is on using this knowledge effectively within streamlined organizational systems. In other practice groups such as Corporate law there was more emphasis on developing approaches which were distinctive to particular firms based on ways of solving problems which were closely tailored to firm needs. This placed more emphasis on talent-rich mentoring and coaching between seniors and juniors.

Performance management systems play a key role in stimulating the development of human capital and give very powerful messages over what is valued within the firm (Swart, 2007). The firms in our sample used two types of performance management systems: those which are focused on *targets*, which may be similar across the industry such as the billing targets for lawyers, i.e. the focus is on the individual professional skill and those which adopt a *balanced scorecard* approach, often involving teams of employees, that are more focused on the organization and draw on multiple data sources.

Many firms will set utilisation and billings targets for individual employees as part of error avoiding performance management systems (Kang and Snell, 2009). In law firms this typically includes green (billable) time and red (non-billable) time which can be closely monitored in fractions of an hour. These systems provide a strong focus on the technical industry-specific knowledge and skills and often create a disincentive to collaborate to across professional boundaries. Employees can develop a strong attachment to the industry rather than the firm and look to develop their own professional, transferable skills rather than share their knowledge internally. There may be an incentive to hoard rather than share knowledge because it enhances their individual value. This produces a very utilitarian results-based culture where staff are simply concerned about how their own performance is judged and how this will advance their own careers. According to one law firm employee '*there is no real encouragement for people to invest their time in sharing their know-how by documenting it on the system – because they don't get any credit – so we rely heavily on individual knowledge.'*

The cases in our sample illustrated a close link between their reward and performance management systems. We identified two reward approaches; i.e. *tournament and tenure-based*. Some pay structures have a high dispersion between the highest and lowest paid employees with steep hierarchical differentials to attract

talented performers to join, stay and perform well. These tournament based pay structures (Lazear and Rosen, 1981) encourage employees to effectively compete for prizes which may take the form of higher salaries, promotion, perks or bonuses. A close link between fee earning and bonus payments can encourage highly individualistic behaviour and the development of industry-specific human capital. This, in turn, facilitates movements between firms as lawyers can provide objective evidence of their fee-earning capacity. Tenure based systems valued and rewarded firm-based experience. They tended to focus more on a balanced set of performance criteria which were linked to the individual's wider contribution to the firm such as knowledge-sharing, new business development and innovation.

Involvement and participation practices were categorized into either *direct or indirect forms of involvement*. The case studies that adopted direct involvement practices ensured that there was a link between these and knowledge and skill development. For example 'Kaleidoscope' employees had the opportunity to become involved in the design of HR practices. As the Head of People said, *'All the initiatives that we develop are delivered for the people, by the people.'* More indirect participation schemes offered no such opportunities. For example in 'Stonehenge' the HR practices were developed by the HR Administrator with no input from junior and middle level employees in the firm.

Social capital

Our case data illustrates that firms adopted either *experience based* or *values based* resourcing models to manage social capital in two ways. The former tended to be associated with industry specific skills and was supported by dyadic profession-based trust. For example, law firms will targets lawyers with specialist knowledge in an attempt to improve performance in a particular market segment. These dyadic network structures are associated with entrepreneurial social capital and enable the firm to explore alternative market opportunities whilst also exploiting professional knowledge and skills (Swart and Kinnie, 2010). Recruitment methods that relied more on values tended to emphasize the organizational culture and 'being part of a team'. Indeed, some firms, such as 'High Trust' and 'Kaleidoscope', took the possession of relevant technical skills and knowledge almost for granted and paid more attention to applicants' values. They also foster their firm-wide culture to encourage staff to share their knowledge, pass on their contacts and delegate their work to others. As one of

the Partners in 'High Trust' said '*when we recruit people from outside they are damaged goods, they are defensive, they are used to keeping the work to themselves, doing the fees and then asking for Partnership – they don't think that it might be quicker to Partner if they share their work out.'* Young professionals valued working in these settings as they could develop alternative skills and directly influence the PSF strategy. These methods therefore developed co-operative social capital and supported innovation in the firm.

In addition, firms used either *bounded* or *cross-boundary* approaches to allocate resources to client projects to manage social capital. The former emphasized 'one team' and 'one client' and would involve working closely with the same team members, often in the same profession, over long periods of time on a specified task. This had the advantage of developing strong social and professional networks based on professional respect which is associated with entrepreneurial social capital. The PSFs who used cross-boundary processes for resource allocation would frequently move staff between client teams. This provided important development opportunities and improved the flow of knowledge between teams. This encourages the development of co-operative social capital where the emphasis is on creating and an organizational rather than a team-based focus. Indeed, social capital was described as *the* most important criteria for staff allocation to project teams in 'Blueprint'. Projects that stretched over long periods of time would be 'over staffed' to allow for rotation across projects. This strategy created an infra-structure for knowledge flow not only within the project team but also between various project teams.

Project resource allocation interacts with job design to impact upon social capital so that it determines who will work with whom, how and where. We identified two themes in our data; *profession* and *organization*-focused. The former tended to be associated with entrepreneurial social capital whereas the latter supported the development of co-operative social capital. In 'Stonehenge' it was not uncommon for staff to remain in a specific role with the same client team for several years. Here entrepreneurial capital was developed via professional networks, focused on the client. There is a close connection between the nature of the knowledge employed and social capital. Other work, for example in Corporate Law in 'Temple', required dedicated client teams drawing on deep tacit knowledge to solve client problems where professionally-focused teams were structured on the principle of a high proportion of senior and experienced staff working with fewer associates. This

allowed for highly interactive knowledge sharing as well as the establishment of shared practice based on professional respect. There was an opportunity for entrepreneurial capital to be developed as tacit skills were shared. In 'Kaleidoscope' on the other hand, broadly designed jobs allowed for frequent rotation between client teams, flexible resourcing, and a sense of identification with the organization, which was associated with the building of institutional trust which underpins co-operative social capital. This was reinforced by *organization-focused* training schemes which emphasized a culture which valued versatility and flexibility. This contrasted with other training and development models which were *skill-based* and emphasized the acquisition of transferable skills such as negotiation and pitching and the ability to operate data management systems.

In terms of performance management and reward, the *target-based approaches* which emphasize individual professional skills and adhere to industry standards, were related to professional trust and weaker intra-organizational networks. For example, a partner in a law firm with an exceptionally high fee earning ratio would generate professional respect but the *way* of working encouraged entrepreneurial social capital, i.e. professional networks from which new opportunities might grow, rather than densely connected organizational networks. Rewards were therefore tied closely to role-based performance. An alternative approach is to adopt a *balanced scorecard* where employee performance is broadly defined and uses a variety of data sources. The balanced scorecard is focused on developing firm specific skills and approaches to meet cultural and strategic objectives. Reward is therefore linked to both in-role and extra-role behaviour. For example 'FinConsult' had moved away from a reliance solely on billable hours to include a wider range of firm specific criteria such as knowledge sharing and development of new work. The attempt here is to encourage the development of co-operative social capital. Usually there is greater tolerance of a failure to reach these targets, i.e. they are error embracing (Kang and Snell, 2009: 81).

Opportunities to participate in decision making in the firm were also associated with the development of the nature of social capital. Two distinct approaches were identified in our data which differed in terms of the extent of involvement in decision making they offered employees. *Limited involvement* practices were associated with entrepreneurial social capital, and *extensive involvement* practices contributed to co-operative capital. In the former, the

involvement practices used to consult with employees were restricted to email and anonymous suggestion schemes. These practices provided few opportunities for encouraging identification with the firm or interaction between teams. Consequently, contacts were often stronger with external commercial and professional networks, than with fellow internal employees. In this context the weakness of internal organizational procedures encouraged the development of entrepreneurial social capital.

This was quite different to the extensive involvement practices where employee views were sought on a wide range of issues. In 'Kaleidoscope', for example, the annual staff engagement survey was labelled the 'state of the nation' and employees were referred to as 'nationals'. Not only were employee views sought, but, crucially, clear organizational-level plans were developed to address the problems identified in the survey. These involvement practices contributed strongly to the notion of 'organization as a family' which stimulated direct engagement and identification with the organization.

Organizational capital

The degree to which the PSF emphasized organizational values and processes in their resourcing practices directly linked to the development of the specific type of organizational capital. This was evident in *'know-what'* versus *'know-how'* selection procedures; *profession*-versus *organization-specific* job design and *team*-versus *organization-bounded* project resource allocation. The 'know-what' approach to recruitment emphasized explicit knowledge, which was evident in professional and industry standard skills. These skills did not contribute to the development of organizational procedures and technologies and tended to support institutional isomorphism. This is associated with mechanistic organizational capital with flat structures with large numbers of junior employees and relatively few senior staff which constrains flexibility. For example both 'Stonehenge' and 'Spider's Web' adopted these structures and became overly reliant upon processes and procedures which are associated with mechanistic organizational capital.

The know-how approaches, which value tacit knowledge, on the other hand, tended to be more fluid and emphasized identification with the organization, building institutionalized trust and organic organizational capital. The emphasis on know-how was also linked to organizationally-focused job designs which provided opportunities

to develop customized solutions which could be shaped to suit the particular client request. This provided a foundation for organic organizational capital and fast responses to dynamic client markets as in 'Kaleidoscope'. This also placed the organization at an advantage given that it acquired a niche market position and was able to retain its staff through the structurally dense organizational networks that were built. In these contexts the allocation of staff to project teams also tended to be organizationally bound, as opposed to team-bound, providing further flexibility that underpins organic organizational capital. That is to say, rather than locking skills into specialist silos which constrain the organization, the PSF was able to flexibly deploy resources across diverse client demands. Here project teams had flexible membership and there were permeable boundaries between client projects.

Training and development were used to manage organizational capital either through *procedure* or *process-focused* approaches. The former tended to emphasize the mechanics of the organization which were often less associated with the values of the specific fit, e.g. health and safety procedures, legal engagement processes and project management specifications. Training programs that focused on these aspects were closely related to the development of mechanistic organizational capital and limited the flexible deployment of knowledge and skills.

Process, or firm-specific training and development concentrated on developing potential and strengthening the organizational culture. These relied more on a bottom-up approach to learning rather than a top-down training process. They seek to develop versatile employees who can be deployed in a variety of areas in a specific firm thereby tying and embedding the employee's knowledge and skills to the strategic planning processes in the firm (Bowman and Swart, 2007). For example, in some practice groups in the law firms there was more emphasis on exploring new service offerings such as medical negligence. The development of this rich firm-specific tacit knowledge was highly reliant on the inter-personal mentoring relationships in the firm hence there was a low ratio between junior lawyers and senior partners.

PSFs used the criteria which they emphasize in performance and reward structures to manage organizational capital. Our data analysis indicated that *short term target-based* performance management systems which were associated with *industry-standard* reward systems encouraged the development of mechanistic organizational capital whilst the *balanced scorecard performance systems* which

supported *organizationally focused* reward systems were associated organic organizational capital. The latter which reward service in and contribution to the firm rather than short-term individual performance will appeal to employees, for example in law firms, who are prepared to build up experience and eventually gain promotion to Partner. In this context the capability of the firm takes precedent over 'standard individual rewards' which enable the firm to respond flexibly within a changing market. The power of the organic organizational capital was articulated by one of the Partners in 'High Trust', *'anyone who comes here has to show they can bring in the fees – show they can get hands dirty and build a team through sheer hard work. You sacrifice a decade but you get the reward.'*

In these settings bonuses were linked to group or organizational performance using internal and external evidence to support organic organizational capital and encourage the exchange of tacit knowledge (Kim and Gong, 2009). For example 'High Trust' rewarded practice groups for introducing new business and supported this with monthly management meetings where information on new business opportunities was exchanged. This also encourages identification with the organization, and its performance targets, which in turn develops institutionalized trust which fits very well with the emphasis on shared values and a common culture.

These systems were less attractive to professionals who wanted their rewards to be based on the industry standard and more detailed short-term measures of performance. This approach was expressed by one Partner in 'High Trust' as, *'In the traditional set up you attract clients and keep them in your pocket at all times, you make sure you socialise with them and do their work. This gives you a power base, because you can take them with you and that is attractive to other firms.'* He explained that this was usually reinforced by existence of a billing league table directly linked to individual reward so that *'an individual's value and power were linked to their position in the league table.'* Here the emphasis is on the individual and the standard industry practice. Our data evidenced that firms who adopted these reward practices tended to have very standard organizational blueprints, such as client engagement processes or project specifications. In other words, for a firm to reward in a standard way, it had to operate in a standard way. The emphasis on industry standards in both operations and reward constrained the responses of the firm in changing markets and enhanced its mechanistic organizational capital.

The case study organizations used either *one*-or-*two-way* involvement and participation processes to manage organizational capital. *One-way processes* relied on formal team structures while *two-way processes* deliberately crossed existing internal boundaries to engage professionals. An example of the former was seen in 'Stonehenge' where internal communications were downward and were implemented mostly by email and the line manager. These practices did little to enhance organizational identification and in practice reinforced the existing team structures. This was in stark contrast with the two-way involvement approaches which sought to break down internal boundaries. For example in 'Kaleidoscope' a series of teams were established to take responsibility for social, sporting, environmental and internal marketing activities. These cross-boundary teams were expressly drawn from a range of client teams and functions to promote a sense of organizational ownership of the activity.

Discussion

The purpose of this paper was to understand how HR practices can be used to manage knowledge assets. We did so in an empirically rich and analytically sound way. Firstly, we categorised knowledge assets into human, social and organizational capital and developed a knowledge-based framework to identify the HR practices used to manage each of the knowledge assets. We then drew on rich empirical data to illustrate how these practices are implemented to develop knowledge assets with a specific characteristic, e.g. human capital that is firm specific. In the parallel coding of our data it became evident that certain practices tend to group together to create certain combinations of knowledge assets. For example, firm-specific human capital tended to be associated with co-operative social capital and organic organizational capital. These configurations were managed by specific bundles of HR practices. In order to explore these interactions and to address the second gap in the literature, we now consider the way in which the practices combine, or the patterns of interactions, between the HR practices and the knowledge assets as shown in Figures 1 and 2.

(Insert Figures 1 and 2)

A cross-comparison of our analytical codes enables us to see patterns of knowledge assets that tend to co-exist. More precisely, tracing the co-existence of themes, through parallel coding, enables us to identify two bundles of HR practices which can be used to manage particular types of knowledge assets: the externally focused

profession model and the internally focused *organization model*. The externally focused model is associated with industry-specific human capital, achieved through expertise-based recruitment, profession-related training and development and narrowly defined roles, combined with entrepreneurial social capital which is enacted in loosely coupled networks (often within a fragmented organization) and strong industry-related professional networks. This type of social capital was supported by target-based performance management systems and individually driven reward systems. These more impersonal forms of human and social capital were supported by clear and highly structured organizational systems and processes, i.e., mechanistic organizational capital. These were linked with indirect forms of involvement and participation. There are relatively few attempts to generate long term commitment to the firm in this type as seen in 'Stonehenge' and 'Spider's Web'. Often this is a response to the relative instability in product markets especially where these are dominated by a small number of clients.

The internally-focused organization bundle of HR practices was characterized by firm–specific human capital which was developed via values-based recruitment with an emphasis on potential, rotation between projects and client teams with broadly defined roles. Professional knowledge workers were motivated by a balanced scorecard performance management system and a tenure-based reward system which were strongly linked to the culture, values and objectives of the organization and the development of co-operative social capital. There were also several opportunities to participate directly in decision-making, particularly as it pertained to the development of knowledge resources which were specific to the firm. This was supported by the development of more flexible organic forms of organizational capital within which the professional shapes the organizational systems and is likewise open to being shaped professionally by the organization's values and vision. Here there are much clearer attempts to develop long term commitment to the firm and to reduce employee turnover. This parallels the attempts to develop long term relationships with clients to reduce product market instability.

These two types resemble the 'internal system' and 'market type system' identified by Delery and Doty (1996) and develop their work in two important respects. First, their focus is principally on human capital whereas we considered a wider range of knowledge assets. Second, we have examined the interactions between a range of HR practices and these various knowledge assets. There are also

parallels with the intellectual capital architectures of Refined Interpolation and Disciplined Extrapolation developed by Kang and Snell (2009). However, we have extended their work in two ways. Whereas they propose close ties between particular knowledge assets and specific HR practices, for example managing human capital by the development system, we argue that all the HR practices can potentially influence all the forms of capital. In addition we provide extensive empirical data to provide deep insights into the actual mechanisms involved when HR practices interaction with the knowledge assets.

Conclusions and Implications

This paper contributes to existing knowledge on the links between HR practices and knowledge assets in three ways. First, based on the literature, it extends our understanding of the knowledge assets in PSFs to include social capital and organizational capital (Jackson et al., 2003). Second, it systematically reveals which HR practices are used to manage human, social and organizational capital. It therefore moves beyond the micro-level to include collective knowledge assets (Wright and Boswell, 2002). Third, it draws on much-needed extensive empirical evidence (Kang and Snell, 2009: 83) to develop the strategic HR-performance perspective to identify the combinations of HR practices which are used to manage a set of knowledge assets. This demonstrates that the knowledge-based HRM perspective needs to be context-specific and appreciative of the ways in which HR practices are configured to meet the specific industry and product-market conditions.

The identification of these two bundles of HR practices has important theoretical and practical implications. First, it illustrates that HRM should and could play a strategic role in the generation of competitive advantage in contexts where firms are reliant upon their individual and collective knowledge assets. This provides the opportunity for HR to demonstrate its legitimacy and the potential contribution of their role in knowledge-based organizations (Pritchard, 2010). It shows that the HRM boundaries should be stretched beyond the management of human capital and that there is a central role for the HRM function in the management of knowledge-based projects. This allows us to speak more directly to the links between HRM and the development of dynamic capabilities. Further work in this area might consider the interactions between HR practices and knowledge assets more systematically and whether these interactions are the same in different kinds of PSFs (Laursen and

Mahnke, 2001). Second, we have shown how various types of HR practices play a role in shaping the knowledge assets. The HRM bundles that we identify illustrate the co-existence of the various types of knowledge assets which combine during the creation of valuable intellectual capital. These findings therefore contribute directly to our understanding of: (i) the processes which lead to the creation of competitive advantage, i.e. which types of knowledge assets interact; (ii) the HRM systems which enable these interactions and (iii) the various orientations that firms can adopt to manage knowledge, i.e. profession-or-organisation focused. The paper therefore develops a context-sensitive framework for the management of intellectual capital which is central to the success of PSFs.

The framework has numerous practical applications. Firstly, it focuses attention on the types of knowledge assets which are the key to success in knowledge intensive organizations. In particular, it stresses the importance, not only of human capital, but also of social and organizational capital. Second it demonstrates the vital role that HR practices play in knowledge-based firms. HR practices are at the heart of knowledge-based performance: the ways people are attracted, developed, motivated and retained have a direct impact on the firm's ability to convert their human capital into valuable intellectual capital. Third, the framework allows practitioners to identify the key combinations of HR practices needed to stimulate the development of knowledge assets vital to firm success.

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Figure 1: Profession focus

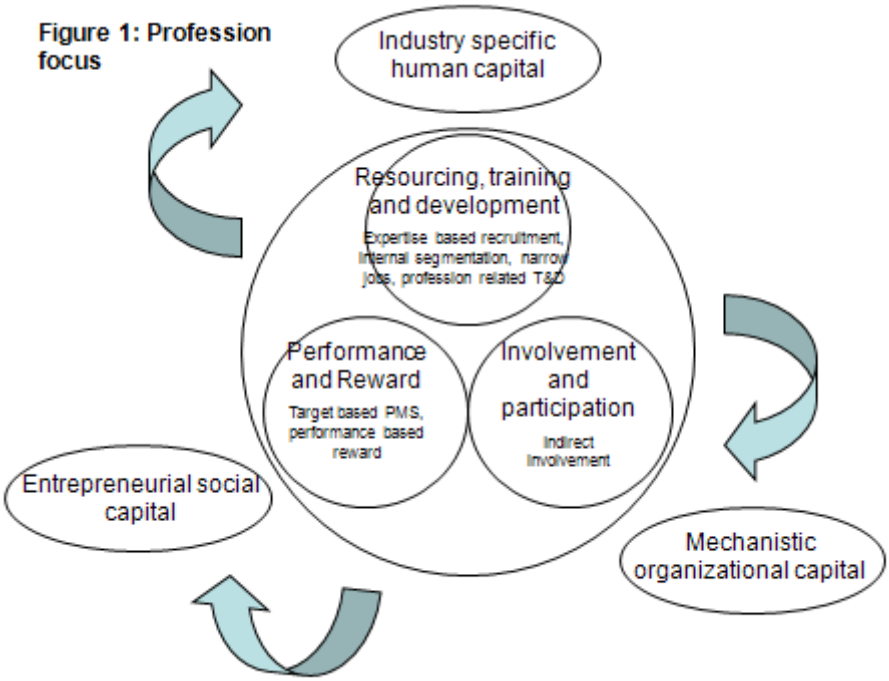

Figure 2: Organisation focus

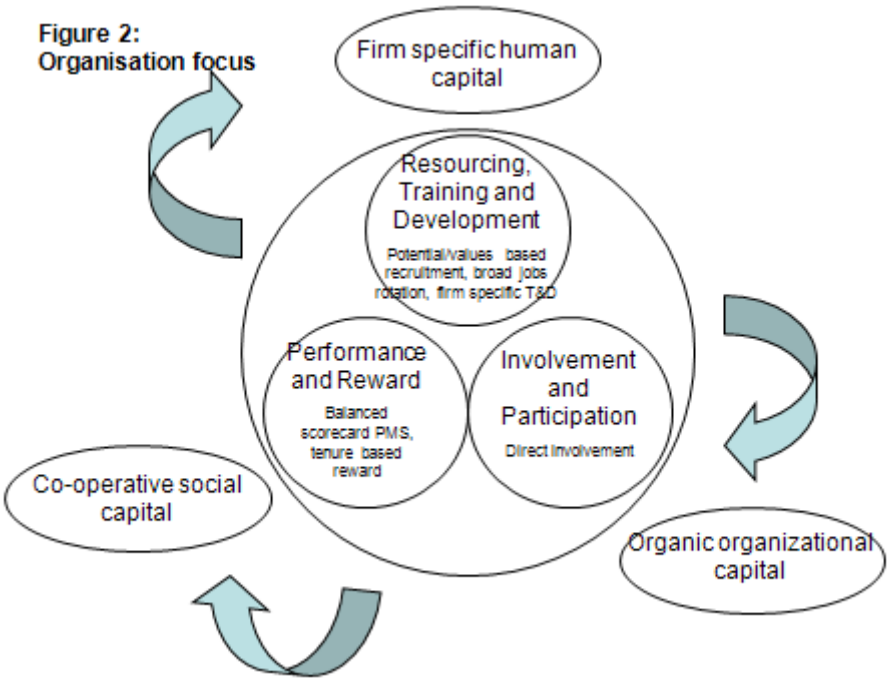

Table 1: The case studies

Sector	**Law**	**Management consulting**‘	**Creative**	**Software**
Case	‘The Matrix’ ‘Temple’ ‘South West Law’ ‘High Trust’	‘FinConsult’ ‘GlobalConsult&Co’ ‘Blueprint’	‘Kaleidoscope’ ‘Stonehenge’ ‘Spider’s Web’	‘IT Integrate’ ‘South Fork’
Interviews	**41**	**42**	**57**	**10**
Observations	**5**	**7**	**24**	**12**

Table 2: Combinations of Knowledge Assets and HR Practices

Human Resource Management Practices								
		Resourcing			**Training and development**	**Performance and Reward**		**Involvement and Participation**
Knowledge Asset	**Quality of knowledge asset as defined in the literature**	**Recruitment and selection**	**Job design**	**Allocation of staff to project teams**		**Performance Management criteria**	**Reward structure**	
Human	**Industry-specific**	**Expertise-based –** ability to do the job immediately	**Narrow -** re-using industry standard knowledge	**Deep expertise** - Segmented with limited movement	**Profession-related –** reliance on formal training programmes	**Target-based -** Individual utilization and billing targets	**Tournament based** - individual rewards encouraging competition and inter-firm movement	**Indirect -** Few skill development opportunities
	Firm specific	**Potential-based -** developing future firm specific knowledge and skills	**Broad** - encouraging multi-skilling and versatility, creativity and innovation	**Flexible -** Internal rotation	**Firm specific -** skills development through mentoring and coaching	**Balanced Score card -** Takes firm approaches into account	**Tenure-based** - with firm and group rewards	**Direct opportunities** - for skill development

Human Resource Management Practices								
		Resourcing			**Training and development**	**Performance and Reward**		**Involvement and Participation**
Knowledge Asset	**Quality of knowledge asset as defined in the literature**	**Recruitment and selection**	**Job design**	**Allocation of staff to project teams**		**Performance Management criteria**	**Reward structure**	
Social	**Entrepreneurial**	**Experience based -** dyadic trust between experts	**Professional -** limited co-operation between teams	**Bounded -** Limited movement - developing strong team based networks	**Skill-based -** Focus on transferable and data management skills	**Target based** - inhibiting co-operation	**Role-based** – individual skill and emphasis on professional respect and networks	**Limited involvement practices –** with a weak organizational focus
	Co-operative	**Values-based -** trust and organizational identification	**Organizational** – encouraging intra-team co-operation	**Cross-boundary -** Staff rotation to create organization focus	**Organization-focused -** Emphasis on culture and valuing versatile knowledge and skills	**Balanced Score card -** encouraging knowledge sharing and new business development	**Extra-role based reward -** incentives to share knowledge	**Extensive involvement practices -** including activities with an organizational focus

Human Resource Management Practices								
		Resourcing			**Training and development**	**Performance and Reward**		**Involvement and Participation**
Knowledge Asset	**Quality of knowledge asset as defined in the literature**	**Recruitment and selection**	**Job design**	**Allocation of staff to project teams**		**Performance Management criteria**	**Reward structure**	
Organizational	**Mechanistic**	**Know-what -** Emphasis on explicit knowledge	**Profession specific -** Drawing on formal systems of explicit knowledge	**Team bounded** - flat structures, limited movement between teams with impermeable boundaries	**Procedure focused -** Embedding mechanisms of the organization	**Short-term measures of performance** - and league tables	**Industry standard –** rewarding individual short term performance	**One-way communications -** reinforcing team structures
	Organic	**Know-how** - emphasis on tacit knowledge	**Organization specific -** Dense organizational networks - facilitating customized solutions to dynamic client problems	**Organization-bounded -** Flexible staff deployment to meet diverse client needs	**Process focused -** develop knowledge or organization-wide processes and exploring new products	**Long term, diverse measures of performance** - drawing data from internal and external sources	**Organizational contribution –** reward experience, tenure and organizational and group performance	**Two-way communications -** cutting across internal team and functional boundaries