
Information systems employment structures in the USA and Singapore: a cross-cultural comparison

Information
systems

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Introduction

According to the classic view of labour markets, workers move freely from job to job and firm to firm (Bakke, 1954). From the worker's perspective, this movement is governed by pressures to maximize the fit between worker skills and job requirements, with the objective of maximizing earnings. Historically, however, hierarchical (internal) control of labour supplanted the open labour market as a way of securing and controlling workers (Doeringer and Piore, 1971). More recently, there have been challenges to the historical perspective of internal labour markets as the primary structure of employment. Pfeffer and Baron (1988), for example, suggest that organizations increasingly are externalizing a buffer of workers against the core or permanent workforce. Externalization refers to the degree of attachment, or more appropriately, detachment of a worker to the organization. According to Pfeffer and Baron (1988) there are three dimensions of externalization:

- (1) the physical proximity between the worker and organization;
- (2) the extent of administrative control over the employee wielded by the organization; and
- (3) the duration of employment.

Thus, externalization occurs where the worker is removed from the workplace for non job-related reasons, by diminishing the duration of employment and by reducing administrative control over the employee (for example, where payment is done by another employer). Externalization is viewed by some as a necessary economic response to an environment which is becoming

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increasingly dynamic, competitive and uncertain (Handy, 1989; Scott-Morton, 1991).

Although organizations may be adopting forms of structuring their workforce which move away from the traditional internal structure (for example, by outsourcing activities), the assumption that work is subject largely to hierarchical/bureaucratic control appears to underlie much of the research concerning personnel, including information systems (IS) personnel. Many studies of IS personnel (e.g. Bartol, 1983; Ferratt and Short, 1986; Igbaria *et al.*, 1991) focus on examining issues relevant to the organization's permanent internal IS workforce (such as turnover and career pathing), and studies of temporary or contract IS workers are rare. However, in practice, since the late 1980s, many internal IS organizations have been undergoing continual "downsizing" of the traditional permanent workforce and experimentation with alternative forms of work structure (Ang, 1991; *Computerworld*, 1989; Korzeniowski, 1990). Thus, in light of more recent trends in the actual organization of IS work, it is important to gain an understanding of the evolution away from traditional work structures and to reassess and re-evaluate the implications of this phenomenon for managing IS personnel. Furthermore, it is instructive to examine whether trends towards more externalized employment structures are restricted to the USA or occur in other countries. Such an examination provides deeper insight into the antecedents of IS employment structures.

This study focuses on gaining an improved understanding of the externalization phenomenon in relation to the IS workforce in the USA and Singapore. These countries have been selected for analysis since they have very different forms of industrial economies (*Economist*, 1993) and cultures (Bunke, 1990), and should therefore provide unique insights into the externalization phenomenon. We propose two perspectives to explain preferences for externalization in these countries:

- (1) a market perspective emphasizing economic factors; and
- (2) a cultural perspective emphasizing values.

Our study investigates the extent of externalizing IS workers in both countries. The methodology employed in the study consists of content coding and analysis of advertisements for job positions in these countries over a three-year timeframe (from July 1990 to April 1993). Results indicate that, overall, the USA adopts more externalized IS employment structures than Singapore. Moreover, a trend towards increased externalization is more discernible in the USA only in the past year.

Results from this study provide preliminary evidence of the existence of external forms of employment structures in the USA, while suggesting that the traditional, hierarchic employment relationship is prevalent in Singapore. We suggest that these results can be interpreted from both market and cultural perspectives. Furthermore, our results have two implications for future studies of IS personnel:

- (1) The results imply that future investigations should examine IS personnel and human resource strategies for managing external, as well as internal workers.
- (2) Our results suggest the importance of sensitivity to the influence of cultural factors in explaining national preferences for IS personnel arrangements.

In the following sections of the article, we discuss the importance of employment structures for the IS workforce, outline employment relationship preferences from both a market and a cultural perspective, describe the methodology employed by this study, present detailed results and conclude with a discussion of results and suggestions for further research.

Employment structures and the information systems workforce

In a study of IS management issues for the 1990s (Niederman *et al.*, 1991), one of the top issues to emerge (ranked No. 4) is the management of IS human resources, in terms of specifying, recruiting and developing personnel. IS executives report that although the size of their department is being continually reduced, they are faced with an increasing number of projects which require greater and more specialized technological skills (Niederman *et al.*, 1991). At the same time, demographic trends are forecasted to result in acute shortages of skilled IS personnel by the year 2000 (US Department of Labor, 1989). In addition, technologies such as CASE (computer-aided software engineering) threaten to make the skills of many traditional analysts and COBOL programmers holding current IS positions obsolete (Rouzer, 1992). Thus, IS managers are faced with resolving difficult issues such as whether to retrain or replace their current permanent IS workforce, how to attract workers with skills in newer technologies, and whether to retain these workers as part of their permanent workforce. Compared with other occupations, managing the IS workforce is becoming particularly challenging because the underlying information technologies are changing rapidly and making the skills of the IS worker obsolete, and because economic conditions continually pressure for increased productivity in information systems work (Yourdon, 1992). This requires the IS manager to weigh constantly the costs and benefits of motivating and attracting skilled IS workers and retraining or replacing them when their skills become obsolete.

Although prior research into IS personnel has provided valuable insights, it has focused, for the most part, on issues relevant to managing a permanent internal workforce. For example, past studies have examined topics such as job satisfaction of IS programmers and analysts (Goldstein and Rockart, 1989), differing levels of turnover among IS personnel (Baroudi, 1985; Bartol, 1983; Guimaraes and Igbaria, 1992), and career path planning, decisions and outcomes (Igbaria and Siegel, 1993; Igbaria and Wormley, 1992; Igbaria *et al.*, 1991). Another body of literature has examined potential differences between IS and non-IS workers in terms of how IS workers should be managed (Ferratt and

Short, 1988), how to motivate IS workers (Couger and Zawaki, 1980; Ferratt and Short, 1986), and differing levels of social and achievement needs of IS versus non-IS workers (Bartol and Martin, 1982). Underlying these studies is the implicit assumption that IS workers are part of the internal permanent workforce of the IS organization. In general, issues such as how to motivate temporary IS workers, how to manage a contracted workforce, and how to allocate optimally tasks between temporary and permanent workers have not been addressed. However, recent press suggests that alternative organizational arrangements for IS work (such as outsourcing) are becoming increasingly popular in practice, and that IS executives need to understand how to manage and monitor these types of arrangements (Leinfuss, 1991). Thus, it is important to assess the extent to which externalized employment structures have been adopted in the IS workforce.

Furthermore, it is important to examine IS work arrangements in various cultures. Cross-cultural comparisons enable insights into the generalizability of the externalization phenomenon. In addition, examining different cultures provides insights into the relative importance of cultural as well as economic factors in motivating-national preferences for employment structures.

As a precursor for further investigation into these issues, we begin by assessing the forms and extent of the externalization phenomenon in the IS function in multiple cultures. Thus, our study addresses the following general research questions:

- *R1*: what are the different forms of externalizing IS human resources?
- *R2*: what is the extent of externalizing IS human resources?
- *R3*: how does the extent of externalizing IS human resources differ across cultures?

It is important to examine these questions because how work is structured has implications for the conditions under which individuals work as well as for the skills, practices and structure required by organizations. To provide insights into these questions, we review existing literature on the evolution of internal and external labour markets, interpreting it from both a market and a cultural perspective. We then apply these insights to the IS employment situation.

A market perspective of work arrangements

In the labour market literature, there are various perspectives regarding the evolution of internal and external labour markets (Scott, 1992). One of the earlier challenges to the classic view of the open labour market was raised by Doeringer and Piore (1971) who observed that information, opportunities, mobility and rewards can be differentially structured and shaped by varying occupational, industry, and organizational arrangements. Thus, they argue that internalization via administrative governance structures emerged as a means of controlling or influencing the open labour market. The market-oriented view of organizational structure can be most closely associated with Williamson (1975;

1981; 1983; 1985). Building on the work of earlier economists (Coase, 1937; Commons, 1934), Williamson argues that the basic unit of economic analysis is the economic transaction – the exchange of goods or services across technological boundaries. Technological boundaries refer to technologically separable interfaces, i.e. points where one stage of activity terminates and another begins (Williamson, 1981). Every transaction contains costs associated with ensuring that each party to a transaction lives up to the terms of the agreement. Williamson argues that the more the uncertainty within the marketplace, the greater the likelihood that some parties will cheat, rendering the marketplace less reliable, less efficient and less profitable. Thus, businesses create governance structures to internalize transactions, reducing transaction costs and increasing efficiency.

In terms of the employer-employee relationship, transaction costs can explain the movement towards internal forms of governance. Internal forms of control lower transaction costs by reducing informational requirements and the need for recurrent contracting (Williamson, 1980). Under this view, where there is a monopoly situation of workers with firm-specific skills, the result is higher transaction costs because firm-specific skills and knowledge create small numbers of bargaining situations between employer and employee, favouring opportunistic behaviour on both sides. Thus, it is more advantageous for the organization to bring the worker under internal management, because the costs of contracting are high. Williamson further argues that the most important influence on the movement towards internal labour markets is the specificity of assets embodied in the worker. Human asset specificity is increased as the skills and knowledge of the worker become more specialized and less transferable to other employers. Thus, internal organization of labour benefits both worker and employer where assets are specific because it provides the employee with prospects of upward mobility through regularized career advancements and enables the employer to recoup investments in training the worker.

A related market explanation of the evolution towards internal forms of control is the size argument (Edwards, 1979). Where there are large, powerful firms which are in a monopoly situation, and as these firms grow in size and complexity, it is more cost-effective to shift towards bureaucratic control of employees. Thus, bureaucratic control becomes embedded in the social and organizational structure of the firm and establishes the impersonal force of company rules or policy as the basis for control. A common thread linking these arguments for internal labour market arrangements is the reduction of costs related to contracting and controlling workers.

Market arguments can also be made for the more recent shift towards external labour markets. Similar to internal markets, external markets can provide cost advantages in certain situations. In general, costs of permanent workers can exceed those for temporary workers because of the additional expenses for benefits, training and recruiting. For example, a recent bulletin on employee benefits published by the United States Chamber of Commerce indicates that while organizations reported paying health, retirement and

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vacation benefits to 100 per cent of full-time employees, only 17 per cent of part-time or temporary workers received paid benefits from these firms (Chamber of Commerce of the United States, 1991). In addition, the cost of these benefits for long-term workers, in particular, has been rising dramatically in recent years. The United States Chamber of Commerce also reports that employee benefits increased from 17.0 per cent to 37.9 per cent of total payroll costs from 1955 to 1990. This provides significant cost incentives for organizations to reduce the number of permanent employees by externalizing workers.

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Thus, the market perspective suggests that costs of contracting and administering workers motivate the choice of appropriate employment structure. Because there are cost trade-offs involved with internal and external workers, an optimal employment structure strategy may be a "dual" form where organizations retain an internal "core" of permanent workers and a buffer of external workers to absorb environmental fluctuations (Mangum, *et al.*, 1985). Such an arrangement allows organizations to adjust more easily the size of their workforce, enabling more flexible response to economy, industry and product demand variations. Cost arguments assert that the internal core of workers would most likely consist of those with firm-specific skills, involved in core or critical activities to the firm's survival, and in whom the firm has invested a significant amount of training. Externalized workers would tend to be those involved in less central activities, and would possess skills that are less firm-specific and more rapidly obsoleted.

A cultural perspective of work arrangements

A different perspective on the choice of work arrangements is the cultural explanation. According to Smircich (1983), culture may be viewed as a socially learned way of life of a people and the means by which orderliness and patterned relations are maintained in a society. While the market perspective views organizations as striving towards maximum efficiency, cultural theorists examine the non-rational, subjective aspects of organizational life. From the cultural perspective, organizations are expressions of the larger culture of the society (Gamst and Norbeck, 1976). Thus, organizational work arrangements reflect the cultural norms, ideals and values of the society in which the organization is embedded.

Under the cultural view, internal forms of work arrangements would likely be preferred in organizations where societal values favour such structures. For example, cultures in which the individual is subordinated to the group may prefer lifetime employment systems and seniority systems to maintain the integrity of the group. Internal employment structures would also be consistent with cultures that stress the importance of the family and obedience to authority. In contrast, external forms of work arrangements may be favoured by cultures which value individualism and free enterprise and fear the power of large, bureaucratic, governmental organizations. Thus, the cultural perspective suggests that societal values motivate the choice of employment structures, i.e. that employment structures result from cultural predispositions.

Of course, it is likely that neither economic nor cultural factors *alone* may suffice to explain national preferences for employment structures. A country's economy and culture may be closely intertwined. The economic structure may reflect the country's culture, and that culture may be generated in part by economic constraints. As Hamilton and Biggart (1988) argue, cultural values may influence the predisposition of nations to favour certain forms of organizational structure. However, value patterns provide only a general sense of why nations may favour certain employment structures. On the other hand, economic factors may be too specific and too narrow to account for organizational forms. Rather, Hamilton and Biggart suggest an integrated cultural and market view in which the patterns of authority relations in the society provide a more complete explanation concerning national preferences for employment structures as organizations adapt to changing economic conditions.

Application to the IS situation

Preferences for employment relationships in the general labour market have implications for the choice of management structure of IS work. In the IS arena, externalization of IS work can arise due to market considerations. As the costs of supporting permanent IS workers increases, organizations would favour externalization schemes to reduce the size of the internal IS workforce. This externalization of IS workers can be characterized by a diminished temporal duration of the relationship between the principal (the firm requiring IS services) and the agent (the worker providing the IS services) which would likely occur in the form of use of contract workers or consulting firms (Niederman and Trower, 1993). In addition, there would also be reduced administrative involvement of the principal in traditional duties of IS personnel management such as selection, recruitment, employee benefits, and compensation schemes by the use of employment agencies.

Similarly, we contend that cultural forces may play an important role in influencing the extent to which externalized IS employment structures are adopted. While cross-cultural research has been conducted on the differential use of advanced information technologies (Straub, 1994), cross-national dimensions of information management (Burn *et al.*, 1993) and the management of IS personnel (Tan and Igbaria, 1994), few studies have examined the impact of cultural factors on the externalization of IS workers.

In this study, we examine the externalization of IS work over three years and in two different countries – the USA and Singapore. The longitudinal design enables assessment of the tendency towards externalization of IS workers over a period of time, while the comparative design enables assessment of the generalizability of the externalization phenomenon. A comparative study of the USA and Singapore was chosen because, while both countries rely heavily on information technology, the industrial economies and cultures of these countries are very different and should therefore provide unique insights into the externalization issue. Singapore represents one of the countries with newly

industrializing economies (NIEs) that rely heavily on information technology skills. Singapore experiences average annual growth rates in gross domestic product (GDP) per head of about 6-7 per cent (*Economist*, 1993). On the other hand, the USA is archetypal of mature industrial economies with similar heavy reliance on information technology, but with a more modest annual growth rate in the range of 2-3 per cent (*Economist*, 1993).

The labour market for IS workers is also very different in these countries in terms of demographics and supply and demand conditions. For example, a survey of Singaporean analysts and programmers (Couger, 1986) reveals demographic differences between IS professionals. In general, Singaporean IS workers are younger (70 per cent are under 31 years of age versus 36 per cent in the USA), less experienced (72 per cent have four years or less experience versus 55 per cent in the USA), and better educated (71 per cent have obtained a BS degree or higher versus 57 per cent in the USA) (Couger, 1986). In addition, the Singaporean government has the goal of becoming a software leader and has implemented considerable economic incentives to attract major software companies to the country. This has the effect of increasing demand for IS labour such that there are shortages of qualified IS workers (Neo, 1993).

Finally, there are interesting cultural differences between these countries which have implications for the IS workforce. Relative to the USA, Singapore stresses collectivism, belongingness, loyalty as reflected by the strong Confucian ethic (Bunke, 1990), and high power distances (Bond and Hofstede, 1989; Hofstede, 1991). Workers with these values may prefer to commit themselves to full-time employer-employee relationships rather than externalized forms of employment. The attractiveness of long-term employer-employee relationships is also enhanced by the use of seniority wage systems, especially in the public sector which forms the primary employer of IS workers in Singapore. In firms where seniority wage systems are used, wages are pegged at length of service, rather than any direct link to performance and productivity.

In contrast, the USA promotes societal values of individualism and free enterprise which are thought to lead to segmentalist organizations, and emphasize productivity and financial performance (Kanter, 1983). These values foster creation by market forces of independent economic "firms" which may be as small as an individual. Such a climate may be favourable to externalizing IS workers from large bureaucracies, since these workers can act profitably as individual economic agents in the marketplace.

Thus, given the differences in the nature of the industrial economies and the cultures of the USA and Singapore, this study will explore the generalizability of the externalization of IS work between the two countries. By assessing the extent of externalization in two different countries, we can determine whether the trend towards externalization is a phenomenon idiosyncratic to the USA or a phenomenon which may be generalizable to other nations.

In the following sections, we describe the methodology employed to study these issues and the results obtained.

Methodology

Method

A content analytic approach was adopted to analyse the employment structures found in the USA and Singapore. This method has the advantage of being unobtrusive, and enables making replicable and valid inferences from data in their context (Krippendorff, 1980).

Sample

Advertisements for IS jobs were gathered from two different sources: *Computerworld* from the USA, and *Straits Times* from Singapore; *Computerworld* was selected as it is the premier national trade journal in IS where IS job opportunities are widely advertised[1]. *Straits Times* is the major English newspaper in Singapore and is the country's largest national source of advertisements for IS jobs.

To gather a sample of recent IS job advertisements, a stratified sampling strategy was adopted. Advertisements were sampled in each quarter beginning July 1990 and ending June 1993. For *Computerworld*, all advertisements appearing in the first week of each quarter were sampled. For *Straits Times*, all IS-related advertisements appearing in the first Saturday of each quarter were sampled[2]. In total, 12 issues of *Computerworld* and *Straits Times* were sampled. Table I provides the total number of advertisements found in the 12 issues of *Computerworld* and *Straits Times*, respectively.

Coding scheme

IS job advertisements were coded for their respective employment structures. The coding scheme is based, in general, on the types of administrative externalization

Journal/quarter and year	<i>Computerworld</i> (USA)	<i>Straits Times</i> (Singapore)
Q3 (July) 1990	35	34
Q4 (October) 1990	25	33
Q1 (January) 1991	41	27
Q2 (April) 1991	56	11
Q3 (July) 1991	31	34
Q4 (October) 1991	28	19
Q1 (January) 1992	58	27
Q2 (April) 1992	38	28
Q3 (July) 1992	29	14
Q4 (October) 1992	34	17
Q1 (January) 1993	52	36
Q2 (April) 1993	51	26
Total	478	306

Table I.
Total number of IS job advertisements found in 12 issues of *Computerworld* and *Straits Times*

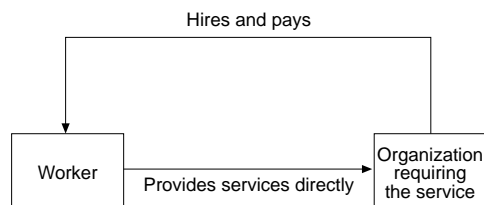
in employment structures discussed by Pfeffer and Baron (1988), and on the types of IS work outlined by Niederman and Trower (1993). From these perspectives, we distinguish between internal and external IS work, and sub-classify external IS work into three different categories (contract work, quasi-contract work, and consulting/employment agency) (Ang and Slaughter, 1995). The coding scheme, therefore, describes four IS employment structures:

- (1) Full employment (Employ) where the potential job applicant enters into an employment relationship with a company whose main business is other than in IS consulting (Figure 1). An archetypal job is one where the IS worker is employed to work in the internal information systems department of a manufacturing or service firm.
- (2) Quasi-contract (Quasi) where the potential job applicant enters into an employment relationship with a company whose main business is in IS consulting (Figure 2). A prototypical job is one where the applicant is employed by the consulting firm (e.g. Arthur Anderson), but his or her skills are employed by clients of the consulting firm.
- (3) Employment agency (Agency) where the potential job applicant is hired by employment agency which either contracts the applicant out to client firms on a permanent basis; or contracts the applicant out to client firms on a temporary basis (Figure 3). In the case of contracting the applicant out to client firms on a permanent basis, the employment agency acts on behalf of its client in the selection and screening process. In the case of contracting the applicant out to client firms on a temporary basis, the employment agency enters into a contractual relationship with each potential applicant who, in turn, works for the client of the employment agency. Thus, the job applicant is typically self-employed, using the agency as a source of contract work.
- (4) Contract work (Contract) where the potential job applicant is contracted directly by a firm requiring his or her IS services (Figure 4).

Coding reliability

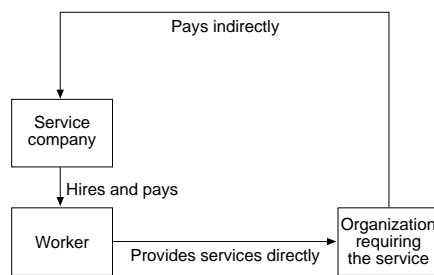
Two coders were given the above employment structure scheme and its description. Before the coders coded the stratified samples of advertisements

Figure 1.
Traditional IS
employment
relationship (Employ)



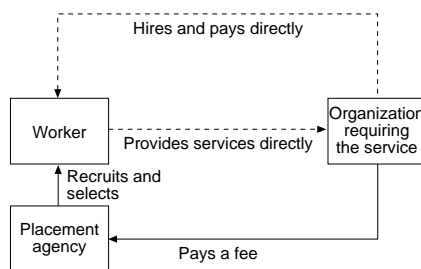
Source: Ang and Slaughter (1995)

from *Computerworld* and *Straits Times*, random samples of job advertisements from issues of *Computerworld* and *Straits Times* outside the July 1990-April 1993 period were used by the coders to achieve sufficient inter-coder reliability regarding the categories of employment structure. Initially the coders independently coded a random sample of ten advertisements each from *Computerworld* and *Straits Times*. After the independent coding, the Cohen coefficient of agreement for nominal scales was computed (Cohen, 1960) to assess the relative agreement between the coders. Differences in coding the employment advertisements were resolved, and the coders independently coded another round of ten advertisements each from *Computerworld* and *Straits Times*. After the second round of independent coding, agreement between the coders was 100 per cent with regards to employment structures. Subsequently, advertisements from *Computerworld* and *Straits Times* from the July 1990-



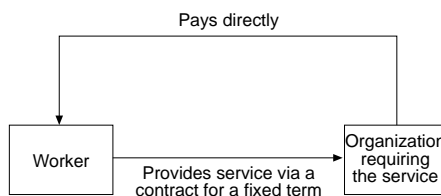
Source: Ang and Slaughter (1995)

Figure 2.
IS employee leasing
work relationship
(Quasi)



Source: Ang and Slaughter (1995)

Figure 3.
IS placement agency
relationship (Agency)



Source: Ang and Slaughter (1995)

Figure 4.
IS contract work
relationship (Contract)

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Figure 5.
Examples of
advertisements coded
for employment
structure

Source: Computerworld (1995b)

Results

Table II shows the number of advertisements in the different categories of employment structures across *Computerworld* and *Straits Times*. A chi-square analysis was conducted on the data in Table II to analyse if the proportion of employment structures found in *Computerworld* differed significantly from those in *Straits Times*. The chi-square of 84.7 ($df = 1$) was significant at $p < 0.0000$. Overall, *Computerworld* reflected a significantly greater proportion of non-Employment structures than *Straits Times*.

To assess if proportions within each individual employment structure differed across the two sources of advertisements, chi-square analyses were performed on each of the four employment structures independently. Tables III-VI reflect the proportion of each employment structure in both *Computerworld*

Employment structure	<i>Computerworld</i> number	<i>Computerworld</i> (%)	<i>Straits Times</i> number	<i>Straits Times</i> (%)	Total number	Total (%)
Employ	291	0.609	278	0.909	569	0.726
Quasi	42	0.088	4	0.013	46	0.059
Agency	96	0.200	16	0.052	112	0.143
Contract	49	0.103	8	0.026	57	0.072
Total	478	1.000	306	1.000	784	1.000

Table II. Overall counts and proportions of employment structures in the USA (*Computerworld*) and Singapore (*Straits Times*)

Employment structure	<i>Computerworld</i> number	<i>Computerworld</i> (%)	<i>Straits Times</i> number	<i>Straits Times</i> (%)	Total number	Total (%)
Employ	291	0.609	278	0.908	569	0.726
Not-employ	187	0.391	28	0.092	215	0.274
Total	478	1.000	306	1.000	784	1.000

Note: chi-square = 84.2 ($df = 1$), $p < 0.00001$

Table III. Proportion of "Employ" structure across the USA (*Computerworld*) and Singapore (*Straits Times*)

Employment structure	<i>Computerworld</i> number	<i>Computerworld</i> (%)	<i>Straits Times</i> number	<i>Straits Times</i> (%)	Total number	Total (%)
Quasi	42	0.088	4	0.013	46	0.059
Not-quasi	436	0.912	302	0.987	738	0.941
Total	478	1.000	306	1.000	784	1.000

Note: chi-square = 18.89 ($df = 1$), $p < 0.0009$

Table IV. Proportion of "Quasi" structure across the USA (*Computerworld*) and Singapore (*Straits Times*)

and *Straits Times*. The resultant chi-square analyses showed that, independently, the proportion of each employment structure in *Computerworld* and *Straits Times* differed significantly.

We then traced the pattern of each employment structure over the 12 quarters. From Tables VII and VIII (illustrated graphically in Figures 6 and 7, respectively), the proportion of employ to other employment structures declined dramatically in the last three quarters in *Computerworld* (from an average of about 65 per cent from late 1991 to the middle of 1992, to about 48 per cent from late 1992 to the middle of 1993). In *Straits Times*, the proportion of employ to

Table V.
Proportion of "Agency" structure across the USA (*Computerworld*) and Singapore (*Straits Times*)

Employment structure	<i>Computerworld</i> number	<i>Computerworld</i> (%)	<i>Straits Times</i> number	<i>Straits Times</i> (%)	Total number	Total (%)
Agency	96	0.201	16	0.052	112	0.143
Not-agency	382	0.799	290	0.948	672	0.857
Total	478	1.000	306	1.000	784	1.000

Note: chi-square = 33.6 (df = 1), $p < 0.00000$

Table VI.
Proportion of "Contract" structure across the USA (*Computerworld*) and Singapore (*Straits Times*)

Employment structure	<i>Computerworld</i> number	<i>Computerworld</i> (%)	<i>Straits Times</i> number	<i>Straits Times</i> (%)	Total number	Total (%)
Contract	49	0.103	8	0.026	57	0.073
Not-contract	429	0.897	298	0.974	727	0.927
Total	478	1.000	306	1.000	784	1.000

Note: Chi-square = 16.14 (df = 1), $p < 0.00006$

Table VII.
Pattern of employment structures across time in the USA (*Computerworld*)

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
E#	24	15	20	45	17	17	40	25	21	16	25	26
%	0.686	0.600	0.488	0.804	0.548	0.607	0.690	0.658	0.724	0.471	0.481	0.51
Q#	1	1	1	4	3	0	4	4	0	10	7	7
%	0.029	0.040	0.024	0.071	0.097	0.000	0.069	0.105	0.000	0.294	0.135	0.14
A#	7	4	13	5	9	8	11	6	7	5	12	9
%	0.200	0.160	0.317	0.089	0.290	0.286	0.190	0.158	0.241	0.147	0.231	0.18
C#	3	5	7	2	2	3	3	3	1	3	8	9
%	0.086	0.200	0.171	0.036	0.065	0.107	0.052	0.079	0.034	0.088	0.154	0.18
T#	35	25	41	56	31	28	58	38	29	34	52	51
%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Notes: E = employ, Q = quasi, A = agency, C = contract, T = total
= number of advertisements; % = proportion of total advertisements

Quarter	1	2	3	4	5	6	7	8	9	10	11	12
E#	31	28	26	8	33	16	26	26	13	16	34	21
%	0.912	0.848	0.963	0.727	0.971	0.842	0.963	0.929	0.929	0.941	0.944	0.81
Q#	0	0	0	0	0	0	1	1	0	0	0	2
%	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.036	0.000	0.000	0.000	0.08
A#	1	4	1	3	1	3	0	1	1	0	0	1
%	0.029	0.121	0.037	0.273	0.029	0.158	0.000	0.036	0.071	0.000	0.000	0.04
C#	2	1	0	0	0	0	0	0	0	1	2	2
%	0.059	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.059	0.056	0.08
T#	34	33	27	11	34	19	27	28	14	17	36	26
%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0

Notes: E = employ, Q = quasi, A = agency, C = contract, T = total
 # = number of advertisements; % = proportion of total advertisements

Table VIII.
 Pattern of employment structures across time in Singapore (Straits Times)

other employment structures remained-stable at over 90 per cent across many quarters, dipping to about 80 per cent only in the last quarter – April 1993.

In absolute numbers, quasi, agency, and contract incidents remain relatively sparse in *Straits Times*, totalling only 28 out a total 306 employment structures. In contrast, the number of quasi and contract employment structures rose dramatically in *Computerworld*, especially in the last three quarters. The average percentage of quasi to total employment structures was about 18.6 per cent in the last three quarters compared with an average of less than 10 per cent in other quarters. The average percentage of contract to total employment structures was about 16.5 per cent in the last two quarters compared with an average of less than 10 per cent in other quarters. For the agency employment structures, the trend is less discernible, with peaks at quarters 3 (1/91), 5 (7/91), 6 (10/91), 9(7/92), and 11 (1/93).

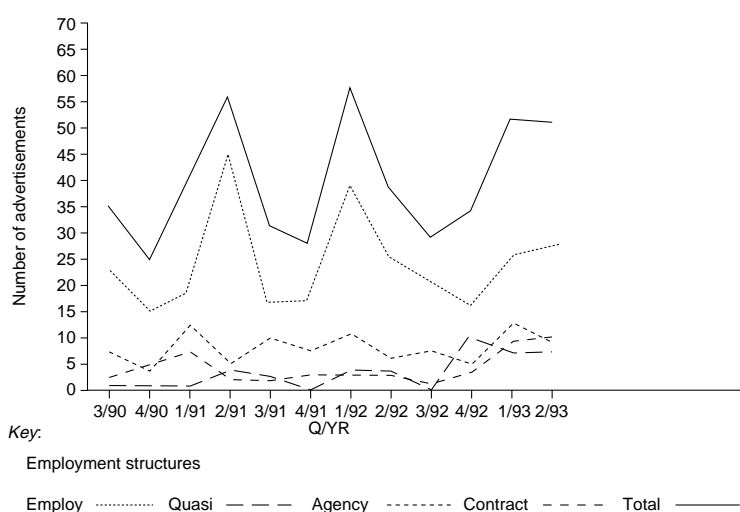


Figure 6.
 Employment structures across time for the USA (Computerworld)

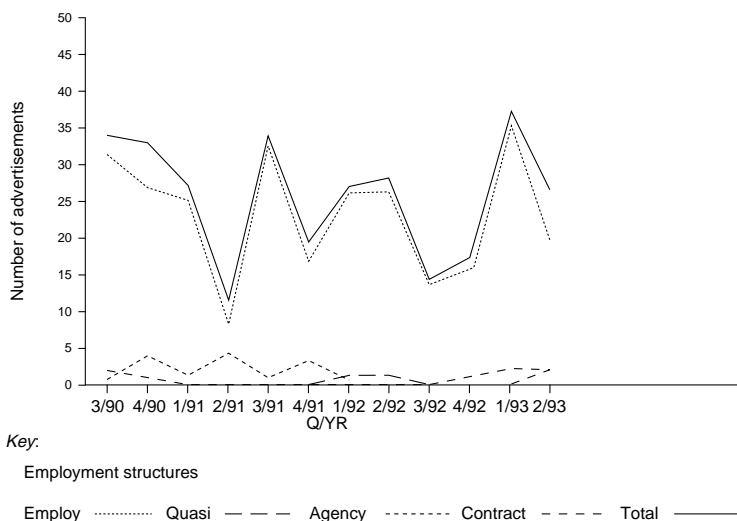


Figure 7.
Employment structures across time for Singapore (*Straits Times*)

Discussion

Overall, we find that the proportion of types of employment structures differs between the USA and Singapore, as reflected by the job advertisements found in *Computerworld* and *Straits Times*, respectively, from July 1990, through April 1993.

IS jobs in the USA appear to be more varied in their employment structures than in Singapore. Specifically, the increasing use of more externalized forms of employment structures in the USA seems to confirm a general trend towards greater reliance on contracting for immediate IS skills requirements (such as using IS consultants from consulting firms, or direct independent contract workers) rather than retaining IS skills in the form of a more permanent employment relationship. This trend may be in response to an increasingly volatile environment where there is an economic imperative to acquire quickly the necessary skills at the lowest cost (Fierman, 1994; Tilly, 1991). In fact, externalized employment structures provide a more rapid and economic means of skill repositioning in light of short-lived technologies than internal efforts to curb skills erosion of incumbents (Powell, 1990). In addition, societal values of individualism and free enterprise in the USA favour externalized IS employment, because independent IS workers can function profitably as economic units. It may also be that a higher level of skills in entrepreneurship is prevalent among workers in the USA, enabling more independent contracting, or that the social network creates more opportunities for private consulting.

In Singapore, the traditional employment relationship for acquiring IS skills persists. One potential explanation is the force of cultural values of

belongingness and loyalty which favour working as a group (as opposed to individually) as well as long-term employment relationships within a firm. Another possible explanation may be the general shortage of IS workers in Singapore (Neo, 1993) which causes firms to offer attractive compensation packages to induce IS workers to remain in full-time employment with the firm, rather than to be self-employed as contract workers or being employed via an employment agency. In addition to attractive compensation packages offered by independent firms, Singapore has a national savings scheme, the Central Provident Fund (CPF), for all employees. Employees can draw on the Fund on retirement or for a number of other long-term investments[3]. From the worker's point of view, the benefit fund may provide an incentive to prefer traditional permanent employment to independent work because of the increase in salary from the employer's contribution to the fund. Moreover, as uncertainty avoiders, workers in Singapore may be attracted to greater security of a long-term employment relationship with a firm rather than a series of short-term contractual relations with many firms (Chew and Chew, 1992).

These findings have implications for future directions in IS personnel research. Evidence of increased externalization in the USA suggests that issues such as how to manage and motivate external IS workers and how to allocate resources and tasks effectively between temporary and permanent IS workers may become significant and fruitful areas for further study. Additional study of the antecedents of the IS externalization phenomenon, including the impact of cultural factors, would also be instructive. For example, future studies could examine the critical dimensions of the cultural and economic environment and attempt to link them to evolving IS employment structures in different nations. These kinds of investigations could provide a better understanding of how and why differing employment structures emerge in the IS workplace and how they can be effectively managed.

Notes

1. *Computerworld* claims to reach more computer professionals each week than any other journal of its kind (*Computerworld*, 1992a). Job advertisements in *Computerworld* differ by region. For this sample, we used the *Computerworld* which reflected job advertisements in the Eastern portion of the USA. The Eastern region represents the largest number of *Computerworld* subscriptions for the USA (40 per cent of the total number of subscriptions). Thus, the sample is restricted only to advertisements pertaining to the Eastern region of the USA and may not necessarily reflect IS job advertisements in the Mid-western and Western parts of the USA.
2. *Straits Times* is a daily newspaper. More job advertisements appear on Saturday than on any other day of the week. Accordingly, Saturday was chosen as the day to sample IS job advertisements.
3. The CPF scheme is compulsory. The employer has to contribute an additional 20-25 per cent of the employee's salary to the fund each month. As the CPF contribution by the employer adds 20-25 per cent to the base salary received by an employee, it may therefore be more attractive for workers in Singapore to work as employees rather than as independent workers.

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