

# HUMAN RESOURCE INFORMATION SYSTEMS IN CONSTRUCTION – A REVIEW SEVEN YEARS ON

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Human resource information systems (HRISs) include databases and other computer applications developed to provide specific support for the personnel/ human resource management (HRM) function. Such systems have tremendous potential to make difference to the way the function works, its credibility, its contribution and the way people communicate. Seven years ago, a survey of leading construction firms reported that although the use of computers for human resource information in construction was broadly similar to the national average, the utilisation of the systems was extremely limited, restricted to routine administrative tasks. In order to monitor/ track trends in the use of HRISs in construction the same survey was repeated early summer 2007. The one page self-administered questionnaire form asked about the companies' use of information technology for HRM related functions; which HRIS application, if any, they used; the length of time the system had been in place; the functions for which the HRIS was used; and how satisfied they were with the system. The questionnaire revealed an increase in the main uses of HRISs and levels of satisfaction the respondents recorded. However, the type of system many organisations have in place suggests that efficiency and control are still the central drives for HRIS use. At the same time, many face challenges in the implementation of the systems despite sector expertise on crucial project management.

Keywords: human resource management, information technology, management information systems.

## INTRODUCTION

The development of human resource information systems (HRISs) over the last 20 years has been driven, in the main, by technical imperatives. The need to 'automate' (Zuboff 1988) mainly administrative HR processes, with a focus on speed and gaining efficiencies, has been the *raison d'être* for information systems across all functional areas. Early definitions describe HRISs as "the composite of databases, computer applications and hardware and software that are used to collect/record, store, manage, deliver, present and manipulate [descriptive] data for human resources" (Broderick and Boudreau 1992: 17). More recent work proposes that HRIS seeks to go beyond the 'electronic filing cabinet', vertically and horizontally integrating HR-style practices and processes in order to enable and transform strategy-making and thus add value to the organisation {Williams, 2000 #1287: 30}. This suggests a step change in the use of HRIS from an 'electronic filing cabinet' to a tool that enhances HR strategy making and signals a transformation from 'unsophisticated' to 'sophisticated' use of

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information (Martinsons 1994). This step change is described by Fletcher (2005:2) as an evolution of electronic HR through three phases: “the efficiency and control phase; the enabling insight or partnership phase; and the creating value or player phase”.

The Chartered Institute of Personnel and Development (CIPD 2004: 6) classifies HRISs into four types:

1. A single HRIS that covers several HR functions which are integrated within the system itself but not with any other system within the wider organisation. This is the most common type of HRIS in use (59% of the CIPD 2004 survey respondents indicated using such system).
2. A single HRIS which covers several HR functions that are integrated within the system itself and with other IT systems within the wider organisation (21% of the respondents to the CIPD 2004 survey had this type of system in place).
3. Multiple systems with two or more stand-alone HRIS packages that cover different HR functions, but are not integrated with each other or other organisational IT systems (14% of the respondents to the CIPD 2004 survey had this type of system in place).
4. Multiple systems with two or more stand-alone HRIS packages that cover different HR functions and are integrated with other IT systems within the wider organisation. This approach is relatively rare. Only 6% of the respondents to the CIPD 2004 survey indicated using such systems.

These integrated suites of HRIS work packages are now widely available, both as the stand-alone solutions or global, enterprise-wide information systems that support many functional and operational pillars of an organisation. The systems can be specifically tailored to support particular strategic initiatives such as talent management. Although the strategic opportunities for HRIS are recognised, it has been, and continues to be, a difficult journey for many organisations. Nevertheless the introduction and sophisticated use of integrated HRIS can enhance the credibility of the HR specialist and increase recognition of the value they contribute in organisational settings (Lawler and Mohrman 2003; Williams *et al.* 2008).

The actual use of HRIS has been studied in various public and commercial sectors: Ngai and Wat (2006) offer a useful summary of the key empirical studies on HRIS. However, there is limited empirical evidence of such work in the civil engineering and construction sectors. The limited number of other studies undertaken tends to be located in non-UK organisations (for example Ng *et al.* 2001; Florkowski and Olivas-Lujan 2006). Given the highly mobile and transient nature of the construction workforce, HRIS offer a more reliable, accurate and accessible means of human resource planning, reducing labour turnover and targeted training and development.

This paper begins with an exploration of HRIS literature, before discussing the update to a UK-based HRIS survey in the construction sector.

## **HUMAN RESOURCE INFORMATION SYSTEMS**

In the last eight years there has been increasing scholarly interest in the use and exploitation of HRISs, both for HR specialists (the natural users) and also to promote devolved and enhanced HR practice in operational roles. Indeed it is suggested that sophisticated use of HRIS can provide a catalyst for devolved HR practice and reduce the administrative burden (Mills 2008). This has been greeted with mixed enthusiasm by both HR specialised and operational line management.

The CIPD offers some insights from questionnaire based survey work (2003, 2004, 2005) and qualitative case studies (2007). These studies focus on large organisations as the size of an organisation and its operational context implies that a HRIS meets its specific needs and cost constraints (Hendrickson 2003). Some (for example, Hendrickson 2003; CIPD 2004; Ngai and Wat 2006; Williams *et al.* 2008) note that there is an additional need for large organisations to incorporate HR applications with enterprise-wide systems so that HR activities can be directly integrated into operational activities. Examples in construction organisations may include workforce planning and time management for construction projects.

Nationally there has been a steady increase in the number of organisations that have a HRIS and now three quarters (77%) of organisations report using such systems (CIPD 2005). The main use of a HRIS is to 'automate' (Zuboff 1988) administrative tasks such as absence management (90%), reward management (75%), and monitoring training and development (75%) (CIPD 2004). Less than a third of organisations use their HRISs for strategic purposes: HR planning (29%); HR strategy (18%); knowledge management (25%) (CIPD 2004; CIPD 2005). This implies that the majority of organisations have not yet moved beyond the "efficiency and control phase" (Fletcher 2005: 2). There may be a number of reasons for this, but research continues to suggest that in the main this is because:

- HR specialist lack the necessary skills and knowledge to analyse and interpret data and information (Lawler and Mohrman 2003; Williams *et al.* 2008)
- There are concerns regarding the integrity, reliability and consistency of data (CIPD 2004; CIPD 2005).

In implementation of HRISs evidence conclusively suggests that there is a strong correlation between an organisation with good project management skills and knowledge and high satisfaction with a HRIS implementation (CIPD 2004; CIPD 2005).

## **METHODOLOGY**

Seven years ago, a survey of leading construction firms reported that although the use of computers for human resource information in construction was broadly similar to the national average, the utilisation of the systems was extremely limited, restricted to routine administrative tasks (Raiden *et al.* 2001). In order to track trends in the use of HRISs in construction organisations the same survey was repeated early summer 2007. The short self-administered questionnaire was posted to 300 construction organisations in the UK. The respondents were asked about the companies' use of information technology for HRM related functions; which HRIS application, if any, they used; the length of time the system had been in place; the functions for which the HRIS was used; and how satisfied they were with the system. The questions were designed to allow for some comparison with the CIPD's People and Technology research (CIPD 2003, 2004, 2005, 2007). This established survey work has charted the increasing utilisation of IT across a variety of different sectors over recent years. However, due to their practitioner focus they tend toward reportage rather than a detailed analytical and critical discussion.

## **SURVEY FINDINGS AND ANALYSIS**

A total of 62 questionnaires were returned. However, of these only 17 included data sufficient for analysis. Clearly this represents a very low response rate (5.66%) but an analysis of the size of the organisations that responded by number of employees

indicates a significant commitment from the larger employers in the industry. With an average number of employees at 1486, one organisation employed 8000 people, another 3000 people, four around 1000 and three around 500 people. Within the profile of the industry overall (according to BERR 2007 only 126 out of 186,107 firms employed 600+ personnel, which represents 0.07% of all organisations in the industry) the nature of the response is probably indicative of the types of organisations likely to invest in sophisticated HRISs.

All respondents used word processing and spreadsheet applications to support their HR functions. E-mail/ Internet facilities were used by all but one organisation (94.1%). Fourteen respondents (82.4%) indicated using a HRIS. This shows an increase in comparison to 2001 data: spreadsheet applications (91.1%) and e-mail/ Internet (77.8%) were used extensively then too but the percentage of HRIS users in the respondent group was at 60% (Raiden *et al.* 2001).

In 2007, most commonly used HRISs were in-house developed systems. Six organisations (35%) had developed bespoke systems in-house. Of the commercial applications three used Snowdrop. Other systems noted included Coins, Canal, Midland Trent, Compel, Oracle, Teamtrak and Vizual Business Tools. Similar range of systems was recorded in 2001. Thus, the results demonstrate an on-going use of a wide variety of different systems within the industry.

In terms of the length of time HRIS had been in place, in 2001 most had used the system between one and seven years, as the timeline in Figure 1 illustrates. In 2007 the survey recorded more new users, which suggests a marginal increase in the adoption of HRIS software in the construction industry.

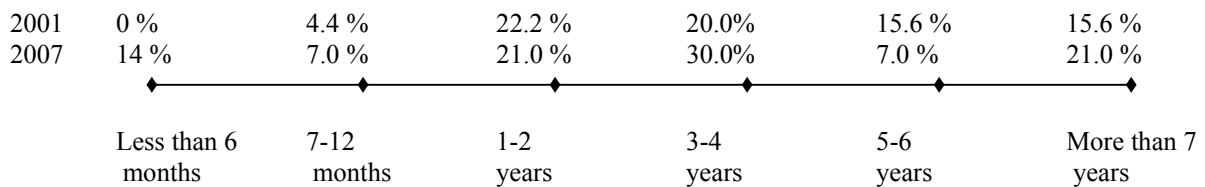


Figure 1: Length in time the respondents had had their system in place

The survey also asked about the main uses of HRISs. As Figure 2 demonstrates, both in 2001 and 2007 employee records, reports and training administration were most commonly cited functions. While there are slight variations in emphasis (for example in attendance, annual leave and equal opportunities monitoring) use of the system is broadly similar. The trend toward increase in the use of systems (also noted above in terms of the length in time the respondents had had their system in place) is evident here too.

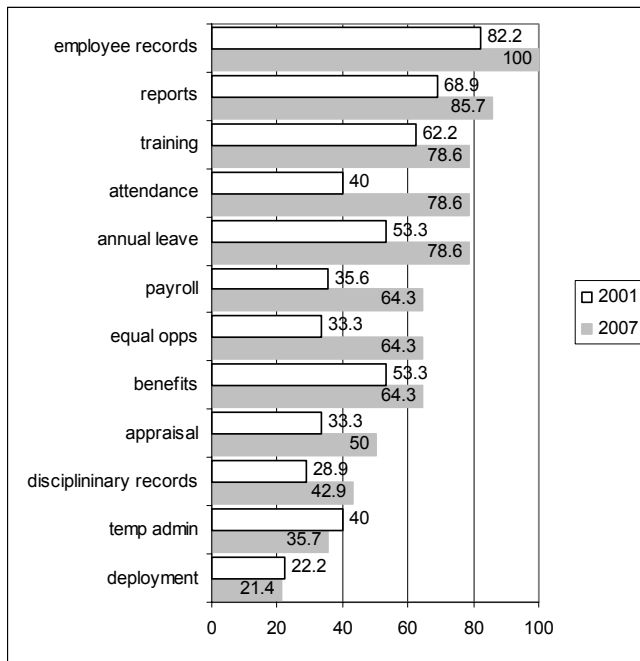


Figure 2: Main uses of HRISs 2001/ 2007

Finally, the respondents were asked to justify their satisfaction with the system in place. In 2001, 65% of the respondents were satisfied with their HRIS. This represents a mean of 2.98 on a scale of 1 (most dissatisfied) – 5 (most satisfied). In 2007 the figure was higher at 3.57. Figure 3 shows the respondents’ satisfaction with regard to HRISs serving different HRM functions (mean satisfaction on the 1-5 scale).

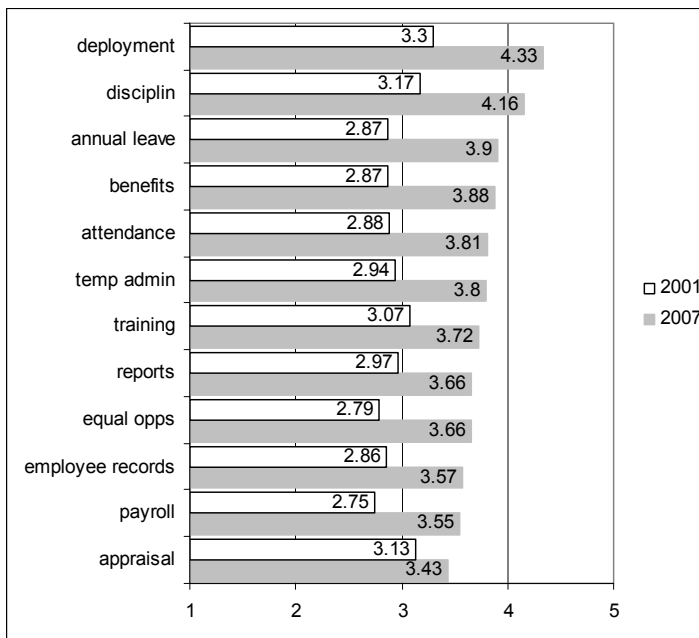


Figure 3: Satisfaction in relation to HRM functions the system is used for

Despite the positive responses on general satisfaction and respondents’ satisfaction with HRIS support for specific HRM functions, the additional comments provided by the survey respondents expressed general dissatisfaction with the implementation of HR systems, even where a bespoke package had been developed for the organisation. Some mentioned that the full potential of the systems was not being realised by their

company. Few were in the process of changing systems. One company highlighted that they were [still] in the process of introducing new elements of the system into the organisation (phased implementation). This was said to cause frustration, within the HR team and management, as everyone involved wanted the process to be quicker. The complexities of simultaneous implementation/ maintenance of the software slowed down the operation. In one organisation, the HRIS implementation process had also identified shortfalls in the existing HRM systems and procedures. These had to be resolved before the completion of the HRIS project. Another organisation had very specific hopes for the HRIS. They were looking into procuring a new system with a view of processing all CITB (ConstructionSkills) grant paperwork more easily. High hopes for improved attendance monitoring were also recorded: "with so many remote workers/sites it is difficult to obtain accurate attendance figures".

## DISCUSSION

Overall, the 2007 questionnaire revealed a significant increase in the main uses of HRISs and levels of satisfaction the respondents recorded. A third of the organisations still rely on bespoke in-house systems. Most of the commercially available systems identified were single HRISs which cover several HR functions that are integrated within the system itself and with other IT systems within the wider organisation. This is the "type 2" HRIS in the CIPD (2004) classification, which 21% of their survey respondents use. Therefore, it is very encouraging to note that construction organisations appear to invest in more sophisticated HR software than is the trend nationally across all organisations.

One of the organisations in the 2007 questionnaire indicated using multiple systems with two or more stand-alone HRIS packages that cover different HR functions, but are not integrated with each other or other organisational IT systems. This corresponds with "type 3" HRIS in the CIPD (2004) classification. Nevertheless, while clearly more sophisticated than simple electronic filing cabinets, these types of HRIS are usually employed to maintain efficiency and control (Fletcher 2005).

In terms of length in time, construction organisations tend to be close to the overall averages reported in Ngai and Wat (2006) as shown in Figure 4. Although data in Ngai and Wat (2006) is not UK specific, the analysis confirms that construction organisations are working to similar timescales with other industries. This should place them at a competitive level in supporting effective HRM practice.

The range of activities that HRISs are used for in construction organisations remains restricted to administrative HR functions. In 2001 the main uses were employee records, reports, training administration, annual leave monitoring and benefits administration. By 2007 there was a particularly significant increase in three key administration areas: attendance monitoring, administration of annual leave and equal opportunities monitoring (see Table 1). This category of compliance -tracking and process-assurance functionality are of great importance in larger firms (Hendrickson 2003), where there is a need to draw from disparate data which are possibly held in separate systems (such as the type 1 single HRIS that covers several HR functions which are integrated within the system itself but not with any other system within the wider organisation). However, taking into account the type of systems in place (in-house developed bespoke packages, type 2 single HRISs which cover several HR functions that are integrated within the system itself and with other IT systems within the wider organisation, and type 3 multiple systems with two or more stand-alone HRIS packages that cover different HR functions, but are not integrated with each

other or other organisational IT systems) this suggest a marked under-utilisation of their capabilities.

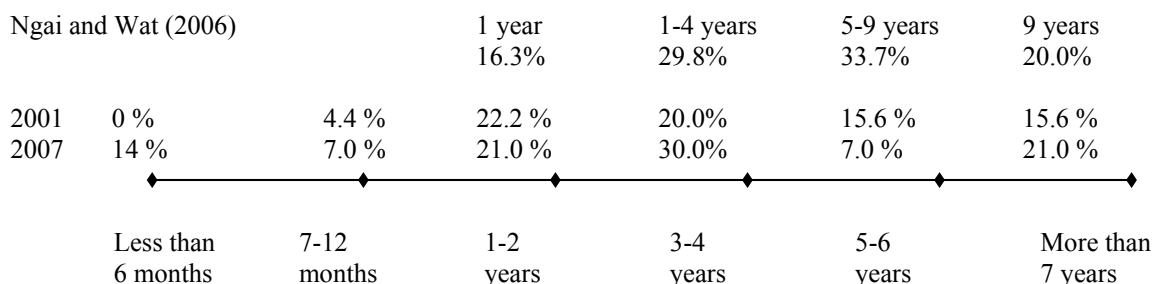


Figure 4: Comparison of the length in time the respondents had had their system in place with data from Ngai and Wat (2006)

Table 1 outlines further key data from three surveys including the two construction-based questionnaires by Raiden *et al.* (2001 and the current data) and the latest CIPD survey (2005).

Table 1: Comparison data

		Raiden et al (2001)	Raiden et al (2007)	CIPD (2005)
Performance management	Appraisal	33	50	47
	Attendance	40	79	85
Staffing	Human resource planning	-	-	29
	Deployment	22	21	-
	Recruitment	-	-	51
	Temporary / fixed term	40	36	-
Training & development		62	79	75
Equal opportunities /diversity		33	64	57

These figures also show an increase in the use of HRIS for performance management, including appraisal and attendance monitoring. Figures in 2007 correspond more closely with the national averages recorded by the CIPD (2005). The other area of significant increase noted above, equal opportunities monitoring, also brings the figures for construction organisations more in line with national averages. In 2001 this was particularly low, nearly 50% lower than similar sized organisation in other sectors (Raiden *et al.* 2001). This is an important development within a sector that is traditionally occupied by white men, but now increasingly interested in diversifying and thus drawing in much wider pool of personnel. Effective monitoring of access, opportunities and success of women, ethnic minorities and other minority groups is crucial for ensuring equitable working practices. Availability of such data is also useful support in the development and evaluation of people management initiatives.

Although the data on staffing activities in the construction industry do not match exactly with the categories in the CIPD survey, close examination of the figures in Table 2 reveals noticeable trends. Both, human resource planning and deployment are strategic HR functions, while recruitment and administration of temporary/ fixed-term contracts staff tend to refer to more operational activities. Such grouping indicates that less than a third of organisations nationally and one fifth of organisations in construction use HRIS to support strategic decision-making. Many more use the

systems to assist in the operational tasks, such as recruitment (half of organisations nationally) or administration of temporary/ fixed-term contracts staff (a third of organisations in construction).

In summary, cross comparison of the national data with figures from construction industry indicate broadly similar trends across the key function in HRM: staffing, training and performance management.

With regards to explanations for the under-utilisation of HRISs in construction organisations (or nationally) little change is evident since 2001. Raiden et al (2001) discussed both general and construction specific issues that may contribute toward this situation (such as the skills and confidence of HR professionals, and the construction industry's inability to quickly adopt new information technologies). What is interesting to note in relation to recent findings from the CIPD (2004, 2005) is the strong correlation between an organisation with good project management skills and knowledge and high satisfaction with a HRIS implementation. Taking that much of the core business in the construction industry is indeed project management, this raises questions about the transfer of knowledge and experience within the organisations internally. Clearly this is an area that warrants in-depth research.

The fourth area explored within the HRISs in construction questionnaires (2001 and 2007) was user satisfaction. Clear increase in the overall satisfaction (from 2.98 in 2001 to 3.57 in 2007) as well as with reference to using HRISs for specific HR activities was noted. As in 2001, there are significant differences between complex, strategic activities such as deployment (very high satisfaction at 4.33) and more systematic, administrative functions such as payroll and employee records (3.55 and 3.57 respectively). Thus, it appears that the more 'advanced' the activity the higher user satisfaction rating. This could suggest that the dynamic environment that the construction industry presents is well suited to the application of HRISs. Such a hypothesis needs confirmation.

Since no construction organisations were included in the CIPD (2007) study that explored the use of HRISs through a qualitative, in-depth methodology our understanding of the particular issues in the industry remain limited. Taking the challenges and characteristics of the industry, and the indicative discussion above, it would be most useful to investigate the use of HRIS in large construction organisations via qualitative methodology. The specific themes to develop on could draw on the greater satisfaction amongst construction organisations in the use of HRISs for the more sophisticated and strategically focused HRM activities and how the presently limited application of HRIS could be expanded to support the management of a geographically disparate workforce. Organisational preferences, traditions and policies are often influential strategically aligning HR and the business priorities. HRIS could support this in terms of value added, but this requires step change from current "efficiency and control" toward "enabling insight and partnership" and ultimately "creating value" (Fletcher 2005).

## **CONCLUSIONS**

There has been a significant increase in the interest and increase in the use of human resource information systems (HRISs) over recent years. Fletcher (2005) describes this evolution in three phases: "efficiency and control", "enabling insight and partnership" and "creating value". In order to track trends in the use of HRISs in construction organisations a repeat of an earlier survey (Raiden *et al.* 2001) was



conducted. The results revealed an interesting mix of ongoing focus on efficiency and control together with a significant increase in the use of HRIS on important functions (such as equal opportunities), high satisfaction ratings on strategic HRM activities and challenges in implementation of the systems. Many important questions are left unanswered.

## REFERENCES

- Alvesson, M. (2003) Beyond Neopositivists, Romantics, and Localists: A Reflexive Approach to Interviews in Organizational Research. *Academy of Management Review*, **28**(1), 13-33.
- Broderick, R. and Boudreau, J.W. (1992) HRM, Information Technology, and the Competitive Edge. *Academy of Management Executive*, **6**(2), 7-17.
- CIPD (2003) *People and Technology*. London, Chartered Institute of Personnel and Development.
- CIPD (2004) *People and Technology: Is HR Getting the Best Out of IT?* London, Chartered Institute of Personnel and Development.
- CIPD (2005) *People Management and Technology: Progress and Potential*. London, Chartered Institute of Personnel and Development.
- CIPD (2007) *HR and Technology: Impact and Advantages, Research into Practice*. London, Chartered Institute of Personnel and Development.
- BERR (2007) *Construction Statistics Annual, Department for Business Enterprise and Regulatory Reform*, London, TSO.
- Florkowski, G.W. and Olivas-Luján, M.R. (2006) The diffusion of human-resource information-technology innovations in US and non-US firms. *Personnel Review*, **35**(6), 684-710.
- Fletcher, P. A. K. (2005) From Personnel Administration to Business-driven Human Capital Management: The Transformation of the Role of HR in the Digital Age. In: Gueutal and Stone (eds.) *The Brave New World of E-HR*. San Francisco, CA: Jossey-Bass.
- Hendrickson, A. R. (2003) *Human Resource Information Systems: Backbone Technology of Contemporary Human Resources*. *Journal of Labor Research*, **24**(3), 381-394.
- Lawler, E. E. and Mohrman, S. A. (2003) *HR as a strategic partner: what does it take to make it happen?* *Human Resource Planning*, **26**(3), 15-29.
- Martinsons, M. G. (1994) Benchmarking Human Resource Information Systems in Canada and Hong Kong. *Information Management*, **26**, 305-316.
- Mills, C. (2008) *Pressure point PMP Research (January)*  
[http://www.evaluationcentre.com/hr\\_software\\_payroll\\_software/strategy/market\\_research.go](http://www.evaluationcentre.com/hr_software_payroll_software/strategy/market_research.go) (Accessed 28 April 2008)
- Ngai, E.W.T. and Wat, F.K.T (2006) Human resource information systems: a review and empirical analysis *Personnel Review*, **35**(3), 297-314
- Ng, S.T. Skitmore, R.M. and Sharma, T. (2001) Towards a human resource information system for Australian construction companies. *Engineering, Construction and Architectural Management*, **8**(4), 238-249
- Raiden, A.B., Dainty, A.R.J. and Neale, R.H. (2001) Human resource information systems in construction: are their capabilities fully exploited? In: Akintoye, A. (ed.), *17th Annual ARCOM Conference*, 5-7 September, University of Salford. Association of Researchers in Construction Management

Williams, H., C. Tansley, *et al.* (2008) Skills and Knowledge of HR IS Project Teams: A Human Capital Analysis. *The Second European Academic Workshop on e-HRM*, Aix en Provence (Carré Le Rouet), France.

Zuboff, S. (1988) *In the Age of the Smart Machine*. New York: Basic Books.