HUMAN RESOURCE INFORMATION SYSTEMS IN CONSTRUCTION: ARE THEIR CAPABILITIES FULLY EXPLOITED?

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Over the past decade many writers and professional practitioners have recognized the substantial benefits that human resource information systems (HRISs) can bring to the human resource management (HRM) function. Such systems can help HRM professionals to improve productivity, control employee benefits, streamline compliance with HR legislation, manage the payroll function, and lower employee resourcing costs. This paper explores the ways in which HR systems are currently used by large UK-based construction firms, as part of a research project which is developing an improved method for the strategic deployment of people within such organizations. It reviews the potential of state-of-the-art software systems to facilitate the management of the resourcing process within the UK contracting sector, and compares this with the findings of a survey of leading construction companies' utilization of HRIS software. The analysis suggests that despite many companies using such software in a limited manner, the full potential of HRISs is not currently being exploited by UK construction companies. This could have negative implications with regards to the strategic deployment, development and retention of human resources in the future.

Keywords: employee resourcing, human resource, information systems, decision making

INTRODUCTION

Since the late 1960s, there has been an increased recognition of the need to incorporate a wider range of information on personnel in order to ensure an effective HRM decision-making process (Tetz, 1974: 10). Accordingly, as information technology (IT) has developed within large companies, many have adopted applications to provide storage for the data required and ensure that clerical costs associated with the HRM function do not escalate. Thus, the use of computers for personnel work has steadily increased throughout the last decade (Hall and Torrington, 1986; Kossek *et al.*, 1994; Richards-Carpenter, 1996, 1997; CIPD, 2000). More recently, 'Human Resource Information Systems' (HRISs) have been developed in order to provide comprehensive expert or decision-support systems specifically to facilitate the HRM function. They provide organizations with a vital tool for supporting the recruitment, selection, deployment and development of people in a way that supports strategic business objectives. Such systems have considerable potential for facilitating the HRM function in industries such as construction, whose dynamic, project-based environment leads to companies having to contend with rapidly changing human resource requirements.

This paper explores the current use of HRISs within large construction companies and examines how they currently support the employee resourcing process. Initially, the paper reviews HRISs systems and examines their capability to facilitate the challenging resourcing context of the UK construction industry. It then discusses the findings of a survey of leading construction contractors which explored the use of HRISs in supporting HRM decision making. The paper concludes by comparing the current utilization of HRISs with the full potential of the systems, and suggests how the improved utilization of the systems could support the employee resourcing process in the future.

THE BENEFITS OF HUMAN RESOURCE INFORMATION SYSTEMS

'HRISs' is the term now used to refer to software aimed at supporting the HRM function within large organizations. Broderick and Boudreau (1992: 17) define HRISs as "the composite of databases, computer applications and hardware and software that are used to collect/record, store, manage, deliver, present and manipulate data for human resources". They identify three types of IT applications suitable to HR needs:

1. *transaction processing/ reporting/ tracking applications* best suited to support routine high volume HR decisions;
2. *expert systems* which seek to improve decisions through rules derived from careful analysis of expert decisions over time; and
3. *decision-support systems* that seek to improve decisions for which the rules are changing or are not well defined, and the right outcomes are unknown (Broderick and Boudreau, 1992: 11-14).

Many writers and professional practitioners have recognized the substantial benefits that HRISs can bring to the efficient management of the HR function (see, for example: Broderick and Boudreau, 1992; Ettorre, 1993; Greenlaw and Valonis, 1994; Kossek *et al.*, 1994; Hosie, 1995; Kinnie and Arthurs, 1996; Edward, 1997; Eddy *et al.*, 1999). The systems have particular capabilities for managing succession planning, management development, career management, and pension and benefits administration (Burack, 1985: 422). They can help HR professionals to improve productivity, control employee benefits, streamline compliance with HR legislation, manage the payroll function, and lower the costs of employee resourcing. In essence, they automate daily administrative HR tasks, integrate cross-departmental activities and ensure the accuracy and consistency of employee records.

Recent developments have led to HRISs having the potential to hold comprehensive, almost endless, databases of employee skills and qualities, including their future aspirations, and produce complex reports mapping the employee abilities and preferences against forthcoming vacancies/ projects.

The latest generation of web-enabled HRISs now also allows employees to update their own personnel records, submit timesheet data, review benefits, request holidays and enrol on training courses. This integration of so many key HRM activities can facilitate both the recruitment *and* retention of staff by delivering automated recruitment features and quantifying the value of total compensation packages (Carter, 2000; Sokol, 2000; McLeod, 2001). However, the key espoused benefits of automating HRM processes is that it leaves HR professionals more time to focus on strategic activities, and provides information for them to be able to turn their

employee assets to a source of competitive advantage (Cabrera and Boneche, 1999: 51). Thus, HRISs are revolutionizing the HR function by providing up-to-date information, services to employees, return on investment, and strategic analysis and partnership (Greenlaw and Valonis, 1994; Miller, 1998).

EMPLOYEE RESOURCING CHALLENGES IN CONSTRUCTION

Employee resourcing refers to the recruitment, selection and deployment of staff to project teams, departments and operating divisions within an organization (Dainty *et al.*, 2000). This encompasses aspects of training and development, performance management, staff retention and release form the organization. The construction industry's dynamic project-based environment sets an extremely challenging context for employee resourcing. Organizations have to respond to the fluctuating markets in which they operate, the temporary nature of construction teams and the expected and unexpected changes in the resourcing requirements and skills requirements during projects. This places extreme demands on both HRM departments and line managers, and requires a flexible approach to the employee resourcing function in large construction organizations (Dainty *et al.*, 2000).

Many researchers commentating on the approach of construction firms to dealing with the problems of HRM in such a dynamic sector have recognized the relationship with Atkinson's 'Flexible Firm' framework of HRM (Winch, 1986; Druker and White, 1996; Langford *et al.*, 1995; Dainty *et al.*, 2000). Atkinson's (1986) framework provides an effective response to the economic pressures faced by construction organizations and embodies the way in which they adapt to their labour force requirements. However, although Atkinson's model provides a framework for responding to changing business needs, it does not provide a method of developing and deploying people in a manner that is mutually beneficial to both themselves and the organization. HRISs offer the potential to recognize and integrate the individual needs, preferences and requirements of employees' with the achievement of business objectives by suggesting optimal solutions to particular resourcing requirements. This could have long-term benefits in relation to the retention and development of staff, and hence in meeting the future succession management plans of the organization.

The work in this paper forms part of a research project which aims to address the current ad-hoc approach to employee resourcing within such companies. The initial findings of this work suggested that neither a centralized nor a devolved approach HRM framework offers an effective resourcing paradigm within large construction companies, but that a balance between these two extremes may provide better HR planning and scheduling within the industry (Dainty *et al.*, 2000). This paper builds on these findings by exploring how the use of a computerized HRIS system could enhance the resourcing process within such a balanced system.

METHODOLOGY

As a preliminary explanation of the current use of HRISs in construction, a short postal questionnaire survey was administered to 100 leading medium-large construction organizations in the UK. The respondents were asked to state: their use of information technology applications for human resource 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. In order to facilitate a reasonable response, four options for returning the

survey were offered to respondents; by pre-paid return envelope, fax, e-mail or an on-line web-based questionnaire. The questions were designed to allow a comparative analysis with the annual *Computers in Personnel Survey* which is carried out by the Chartered Institute of Personnel and Development (CIPD) and Institute for Employment Studies (IES) (see Robinson *et al.*, 1999; CIPD, 2000). This established survey has charted the increasing utilization of IT across a variety of different sectors over recent years. Hence, questions were extracted from this survey and asked to the construction companies surveyed so that a comparison could be made with other business sectors.

Following the initial returns of the questionnaire, a series of short telephone interviews was conducted with a sample of the original informants. Respondents who had showed interest in the results of the survey and specified using HRIS for appraisal records and/or to deploy staff to projects were contacted and asked to elaborate on their answers to the questionnaire. This provided some additional qualitative data to complement the survey results such as details of user experiences and utilization characteristics.

RESULTS

A total of 44 of the organizations returned the questionnaire, 43 by pre-paid envelope and 1 by fax. All of the companies responding to the survey directly employed several hundred employees, and each had a defined personnel or HRM department. Whilst this level of response is relatively high for a postal questionnaire survey, none of the respondents used the e-mail or internet-based versions of the form, which in itself suggests a potential under-utilization of IT applications. The results are discussed below under headings extracted from the questionnaire survey.

**Information technology applications used for HRM related functions**
The respondents were firstly asked to state which IT applications they used for HRM related functions. Of the range specified, spreadsheet applications (91.1%), e-mail/ Internet facilities (77.8%) and database applications (68.9%) were most commonly used packages. Just over half (60.0%) of the respondents specified that they used a HRIS.
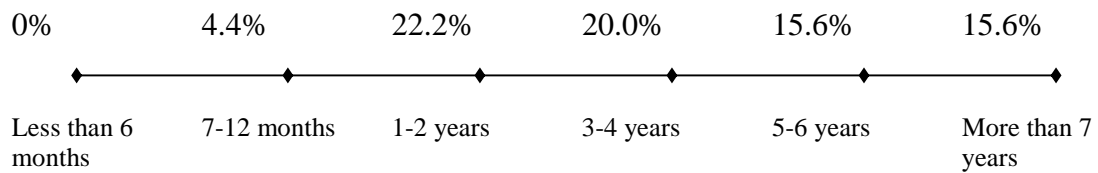
HRISs used
The second question asked the respondents to state which specific HRIS, if any, they operated. Most commonly used HRISs were in-house developed systems (26.7%). Figure 1 shows the distribution amongst other systems. The 'other' answers (20.0%) included P.W.A., PS2000, Cyborg, Team Spirit, Job master and Coins, all well-known generally available packages. Considering that only a little over half (60.0%) of the respondents specified using an HRIS, the results demonstrate the use of a wide variety of different systems within the industry.

Length of time HRIS in place
Respondents were asked to specify how long they had an HRIS system in place. Of those respondents using such a system, most had being in place from between one and seven years, as the timeline in Figure 2 illustrates. None of the respondents had used the system for less than 6 months, although 22.2% of respondents failed to answer the question.
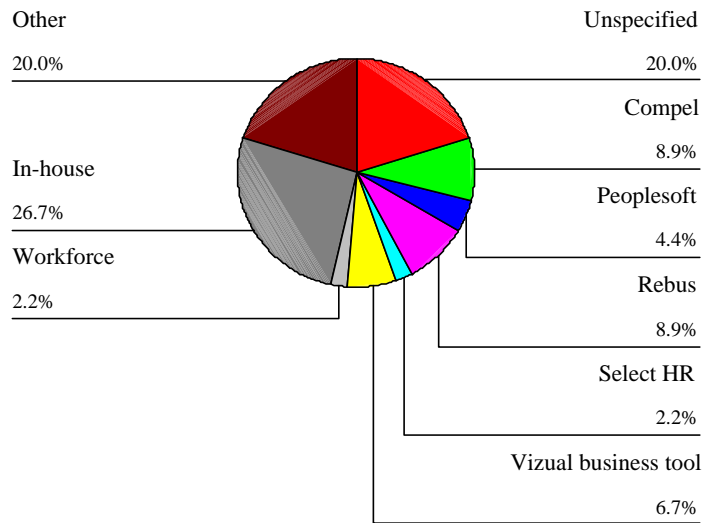
Figure 1: Use of HRISs by Large Construction Companies

Figure 2: Length in time the respondents had had their system in place
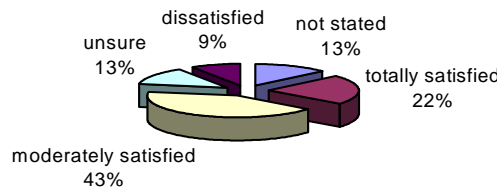
Functions HRISs used for

Question 4 asked respondents to specify the functions for which they used their HRIS. As Figure 3 demonstrates, employee records (82.2%) and reports and enquiries (68.9%) were most commonly cited functions, followed by training administration (62.2%). 'Other' answers (4.4%) included recruitment and recording site location.
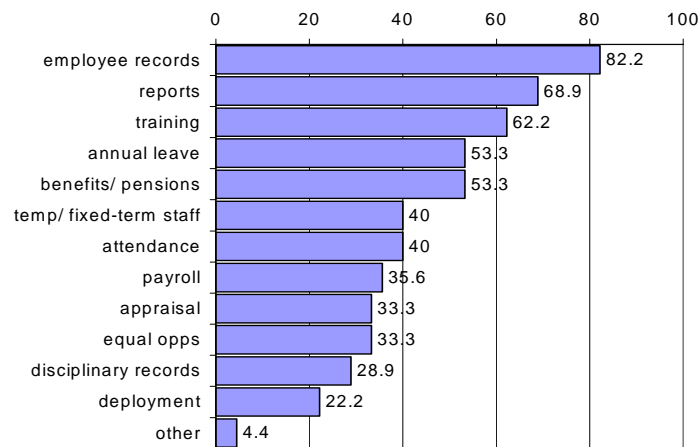

Figure 3: Main uses of HRISs

Justification/ satisfaction re HRIS

Finally, the respondents were asked to justify their satisfaction with the system in place. Figure 4 shows that overall, 65% of the respondents were satisfied with their HRIS. This represents a mean of 2.10 on a scale of 1 (most satisfied) – 5 (most dissatisfied).
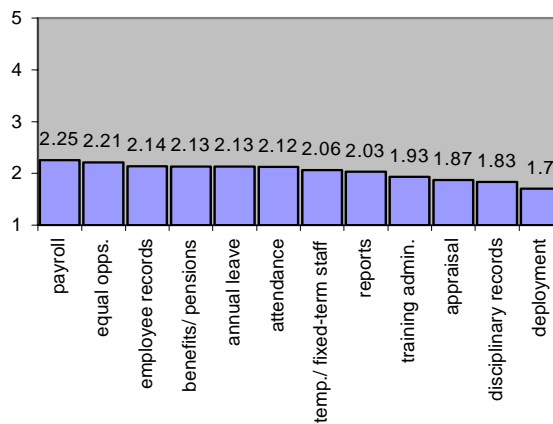

Figure 4: Satisfaction with the HRIS in place

Figure 5 shows the respondents' satisfaction in relation to specific HRISs used and Figure 6 their satisfaction with regard to HRISs serving different HRM functions. Both show mean satisfaction on the 1-5 scale identified above.
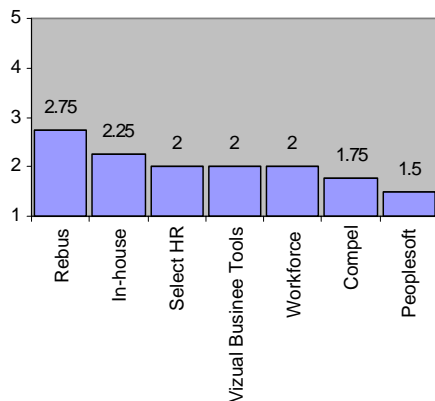
Figure 5: Satisfaction in relation to specific HRIS

Figure 6: Satisfaction with HRIS in relation to HR functions the system is used for

Additional comments and telephone interviews

The survey provided the respondents with an opportunity to write additional comments on their use and opinion of HRISs. Although few took this opportunity, those that did generally expressed dissatisfaction with their systems, even where a bespoke package had been developed for the organization. However, others mentioned that the full potential of the systems was not necessarily being realized by their company. Accordingly, the follow-up telephone interviews were used to explore precisely how the organizations used their HRISs to manage HRM functions such as staff deployment, development and performance appraisal. The interviews confirmed the questionnaire data. Rather than facilitate decision-making through making suggestions as to appropriate deployment, training and career development activities, HRISs were merely used to extract information on employees as required by managers. Informal developmental activities, such as work-based learning, were not

recorded in the HRIS, and access tended to be restricted to those with the responsibility of maintaining the data within the systems, rather than the line management staff who could have utilized the information in their day-to-day HRM decision-making.

DISCUSSION

Comparison with national trends in HRIS utilization
The results of the questionnaire survey indicate that a relatively high number of large construction organizations use computers for HR related functions. The number of responding companies using HRIS technology closely corresponds with the national average (see CIPD, 2000) with in-house developed systems, *Rebus*, *Peoplesoft* and *Vizual Business Tools* the most frequently used systems. However, the range of activities that HRISs are used for in construction remains fairly limited and suggests a marked under-utilization of their capabilities. Only using HRISs for training and annual leave administration scored higher than the national average recorded in the CIPD survey. The industry's application of HRISs for maintaining employee records, managing temporary/fixed-term staff administration and monitoring attendance was 10-20% lower than the national average. Moreover, their application to the monitoring of workforce diversity and equal opportunities was nearly 50% lower than similar sized companies from other sectors. Interestingly, in the context of this research, HRISs were also only used for managing deployment in 22.2% of the companies responding. This suggests an under-utilization of HRISs for managing the deployment function.

One of the fundamental arguments for the utilization of HRIS technology is its ability to support HR managers' decision-making in training provision, employee development and project deployment. Traditionally, these activities have been based on manager's subjective value-judgements based on their assessments of human resource capabilities and organizational or project requirements. Despite the obvious advantages of supporting these decisions with an objective needs-based analysis, construction organizations appear not to exploit HRIS technology to facilitate this process. Despite the sophisticated nature of HRIS software, such packages are currently being used as little more than HR databases, even when developed as bespoke packages in accordance with the operational needs of the organization.

Explaining the under-utilization of HRISs in construction
There are several reasons why construction companies have been slow to embrace HRIS technology and exploit its capabilities. The technology is relatively new and so companies may not have had time to collect and input the data required to fully utilize their systems' capabilities. Another explanation could relate to the industry's known inability to quickly adopt and utilize new information technologies (Mitropoulos and Tatum, 1999: 330). Studies in other sectors have also shown that personnel professionals tend to lack expertise in computer use (Hall and Torrington, 1986; Kossek *et al.*, 1994), which could also be the case in construction.

The HRM literature provides a number of explanations as to why IT has failed to make a significant impact on the HRM role. This research evidence suggests that many HR professionals' use of IT largely focuses on routine administrative tasks rather than more complex decision-support modelling (Hall and Torrington, 1986; Kinnie and Arthurs, 1996; Richards-Carpenter, 1996, 1997; Edward, 1997; Carter, 2000; CIPD, 2000; Tansley and Watson, 2000). Factors that may affect the low use of

computers within the personnel function have been identified as: the general belief that people decisions cannot be made by a computer, an inability to use databases and spreadsheets effectively, a fear of contravening data protection legislation and a lack of knowledge of the abilities of the software (Kossek *et al.*, 1994; Kinnie and Arthurs, 1996; Kingsbury, 1997). However, this under-utilization seems even more acute in construction despite the relatively high number who had invested in the software.

User satisfaction of HRIS software in construction

Despite the narrow utilization of the capabilities of the HRISs, most respondents seemed generally satisfied with the system in place (65% stated being totally/ moderately satisfied). However, further analysis of these figures suggests significant variations in satisfaction depending upon the specific HRM related functions to which the systems were applied. For example, it appears that the more 'advanced' or strategically focused the activity (e.g. facilitating employee performance management, training and deployment), the higher the user satisfaction rating. This infers that construction companies that do utilize HRISs for complex HRM tasks derive considerable benefit from their application. This contrasts markedly with the CIPD's and IES's research findings, which highlighted significant dissatisfaction amongst its respondents with the more sophisticated features of HRISs (CIPD, 2000: 5). This could suggest that the complex and dynamic resourcing environment that the construction industry presents is better suited to the application of IT-based systems, as it is precisely in this environment that the most benefit can be derived.

The survey did not explore in-depth who had responsibility for managing aspects of the HRM function within the large companies surveyed. However, the results of the telephone interviews suggested that it tends to be only HRM staff who have access to HRISs within the companies studied. This greatly restricts the potential for the exploitation of HRISs if aspects of the HR function are devolved to line management, as appears to be the case in many construction companies (Dainty *et al.*, 2000). However, line managers and employees updating their own records could save considerable time and further focus on the strategic issues of people management within their organizations if they could use HRIS technology effectively. The latest systems have very few limitations to their adaptability and offer the potential to revolutionize the HR function if utilized efficiently. Further research into the processes of construction employee resourcing is currently being conducted as part of this study. This will include a detailed analysis of how existing software could support HR resourcing decisions in project-based environments.

CONCLUSIONS

The HRM literature and leading-edge HRM practice demonstrate an increasing recognition of the numerous benefits that HRIS technology can bring to the management of human resources. Even the most basic systems offer the potential to automate administrative tasks and free up time to concentrate on the strategic decision-making processes that now characterize the HRM function within large organizations. In the context of the construction industry's challenging employee resourcing operations, HRISs offer even greater potential to facilitate the optimization of complex human resource planning and forecasting processes. Thus, used effectively, HRISs could enhance the overall development and retention of staff within the industry.

The survey has suggested that the use of computers for human resource information in construction is broadly similar to the national average. However, the current utilization of such systems is extremely limited, and remains restricted to routine administrative tasks. In particular, the under-utilization of HRIS technology for managing employee deployment emphasizes the need for this research. The ongoing research project to which this survey forms a part is seeking to address the current ad-hoc approach to employee resourcing within large construction organizations and develop a more appropriate framework to inform the strategic use of human resources in the future. Utilizing the extensive capabilities of HRISs is likely to prove crucial in supporting this model and encourage wider use of such systems in the future. Thus, their potential in facilitating HRM activities will be examined as an integral aspect in the future.

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