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Lin, C. Y. Y., (1997). Human Resource Information Systems: Implementation in Taiwan, *Research and Practice in Human Resource Management*, 5(1), 57-72.

Human Resource Information Systems: Implementation in Taiwan

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ABSTRACT

Approaching the new century, human resource information systems (HRIS) capitalize on the synergy between the two precious assets, human resources and information technology. This study examines the content and context of HRIS in Taiwan. Research shows that higher HRIS level (DSS>MIS>EDP), usage by top managers, usage by HR staff, and HRIS experience contribute to greater organizational support and HRIS effectiveness. Training, support of the information systems department, involvement of human resource leaders, and computer literacy of HR staff are the most significant contributors to the effectiveness of HRIS. In addition, more emphases on support for decision making, timeliness, comprehensiveness, and accuracy can also enhance systems effectiveness.

INTRODUCTION

In an era striving for excellence, human resources become a crucial source of competitiveness (e.g., Porter, 1985; Ulrich, 1987). Pfeffer(1995) reported that the five best performing firms from 1972 to 1992 in the USA rely not on technology, patents, or strategic position, but on the management of their work force for sustained advantages in the marketplace. The business community also realizes that after people, information is its most important asset (Jenkins and Lloyd, 1985). During the past decade, information technology has greatly impacted the way businesses are managed. Reports on how information technology helps companies create and sustain advantages are abundant (e.g., Broderick and Boudreau, 1991; Kossek et al., 1994).

Human Resources (HR) and information technology are the two elements that many firms are learning to use as strategic weapons to compete (Jenkins and Lloyd, 1985). To capitalize on the synergy between these two assets, human resource information systems (HRIS) is an emerging area that may lead human resource management into a new era. In a 1991 report on HRIS, Richards-Carpenter (1991) noted that " If the personnel function is to take the next big step in its development, it will have to integrate with information technology " . HR executive of Federal Express, James Perkins believes that now and in the future, excellence in HR will be defined through the strategic use of information (O ' Connell, 1994). Wagel (1990) also reported that human resource practitioners and scholars had predicted more HR input into the decision-making process and in increasing utilization of computer technology to compile and analyze HR data in the 1990s.

HRIS are designed to support the planning, administration, decision-making, and control activities

of human resources management (DeSanctis, 1986). They have enormous potential to make HR more competitive and thus enable human resource departments to become strategic partners in business organizations (Broderick and Boudreau, 1992; Kossek, 1994). Pasqualetto (1993) argued that HRIS should help reengineer human resources processes to maximize their effectiveness and evolve from capturing information to managing change. The benefits of HRIS are yet to be fully exploited. Many personnel specialists are using the computer as no more than an electronic filing cabinet or for routine operational tasks (Kinnie and Arthurs, 1993).

In Taiwan, computerization of HR information is increasingly catching management ' s attention. Investments in off the shelf personnel information systems, outsourcing of custonierized systems, and self developed systems are observed. Yet, informal interviews with human resource practitioners reveal that obstacles exist, ranging from a lack of top management support to an ignorance of HRIS. In Taiwan, HRIS is rarely discussed in human resource articles and academic literature. This study is prompted by (a) the critical role HRIS should play in strategic human resource management, (b) the desire to promote human resource information systems to a decision support level, and (c) the intention to simplify the application of this strategic tool. It attempts to map out main HRIS modules and probe present HRIS practices in Taiwan for further improvement.

BACKGROUND

The HRIS is used to acquire, store, manipulate, analyze, retrieve, and distribute pertinentinformation regarding an organization ' s human resources (Kavanagh et al., 1990: 16). Its development has been evolutionary. Before the 1960s, computer systems had a very limited purpose in human resource management and were used only to monitor employee records and payroll activities. During the 1970s, in the USA, most organizations of more than a few thousand employees developed some form of personnel data system (DeSanctis, 1986). Decreasing computer costs also helped encourage establishment of the systems. By the 1980s, 40% of U.S. corporations had HRIS (Richards-Carpenter, 1982). More recently, HRIS is being advocated to support decision-making processes in order to gain sustained competitive advantages (Broderick and Boudreau, 1992).

The breadth and depth of computerization in human resource information varies depending on its developmental stage. To simplify the terminology, in this work HRIS represents computerized personnel information that helps facilitate human resource management (HRM), ranging from simple record-keeping to sophisticated decision support systems. Benefits of employee involvement through company-wide communication channels (Frolick, 1994; Mentzas, 1994) and employee development via self-paced, computer-based training will not be covered. Emphasis will be given to the contents of HRIS and the context of HRIS.

Contents of HRIS

Kavanagh et al. (1990) stated that HRIS functions interactively with human resources management systems such as human resource planning, staffing, training and career development, performance management, and compensation management. They further explained HRIS in a three level continuum, namely electronic data processing (EDP), management information system (MIS), and decision support system (DSS). For easy reference, a comparison of these three levels of HRIS is presented in Table 1. Combinations of these systems can occur within a single firm (Kavanagh et al, 1990).

Table 1
Comparisons of the Three Levels of HRIS

Dimension	EDP	MIS	DSS
Target Users	Basic level operators	Middle managers	Top managers and executives
	Data, files, storage,	Information retrieval, Plan	" What if " analysis

Focus	transaction processing, and reports	and analyze data against expected values, Integration	through use of models, generation of decision alternatives
Characteristics	Basic personnel information	Inquiry capability, report-generation capability	Interactive for users
Examples	Payroll	Turnover reports, age and gender distribution, EEO compliance report	Human resource planning, compensation simulation

Most HRISs are organized by modules which help users to deal with HR data more effectively (Kavanagh et al., 1990). Users can generate calculations or reports that enhance administrative procedures and decisions in one or more functional areas. Therefore, a modular approach is adopted here to map the major contents of HRIS and their relationship with HRM systems. A list of HRJS modules may help novices in system implementation and experienced users to refine and advance existing systems. A matrix of 15 cells is presented in Table 2, which describes three levels of HRIS (EDP, MIS, DSS) and five human resource management functions (human resource planning, staffing, training and career develbpment, performance management, and compensation management). The most commonly used modules are placed into appropriate cells for easy reference. Table 2 is not an exhaustive list of HRIS modules, rather it is a matrix to provide a general description of HRIS that may be applicable to Taiwan. Therefore, modules for equal employment opportunity and affirmative action etc. are not included. It should also be noted that some modules may not be confined to a certain function. A function such as performance appraisal can be a performance index as well as an indicator for human resource planning or training. The depth of application also varies with the business environment. For example, applicant tracking can be an automated applicant administration system at the data processing level, it can also be performed at the decision support level as a recruiting strategy. Modules are placed into the cells where they are most likely to be used. The major purpose of the matrix is to provide a general frame of reference which companies can look to in the initial stages of development. The matrix can be modified to suit individual company needs.

Table 2
HRIS Modules by Level and by Function

Function\Level	EDP	MIS	DSS
Human resource planning	Skills inventory	Turnover analysis, Organizational charting	Succession planning, Work force dynamics analysis
Staffing	Basic employee information, Applicant tracking	Recruitment analysis, Selection analysis, Position analysis, Manpower structure analysis	Staffing simulation
Training and career development	Employee training data, Training courses Career profile	Training needs analysis, Training cost-benefit analysis, Promotion analysis	Career management simulation, Training evaluation and decisions
Performance management	Performance data	Performance appraisal analysis, Attitude survey, Attendance management analysis, Productivity analysis	Performance management simulation
Compensation management	Payroll, Health insurance Routine reports (e.g. income tax)	Personnel cost analysis Compensation structure analysis	Compensation management simulation

Context of HRIS

Implementation of HRIS is an organizational change (McElroy, 1991). For any change, resistance is

expected: To ensure successful HRIS implementation, context issues need to be assessed. Six influencing factors are identified from the literature. Wong et al. (1994) commented that for system acceptance the most needed support comes from top management. Jones and Arnett (1994) reported that the involvement of chief executive officers has been rigorously examined as a key factor in information systems performance. Pitman (1994) cited visible management support and commitment as critical success factors. Kavanagh et al. (1990) also said that top management support is crucial to the success of HRIS.

The second source of impact is the support of information system (IS) department. In the evolution of HRIS, the IS department plays a major role in facilitating the computerization of human resource information (e.g., Kinnei and Arthurs, 1993). DeSanctis (1986) concluded from her survey that although the HRIS has established independence from corporate MIS, it has not yet matured to be an independent entity within the personnel area in a large number of firms. Cholak & Simmons (1991) also mentioned that an HRIS still requires the participation of IS department, particularly in the planning and developmental stages.

The third variable that may affect the implementation of HRIS is the involvement of human resource leaders. As HR computer use increased, Lederer (1984) reported that more and more firms formally housed the HR computer systems within the HR department. He also commented that the personnel department is in the best position to obtain and keep an organization ' s management commitment to an HRIS. HR department should be responsible for advocating the project, providing justification for the HRIS, and for resources acquisition. However, Kossek et al. (1994) found that in corporations, the higher the positions in the human resources department, the more negative they become toward the HRIS. Their interviews revealed that HRIS use is viewed as a clerical activity that does little to enhance HR ' s reputation. In addition, an HRIS may foster increased information sharing. Since information is power, the HRIS has the potential to change the power dynamics (Kossek et al., 1994).

The fourth element is the support of HR staff. Resistance to change and computer phobia are impediments to HRIS implementation. Pitman (1994) said that user participation is a critical factor to successful change. Since clerical staff have considerable responsibility in system operations, their support is crucial.

The fifth influence is the level of computer knowledge of the HR staff. Lack of computer knowledge has been attributed to slowness in applying information technology to human resources departments (Kavanagh et al., 1990). Kossek et al. (1994) also mentioned that user skill level may be strongly related to the variance in attitudes toward the value of an HRIS.

The sixth context variable is HRIS training. Computer skills training for relevant employees helps achieve optimal HRIS effectiveness (O ' Connell, 1994). Denton (1987) and DeSanctis (1986) described that one of the potential problems of HRIS management is a lack of employee technical training and experience in information management. Kavanagh et al. (1990) also commented that for a successful HRJS, appropriate training should go to all HR staff, line managers, as well as other employees.

The literature indicates that successful HRIS implementation relies on the support of top management, the support of the IS department, the involvement of human resource leaders, the support of human resource staff, the computer knowledge of HR staff, and HRIS training. These six context variables are later termed organizational support. The degree of organizational support will also be investigated in this study.

METHOD

The data reported here was obtained from a postal survey. A questionnaire was designed to assess current HRIS practices in Taiwan. The questionnaire provided data on company characteristics, hardware deployment, major sources of software, estimated expenditure on software, departments responsible for the design and maintenance of HRIS, perceived HRIS level, utilization of HRIS in terms of users and frequency, and a checklist of HRTS modules based on Table 2. The status of

organizational support, namely the support of top management, support of the IS department, involvement of HR leaders, support of HR staff, the computer knowledge of HR staff, and HRIS training were assessed on a 5-point scale.

Based on the 1994 Directories of the Human Resources Development Association and Chinese Human Resource Management Association in Taiwan, all members with the title of human resource (personnel) manager were selected. In February 1995, questionnaires were distributed to the selected 240 managers.

RESULTS AND DISCUSSION

Sample Characteristics

The characteristics of the responding companies are as follows. In total, 112 questionnaires were returned with a response rate of 46.7%. Among them, 109 copies were usable. Table 3 exhibits the characteristics of the responding companies. The data show that 92% of the companies have computerized their personnel information; about half of them have had their personnel information computerized in some form for more than 6 years; about half of them are foreign firms or joint ventures; and about 33% of them hire less than 250 employees. In comparison, a 1988 survey of 1000 "Personnel Journal" subscribers revealed that 99.8% of the respondents used computers in one capacity or another in the human resources function (Magnus and Grossman, 1985).

Table 3
Characteristics of Responding Companies

Characteristics	Grouping	Number	Percentage (%)
Age of company	30 +	23	21.5
	21 - 30	21	19.6
	11 - 20	33	30.8
	10 -	30	28.1
Computerization	Computerized	100	91.8
	Not computerized	9	8.2
Years of HRIS implementation	10 +	25	27.1
	7 - 9	19	20.7
	4 - 6	31	33.7
	3 -	17	18.5
Company ownership	Local Taiwanese	56	51.4
	USA and joint-venture	28	25.7
	Other foreign firms and joint-venture	25	22.9
Industry	Manufacturing	64	59.3
	Service	44	40.7
Employee number	1001 +	21	19.6
	501 - 1000	27	25.3
	251 - 500	24	22.4
	250 -	35	32.7

Current HRIS Practices in Taiwan

Tables 4 and 5 exhibit some characteristics of current HRIS practices in Taiwan. To determine the status of hardware and software usage, respondents were requested to allocate a percentage of resources (total 100%) to those categories applicable to their companies based on frequency of utilization. The most typical hardware to be deployed is the stand-alone PC. About 62% of the software is self- developed, which indicates that the majority of the responding companies employ

personnel with information systems background to develop their own HRIS. About 60% of the companies spent less than US$16,000 on HRIS software, the smallness of which may be related to the high percentage of software self-development. It may also indicate that company-specific HRIS is preferable in Taiwan.

Table 4 also shows that in 69% of the responding companies, the human resource department plays a major role in designing the HRIS. This finding is consistent with Lederer ' s (1984) advocacy of human resource department taking the responsibility for HRIS development. In a survey, Cholak and Simon (1991) reported that 63% of respondents believed that their needs are more satisfactorily met when the HRIS is controlledby the HR department. However, in the maintenance stage, the IS department seems to have increasing control in this study. Perhaps ongoing modification of the system or maintaining an effective HRIS requires more technical knowledge than typical HR staff have available. For HRIS level (EDP, MIS, DSS), three quarters of the respondents reported that their present focus is on management information systems.

Table 4
Current HRIS Practices in Taiwan

	Grouping	Number	Percentage (%)
Hardware deployment	PC-standalone	—	36.14
	PC-network		19.35
	PC-mainframe		17.60
	Mini computer		11.36
	Mainframe computer		8.28.
	PC-Mini computer		7.25
Major source of software	Self-development	—	62.2
	Outsourcing		19.37
	Purchasing from shelf		18.43
Software expenditure	US$8,000 -	32	32.7
	US$8,001 - 16,000	27	27.6
	US$16,000 +	39	39.8
Responsible dept. - planning & designing	HR in charge, IS assist	63	69.23
	IS in charge, HR assist	16	17.58
	HR in charge	11	12.09
	IS in charge	1	1.10
Responsible dept. - maintenance	HR in charge, IS assist	35	38.46
	IS in charge, HR assist	30	32.97
	HR in charge	12	13.19
	IS in charge	14	15.38
Self-reported level of HRIS	EDP	12	12.1
	MIS	74	74.7
	DSS	13	13.2

As for the end users and the frequency of HRIS utilization, Table 5 shows that on a 5-point scale (5 being the most frequent), human resources staff are the most frequent users (mean 4.62), followed by human resources managers (mean 4.25) and top managers (mean 3.16). In this study, 43.1% (12.6%+30.5%) of top nianagers and 27.1% (4.2%+22.9%) of line managers are frequent system users, whereas a 1993 survey in the USA reported corresponding statistics of 27% and 36% (Richards-Carpenter, 1993). The differences may be related to different time frames and samples, however, the recognition of HRIS by top management in Taiwan is clear. Richard-Carpenter (1994) also predicted that in the future, HRIS will be used directly by the line managers and

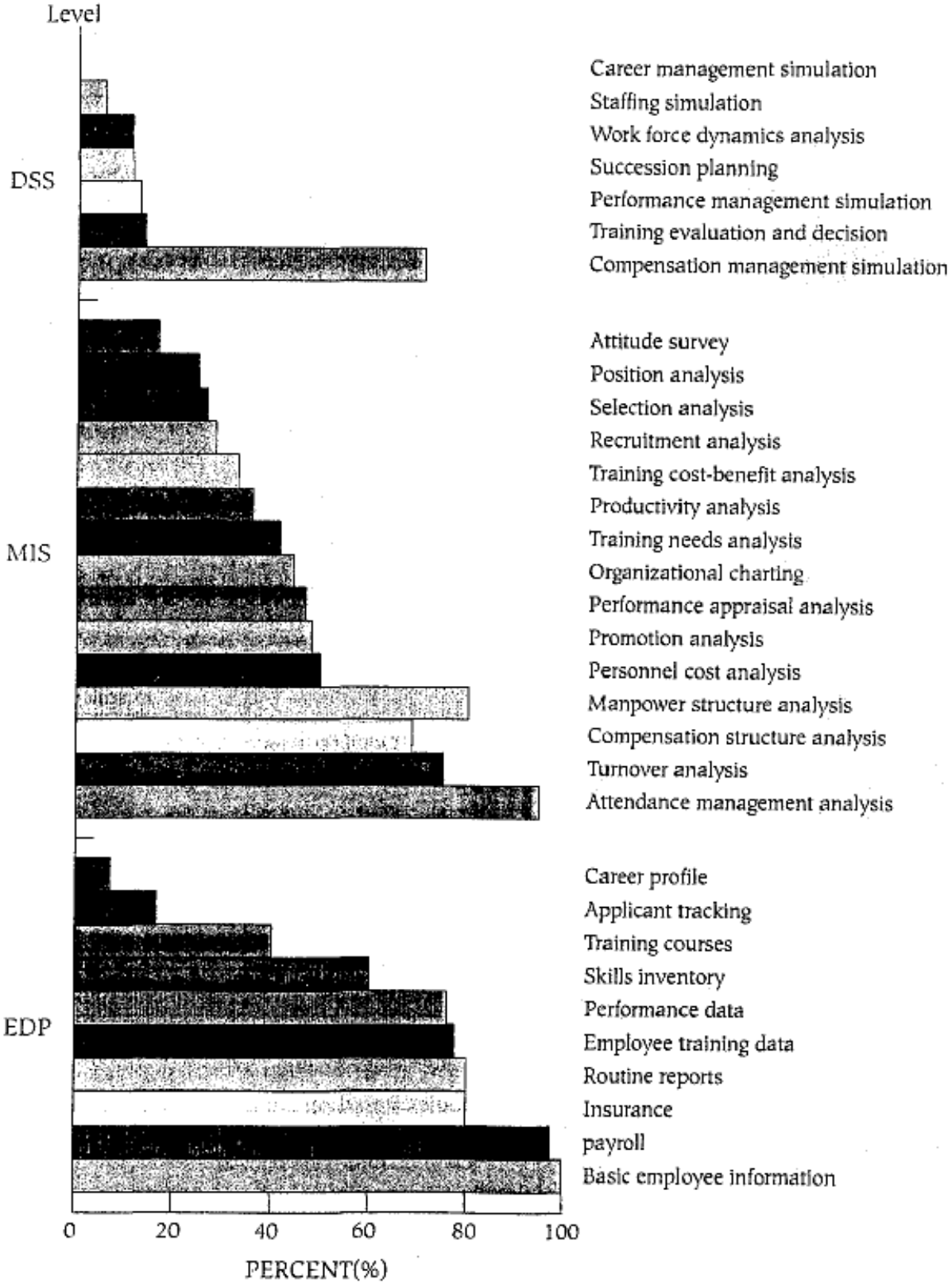
become part of their integrated support systems. With this in mind, line managers should be more aggressively introduced to the potential benefits and the existing capabilities of HRIS systems. The finding that non-HR and non-IS employees use the system the least is expected. Yet, it deserves further attention. Using the HRIS system, employees company-wide can communicate more effectively with management, obtain access to company information for personal advancement such as job availability and other career opportunities, and check basic data to ensure their own rights etc. If all employees can be trained to update their own personal data such as address changes, training completed, skills acquired etc., the HR staff can also be liberated from these time consuming routines enabling planning and design improvements. HRIS can thus create added value if the system is effectively designed and utilized.

Table 5
Frequency of the HRIS Utilization by Various Users

Users	Frequency No.(%)					mean/S.D. (5-point scale)
	Always	Often	Sometimes	Seldom	Never	
Top manager	12 (12.6%)	29 (30.5%)	26(27.4%)	18 (18.9%)	10 (10.5%)	3.16/1.19
HR manager	52 (52.5%)	27 (27.3%)	14(14.1%)	5(5.1%)	1(1.0%)	4.25/0.95
Manager of other dept.	4(4.2%)	22 (22.9%)	33(34.3%)	24 (25.0%)	13 (13.5%)	2.79/1.08
HR staff	70 (71.4%)	20 (20.4%)	5(5.1%)	1(1.0%)	2(2.0%)	4.62/0.78
MIS staff	13 (13.7%)	21 (22.1%)	26(27.4%)	19 (20.0%)	16 (16.8%)	2.96/1.29
Other employee	6(6.2%)	11 (11.5%)	19(19.8%)	26 (27.1%)	34 (35.4%)	2.26/1.23

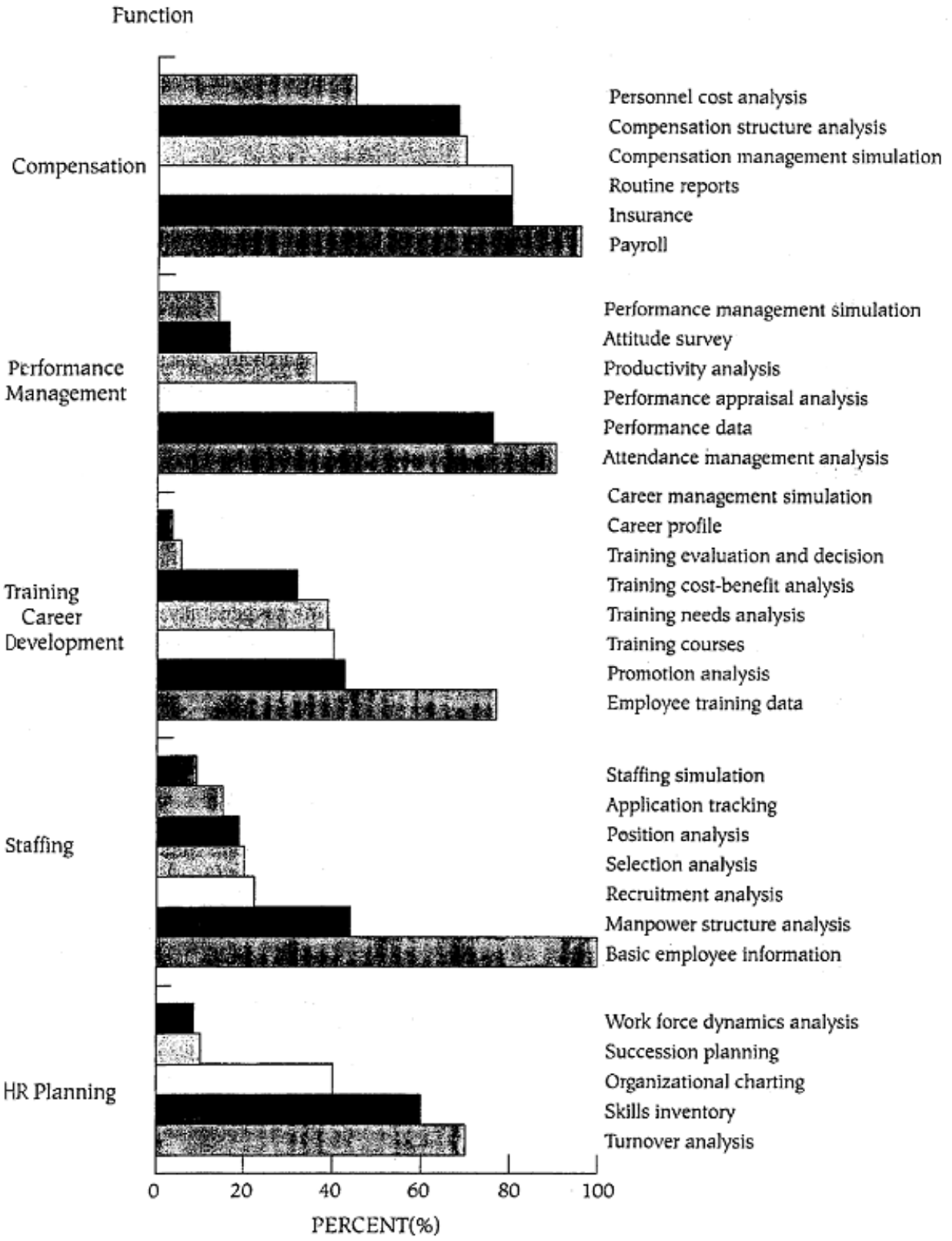
The results of a checklist of 32 modules based on Table 2 are exhibited in Figures 1 and 2. Generally speaking, HRIS is most extensively utilized at the EDP level, followed by the MIS and DSS levels. The finding is consistent with the survey of Kinnie and Arthurs (1993) that most organizations with computerized personnel systems used them primarily for routine operational tasks such as recording-keeping, word-processing etc. In this study, the most commonly use of the HRIS at the EDP level is for basic employee information, payroll, insurance and routine tax reports, whereas in MIS level the system is used for attendance analysis, turnover analysis, and compensation structure analysis. Differing with the findings of this research, Richard-Carpenter in a 1993 study found compensation analysis to be among the least popular applications. At the DSS level, compensation simulation (64.6%) is the most commonly used type of module. By comparison, Kinnei and Arthurs (1993) concluded from their survey that less than a third of those with computer-based personnel systems use them for wage modeling or human resource planning. Figure 1 shows that responding companies are progressing toward the MIS level, which may explain why three quarters of the companies report their present focus to be at the MIS level.

Figure 1
HRIS Modules by HRIS Level



Of the five human resource management functions, compensation management is the most commonly used, followed by performance management, and training and career development (Figure 2). Human resource planning and staffing capabilities are less frequently utilized. DeSanctis (1986) also reported that compensation and benefits are the most frequently used system capabilities, human resource planning, recruiting and training are less frequent uses.

Figure 2
HRIS Modules by Human Resource Function



In general, comparisons of statistics between current research and past studies seem to indicate a rather active HRIS utilization in Taiwan. Three reasons may partially explain the results. First, questionnaires were distributed only to the members of the Human Resources Development Association and the Chinese Human Resource Management Association in Taiwan. HR managers that joined these associations probably have a stronger intention to exchange information related to human resource management advancement (Lin, 1996). They are more likely to adopt effective ways of managing human resources and are more likely to be receptive to new HRIS methodologies. Second, half of the responding companies are foreign firms or joint-ventures. Many multinational corporations in Taiwan are large scale. Human resources management in their headquarters is generally more sophisticated than that oflocal firms. They may be more knowledgeable about the advantages of HRIS and therefore more likely to use the system

frequently. Third, the prevalence of computer. usage in Taiwan may also be facilitating the develop ment of HRIS in Taiwan.

Organizational Support of HRIS in Taiwan

This section reports organizational support of the responding companies when implementing HRIS. On a 5-point scale, the means of the six variables under investigation are support of 1-IR staff (3.60), support of top management (3.58), support of IS department (3.52), HRIS training (3.43), involvement of HR leaders (3.30), and computer knowledge of I-JR staff (3.17). Overall, responding companies provided good organizational support. In particular, thestrong support of HR staff, top management and IS department may pave the way for a smoother HRIS. In this study, the role of top management in HRIS has been impressive. They not only utilized the system more often than expected, but also successfully relayed their commitment to the employees. The support of the IS department is also noteworthy. In Taiwan, information technology is generally regarded as an area with a high entry barrier. Many IS departments have their own turf. It is quite surprising that human resources personnel rated the support of the IS department so high that most of the HR departments rather than IS departments dominated the planning and designing of HRIS. A tremendous amount of effort, including extensive communication, and reaching a consensus for an overarching goal must have been exerted. Unexpectedly, the involvement of HR leaders is graded lower than the support of top management and the IS department. Perhaps what Kossek et a]. (1994) found to be true, namely ‘ the higher the positions in the human resources department, the more negative they become toward the HRIS ’ , also poses a question for further investigation in Taiwan.

CONCLUSION

Jenkins and Lloyd (1985) have stated that ‘ This is.an information society in which 60% of the work force is occupied with the creation, processing, and distribution of information ’ . The notion of information technology as a strategic advantage is becoming increasingly popular. Although the computerization of personnel information has been introduced to the business community for a few decades, nearly three-quarters of personnel departments did not consider that their business processes had changed (Kinnei and Arthurs, 1993). The changes that had occurred seemed to be a simplification of existing procedures, rather than a large- scale process redesign. Pasqualetto ’ s (1993) vision that “ HRIS should help reengineer human resources processes for optimal effectiveness and evolve from capturing information to managing change ” seems to be still beyond the capacity of most companies.

In responding to the intense search for solid guidance in implementing HRIS, this study has described HRIS practices in the Taiwan setting. In addition to the above discussion of research findings, the following implications may also be drawn.

First, HRIS helps maximize the effects of strategic human resource management. Strategic human resource management is concerned with the impact of the outside environment,.the integration of corporate strategy with human resources strategy, and is characterized by a long-term orientation (Anthony et al., 1993:12- 13). HRIS fosters various long-term-oriented practices such as human resource planning, career management and succession planning, and places them under constant scrutiny. Information disclosed in HRIS enables management to cross- check management practices with corporate strategy, market trends, external and internal manpower supply, among others, for timely strategic human resource management. With proper maintenance, HRIS is capable of providing updated and objective information for better decision-making.

Second, support of top management is critical to HRIS implementation. Corresponding to previous literature (Jones and Arnett, 1994; Kavanagh et al., 1990; Pitman, 1994; Wong et al., 1994), strong support by top management has also been observed in this study. Their relatively frequent referral to HRIS is particularly enlightening. In addition to verbal support, top management demonstrated. their confidence in HRJS by personally utilizing the system. Their frequent personal HRIS usage

may result in sufficient resources and an increased pressure for HRIS success. Budget support for system development, for training and cooperation of IS department and line managers may be forthcoming. The positive outcome has been revealed in the high support of the IS department as rated by human resource personnel. A common department-centric phenomenon has not been found in IS department and HR department interactions.

Third, the human resource department has to play a greater number of roles in maximizing the HRIS contribution. At least four roles could be more actively performed. The human resource department should be an active learner of HRIS. Greater HRIS expertise is required. HR leaders need to learn how to interpret trends of the external environment so as to feed the information into HRIS for appropriate decision-making. Harriger (1993) commented that to have a strategic impact, the human resource department should have the ability to provide true decision- support systems. HR middle managers need to learn to maximize the application of the system for effective management. HR staff need to continuously upgrade their knowledge and skills to competently serve internal customers. The human resource department should be an active practitioner of HRIS. They should utilize the system themselves to improve the performance of human resource managenient. By extensively utilizing the system, they will be able to continuously improve it. The human resource department should be an active resources acquirer. HRIS requires a wide range of resources including the intangible support of top management, IS department, other departments, HR staff, and the tangible budget. Without these resources, HRIS implementation may be hampered. The human resource department should also be an active advocator of HRIS. Contributions of HRIS will be maximized when the database is comprehensive and regularly updated, various information systems can be hooked up, and the utilization is company-wide. Therefore, the benefits of HRIS to line managers, to relevant personnel and even to all company employees need to be more aggressively advocated, so that data collection, information updating and system integration may be supported by relevant departments. In general, the human resource management department has to initiate and maintain an organizational management commitment to an HRIS (Lederer, 1984).

As we approach the twenty-first century with an ever increasing amount of information at our disposal, an effective HRIS can help us to capitalize on the synergy of our two most precious assets — human resources and information technology. Those companies that make the best use of these systems have the best chances to sustain a competitive advantage.

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