

A Study on the Outsourcing of Information Systems*

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<ABSTRACT>

In recent years, an interesting amount of attention has been paid to outsourcing of information systems (IS) functions. In spite of a number of articles describing the experiences of individual firms in other countries, little is studied about IS outsourcing practices in Korea. This paper attempts to provide a benchmark of current IS outsourcing practice in Korea. A detailed descriptive analysis of survey responses from 186 Korean companies indicates the usage, length of experience, expenditure of outsourcing, and kinds of IS functions being outsourced. The analysis also provides information about the perceived advantages and disadvantages of outsourcing and examines their relationships with outsourcing success. In addition, this study also provides the criteria for selecting qualified outsourcing service providers from data collected.

정보시스템의 아웃소싱에 관한 연구

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<요 약>

최근 정보시스템 기능의 아웃소싱에 많은 관심을 가져오고 있다. 외국 기업들의 정보시스템 아웃소싱 현황에 대한 논문들은 많은 반면에, 한국 기업들에 관한 것은 거의 없는 실

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정이다 따라서, 본 논문은 한국 기업들의 정보시스템 아웃소싱 현황을 파악하고자 한다. 186개의 기업을 대상으로, 정보시스템 아웃소싱의 활용도, 적용기간, 아웃소싱 비용, 아웃소싱하고 있는 정보시스템의 기능 등을 파악하며, 정보시스템 아웃소싱의 장점과 단점을 조사하고 또한 이들과 아웃소싱 성공과의 관계를 알아보며, 정보시스템 아웃소싱 제공자의 선택 기준에 관한 내용도 아울러 알아본다.

INTRODUCTION

In recent years, there has been an increasing amount of attention paid to outsourcing of information systems (IS) functions in organizations. A recent survey on IS senior executives in America highlights outside services management as one of the six strategic management issues confronting organizations in their management of corporate systems (Clark, 1992). Another recent study by the Yankee Group indicates that every Fortune 500 company would have considered IS outsourcing by 1994. The changing and more strategic role of outsourcing in business firms has been given much coverage in trade publications, such as Computerworld, Datamation, Network World, and MIS week. Trying to remain competitive and up-to-date in the rapidly developing world of computer technology becomes a financial burden to many organizations, such as banking and financial services, health care, and manufacturing. Hiring outsiders to handle part or even all of its information services helps an organization provide better services and maintain a competitive advantage.

Studies from several countries (e.g., US and Europe) have added to our understanding of IS outsourcing. However, information on outsourcing from Korean top IS managers is very limited. Given a lack of research on IS outsourcing in Korea, the purpose of this study is to examine the outsourcing practices within companies in Korea in a general manner. Specifically, the study explores the advantages and disadvantages of outsourcing, and whether these advantages and disadvantages are related to IS outsourcing success as well as the general descriptions on IS outsourcing in Korea.

GENERAL BACKGROUND ON OUTSOURCING

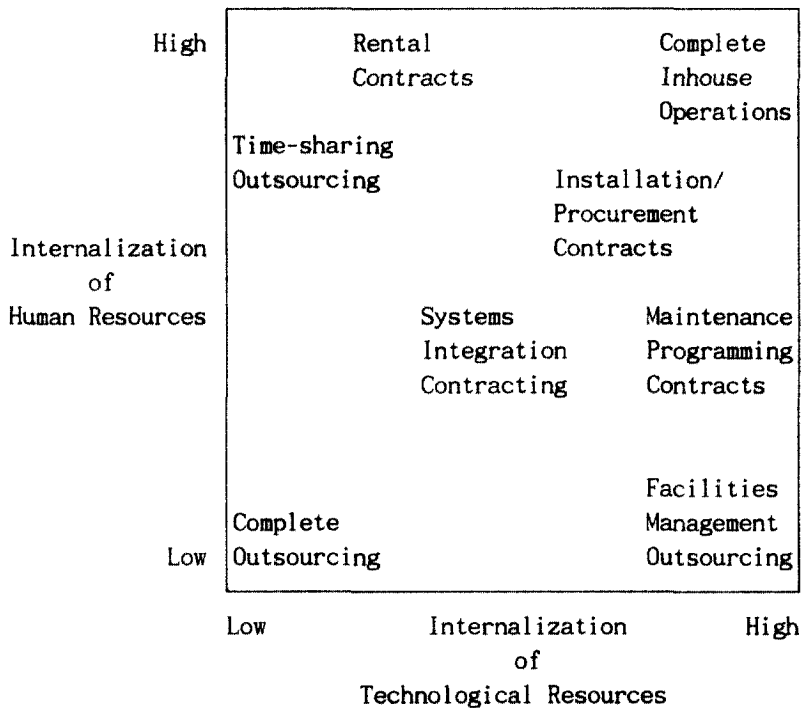
The term outsourcing refers to the acquisition of services from external service providers. Outsourcing has been described by Loh and Venkatraman (1991a; 1991b) using two dimensions: (1) the degree of internalization of technological resources and (2) the degree of internalization of human resources. They define this internalization as "ownership by the focal organization which takes on full control with profit and loss responsibility." Based on this, they define outsourcing as "involving a significant use of

resources -- either technological and/or human resources -- external to the organizational hierarchy in the management of the IT infrastructure." Further, they argue that a continuous measure rather than a simple dichotomy of "in-house function" versus "outsourcing" is required to capture the complexity inherent in managing IS functions. Figure 1 presents a framework, based on two continuous dimensions, that maps the various types of outsourcing.

In this study the outsourcing of IS functions is broadly defined as the practice of turning over part or all of an organization's IS functions to external service provider(s). This definition includes the following external services: applications development and maintenance, systems operation and maintenance, telecommunications/networks management and maintenance, end user support, and systems planning and management.

As shown in Figure 1, an organization can obtain these services through the following types of outsourcing. complete outsourcing, facilities management, systems integration, timesharing, and other contracts (including rental, installation & procurement, and maintenance & programming)

Figure 1 Alternative Types of IS Outsourcing. (Adapted from Loh and Venkatraman, 1991)



Outsourcing is really not a new phenomenon, since its roots can be traced to the traditional timesharing and professional services of the late 1950s. Today outsourcing

has become a valid option in all areas of IS services (Apte and Winniford, 1991). For example, certain industries (e.g., thrift institutions) have long purchased timesharing and facilities management services. Other companies have dismantled their data center and have contracted out all data processing and programming (Schiffman and Loftin, 1991).

However, the nature of outsourcing has evolved. Compared with the 1970's, current outsourcing practices differ in the following key ways (Aucoin, 1991, Schiffman and Loftin, 1991). (a) Larger companies are outsourcing although there is evidence that in the current environment size does not affect the outsourcing decision (Grover et al., 1994). (b) A greater range and depth of services are being outsourced. (c) Service providers are accepting more responsibility and risk. (d) The nature of the relationship with the service provider is evolving and in many cases is a partnership. (e) Information technology intensity is higher, giving more companies the option of outsourcing in a competitive provider market.

The rapid changes in the technological base and the increasingly competitive environment have caused some companies to shift the focus of their corporate strategy from technology to information utilization and management. From this perspective, organizations can spend less time and resources building an internal computing infrastructure while concentrating their efforts on the effective use of information and the creation of new analytical data with which they can improve management's responsiveness to organizational needs (Grover and Teng, 1993).

Since outsourcing presents an alternative way of providing IS services, it can be more or less attractive depending on the company's unique needs and circumstances (Schiffman and Loftin, 1991). The factors contributing to the attractiveness and growth of outsourcing are classified into three major categories: strategic, economic, and technological factors (Behara et al., 1995, Garret, 1994, Grover et al., 1994, Ketler and Walstrom, 1993; McLellan and Marcolin, 1994). Strategic factors are (a) focus on the core business, (b) improved focus on strategic use of information technology, (c) improved quality of IS services due to enhanced IT competence and IS staff expertise, and (d) enabled business process redesign. Economic factors are (a) cost savings from economies of scale and scope and (b) cost containment and predictability. Technological factors are (a) access to leading-edge technology and (b) avoidance of obsolescence risk.

In spite of the benefits listed above, there are also drawbacks to outsourcing. The factors that may make outsourcing unattractive to potential users and lead to resistance on their part can be classified into three general categories: managerial, cost related, and conflicting interest factors (Grover et al., 1994, Jurison, 1995, Ketler and Walstrom, 1993, McLellan and Marcolin, 1994). Managerial factors are (a) loss of flexibility or control, (b) loss or degradation of internal IS services, (c) loss of IS strategic planning capability, and (d) qualifications of outside personnel. Cost related factors are (a) increased coordination costs, (b) hidden or potential costs, and (c)

unclear cost/benefit. Conflicting interest factors are (a) data and systems confidentiality, (b) corporate strategy disclosure, (c) existing union/labor agreement, and (d) difficulty to terminate agreement.

Based on the general background of IS outsourcing, the specific objectives of this study is to answer the following areas of IS outsourcing in Korean firms. (1) The usage, length of experience, expenditure of IS outsourcing, and kinds of IS functions being outsourced, (2) The perceived advantages and disadvantages of IS outsourcing and the differences between outsourcing users and nonusers; (3) The relationship between IS outsourcing success and the advantages and disadvantages of IS outsourcing; (4) The selection criteria for IS outsourcing service providers and the differences between outsourcing users and nonusers.

METHODOLOGY

Data Collection

The data for the study were gathered via a mail survey questionnaire. The questionnaire for the study was adopted from a similar US-based study (Collins and Millen, 1995) and modified suitable to Korean firms. Survey methods provide probability sampling, standardized measurement, and information available from no other source (Fowler, 1988) and is an appropriate form for this stage of research in outsourcing.

The unit of analysis for this research is an organization, which may be a corporation, a business unit, a subsidiary, or a division served by an IS department. As used in this research, outsourcing strategy of an organization may include any of the following IS functions: applications development and maintenance (ADM), systems operations and maintenance (SOM), telecommunications/networks management and maintenance (TMM), end user support (EUS), and systems planning and management (SPM).

The survey questionnaire was mailed to the 500 largest Korean listed companies. The following-up questionnaire was mailed to those who had not responded about three weeks later. The questionnaire was addressed to the top manager in charge of Information Systems. Despite follow-up efforts, 2 questionnaires were undeliverable because of bad addresses. 186 usable responses were received representing a response rate of 37%.

Responding Sample Characteristics

The industry representation of respondent companies, as shown in Table 1, indicates

that a large proportion of these companies are manufacturers or involve in banking and insurance. Further, the responding companies represent a wide variance in size, with 49 of 177 companies having an annual sale of \$500 million or above, and 41 having sales below \$100 million. Also, 65 of 184 companies have 1500 or more employees, and 33 have fewer than 500. The IS departments in these companies exhibit similar variance. 66 of 154 companies have IS budgets that are equivalent to 1.0% or more of total sales and 81 of 169 companies have 15 or more IS employees.

Table 1 Profile of the Responding Companies

	Characteristics	Frequency	Percent
Industry	Manufacturing	135	72.6
	Finance/Insurance	25	13.4
	Construction	12	6.5
	Other	14	7.5
Total Sales	Less than \$100 million	47	25.3
	\$100 million to below \$500 million	81	43.5
	\$500 million to below \$1 billion	22	11.8
	\$1 billion to below \$5 billion	22	11.8
	\$5 billion and above	5	2.7
	Unanswered	9	4.8
Number of Total Employees	Less than 500	33	17.7
	500 to below 1500	83	44.6
	1500 to below 2500	26	14.0
	2500 to below 4500	21	12.9
	4500 and above	18	9.7
	Unanswered	2	1.1
IS Budget as Percentage of Total Sales	Less than 0.1	5	2.7
	0.1 to below 1.0	83	44.6
	1.0 to below 2.0	33	17.7
	2.0 to below 5.0	15	8.1
	5.0 and above	18	9.7
	Unanswered	32	17.2
Number of IS Employees	Less than 5	18	9.7
	5 to below 15	70	37.6
	15 to below 25	28	15.1
	25 to below 35	18	9.7
	35 to below 55	10	5.4
	55 and above	25	13.4
	Unanswered	17	9.1

RESULTS

Usage of IS Outsourcing

According to Table 2, of the 186 respondents received, 106 (57%) noted that their companies outsource some IS functions. Interest among nonusers of IS outsourcing is moderate. Thirty-one percent of the nonusers indicated that the potential use of such services was being considered at their companies.

Table 2: Usage of IS Outsourcing

IS Outsourcing		Frequency	Percent
Users		106	57
Nonusers	Potential Users	25	13
	Potential Nonusers	40	22
	Unanswered	15	8
	Subtotal	80	43
Total		186	100

Length of IS Outsourcing Experience

As shown in Table 3, of the 106 IS outsourcing users, 38 (36%) have been doing so for more than five years. 45 (42%) have been doing so for three years or less. Thus, the varied experience of these firms can provide insights for firms contemplating IS outsourcing as well as firms doing so already.

Table 3 Length of IS Outsourcing Experience

Range (Year)	Frequency	Percent
Less than 1	12	11.3
1 to below 3	33	31.1
3 to below 5	22	20.8
5 and above	38	35.8
Unanswered	1	0.9
Total	106	100

Level of IS Outsourcing Expenditure

Respondents were asked to indicate the percentage of their total IS budget paid to IS outsourcing service providers, and this data is provided in Table 4. Of the 106 IS outsourcing users, 51 (48%) noted that their firms allocate 20% or less of their total IS budget to outsourcing service providers. It is also interesting to note from the data in Table 4 that thirteen firms (12%) in this study has apparently outsourced IS functions almost entirely. They reported allocating more than 80% of their total IS expenditure to IS outsourcing. Their total IS outsourcing indicated that there exist the forms of strategic alliance between outsourcing users and providers (Willcocks and Choi, 1995)

Table 4 Level of IS Outsourcing Expenditure

Total IS Budget paid to Outsourcing	Frequency	Percent
1 - 20%	51	48.1
21 - 40%	29	27.4
41 - 60%	9	8.5
61 - 80%	3	2.8
81 - 100%	13	12.3
Unanswered	1	0.9
Total	106	100

IS Functions Outsourced

According to the data in Table 5, those companies outsourcing IS functions typically buy multiple functions. The IS functions most frequently outsourced to one or more service providers by at least half of the respondents are: telecommunications/networks management and maintenance (73%), systems operations and maintenance (57%), and applications development and maintenance (52%).

It is also interesting to note from the data in Table 5 that the IS function most frequently back into insourcing is systems planning and management (38%). This reflects the strategic importance of systems planning and management function for many of firms in this study. It is unwise to outsource IS functions that require extensive knowledge of business needs, such as the development and support of strategic systems, and IS planning and strategy (Lacity et al., 1994)

Table 5: Range of Outsourcing IS Functions

Range \ Functions	ADM	TMM	EUS	SOM	SPM
Single Provider	29 (27.4%)	55 (51.9%)	27 (25.5%)	30 (28.3%)	21 (19.8%)
Multiple Providers	26 (24.5%)	23 (21.7%)	23 (21.7%)	30 (28.3%)	12 (11.3%)
Back in-house	26 (24.5%)	9 (8.5%)	29 (27.4%)	24 (22.6%)	40 (37.7%)
Considering Outsourcing	12 (11.3%)	11 (10.4%)	9 (8.5%)	10 (9.4%)	6 (5.7%)
Insourcing	13 (12.3%)	8 (7.5%)	18 (17.0%)	12 (11.3%)	27 (25.5%)
Total	106 (100%)	106 (100%)	106 (100%)	106 (100%)	106 (100%)

Legend

ADM Applications Development and Maintenance

TMM Telecommunications/Networks Management and Maintenance

EUS End User Support

SOM Systems Operations and Maintenance

SPM: Systems Planning and Management

Advantages of IS Outsourcing

Respondents were asked to rate, in the case of perceived advantages of IS outsourcing, strongly disagree or strongly agree according to a 5-point Likert-type scale. According to the data in Table 6, those advantages rated most favorably, regardless whether or not a firm outsources its IS function, were access to new IS technology, strategic use of information technology, focus in-house IS on core functions, and alternatives to in-house IS. It is also interesting to note that from the data in Table 6 cost-related advantages (i.e., personnel cost savings, stabilizing IS costs, technology cost savings) were rated least favorably even though cost savings through IS outsourcing are referred most frequently to the factors contributing to the attractiveness of IS outsourcing in many academic and trade publications. However, as indicated in Table 6, two group t-tests showed a few differences between IS outsourcing users and nonusers with respect to their perceived advantages of IS outsourcing. The differences between two groups are significant at the level of 0.05 or 0.10 in terms of business process resign and IS technology cost savings. Therefore, the results support that potential advantages mentioned in this study are the factors contributing to the attractiveness and growth of IS outsourcing.

Table 6 Advantages of IS Outsourcing

Advantage	Comparison of Users and Nonusers		
	Users	Nonusers	t-test p-value
Personnel cost savings	3.18	3.32	0.4004
Improved quality of IS services	3.36	3.34	0.8730
Stabilizing IS costs	3.14	3.01	0.3954
Alternatives to in-house IS	3.36	3.43	0.6491
Focus in-house IS on core functions	3.49	3.42	0.6634
Strategic use of information technology	3.50	3.47	0.8404
Reduced technical obsolescence risk	3.24	3.32	0.6498
Business process redesign	3.09	3.40	0.0450
Access to new IS technology	3.55	3.77	0.1985
IS technology cost savings	3.19	2.89	0.0716

Disadvantages of IS Outsourcing

Respondents were also asked to rate, in the case of perceived disadvantages of IS outsourcing, strongly disagree or strongly agree according to a 5-point Likert-type scale. According to the data in Table 7, those disadvantages rated most favorably, regardless whether or not a firm outsources its IS function, were qualifications of outside personnel, data/systems security, corporate strategy disclosure, and occurrences of additional costs.

Table 7 Disadvantages of IS Outsourcing

Disadvantage	Comparison of Users and Nonusers		
	Users	Nonusers	t-test p-value
Loss of control of IS	3.10	3.13	0.8811
Cost/benefit unclear	3.05	3.35	0.0369
Data/systems security	3.42	3.87	0.0064
Corporate strategy disclosure	3.17	3.81	0.0001
Loss of IS strategic planning capability	2.88	3.27	0.0160
Qualifications of outside personnel	3.50	3.94	0.0043
Existing union/labor agreement	2.31	2.45	0.3383
Loss/degradation of internal IS services	2.85	3.05	0.2568
Difficulty to terminate agreement	2.83	3.26	0.0046
Occurrences of additional costs	3.45	3.62	0.2378

Furthermore, as indicated in Table 7, two group t-tests showed the differences between IS outsourcing users and nonusers with respect to their perceived disadvantages of IS outsourcing. The differences between two groups are significant at the level of 0.05 or 0.10 in terms of cost/benefit unclear, data/systems security, corporate strategy disclosure, loss of IS strategic planning capability, qualifications of outside personnel, and difficulty to terminate agreement. Therefore, the results support that potential disadvantages covered in this study are the factors making IS outsourcing unattractive to potential users and leading to resistance on their part.

Selection Criteria for IS Outsourcing Providers

Respondents were also asked to rate, in the case of important factors in making the final selection among outsourcing service providers, very important or very unimportant according to a 5-point Likert-type scale. According to the data in Table 8, those criteria rated most favorably, regardless whether or not a firm outsources its IS function, were qualifications of provider's employees, reliability, timeliness of delivery of services, and responsiveness. Furthermore, as indicated in Table 8, two group t-tests showed a few differences between IS outsourcing users and nonusers with respect to their criteria for selecting among IS outsourcing service providers. The only difference between two groups is significant at the level of 0.10 in terms of provider's financial health/stability. Therefore, the results support that the criteria covered in this study are the important factors in making the final selection among IS outsourcing service providers.

Table 8: Selection Criteria for IS Outsourcing Providers

Criteria	Comparison of Users and Nonusers		
	Users	Nonusers	t-test p-value
Provider's track record	3.62	3.74	0.4556
Qualifications of provider's employees	4.50	4.52	0.8318
Performance clauses in contract	3.58	3.69	0.4237
Provider's financial health/stability	3.33	3.57	0.0886
Price	3.77	3.71	0.6360
Frequency of upgrades	3.91	4.05	0.2265
Timeliness of delivery of services	4.42	4.27	0.1864
Reliability	4.62	4.48	0.1344
Responsiveness to our firm	4.24	4.12	0.2843
Provider's knowledge of our firm's business	3.98	4.13	0.2403

Relationship of IS Outsourcing Advantages and Its Success

Respondents were asked to rate, in the case of perceived success of IS outsourcing, strongly disagree or strongly agree according to a 5-point Likert-type scale. According to Table 9 showing the relationship between IS outsourcing advantages and its success, IS outsourcing success is positively correlated with the outsourcing advantages such as stabilizing IS costs, improved quality of IS services, IS technology cost savings, and personnel cost savings. It is also interesting to note from Table 9 that IS outsourcing success is positively correlated with the cost-related advantages compared to other advantages such as access to new IS technology, strategic use of information technology, focus in-house IS on core functions. These strategic advantages of IS outsourcing are rated most favorably (See Table 6)

Table 9 Relationship of IS Outsourcing Success and Outsourcing Advantages

Advantages	IS Outsourcing Success	
	Correlation Coefficient	p-value
Personnel cost savings	0.2263	0.0202
Improved quality of IS services	0.3471	0.0003
Stabilizing IS costs	0.3577	0.0002
Alternatives to in-house IS	0.0441	0.6553
Focus in-house IS on core functions	0.0516	0.6015
Strategic use of information technology	0.1888	0.0549
Reduced technical obsolescence risk	0.1298	0.1936
Business process redesign	0.1151	0.2468
Access to new IS technology	0.1227	0.2168
IS technology cost savings	0.2515	0.0104

Relationship of IS Outsourcing Disadvantages and Its Success

As shown in Table 10, IS outsourcing success is negatively related to almost all of the outsourcing disadvantages covered in this study. Specially, IS outsourcing success is negatively related to the following disadvantages: cost/benefit unclear, loss/degradation of internal IS services, loss of IS strategic planning capability, and loss of control of IS. It is also interesting to note from the table 10 that there is no relationship between IS outsourcing success and the security-related disadvantages such as data/systems security and corporate strategy disclosure.

Table 10: Relationship of IS Outsourcing Success and Outsourcing Disadvantages

Disadvantages	IS Outsourcing Success	
	Correlation Coefficient	p-value
Loss of control of IS	- 0.2305	0.0180
Cost/benefit unclear	- 0.3546	0.0002
Data/systems security	- 0.1384	0.1571
Corporate strategy disclosure	- 0.1279	0.1935
Loss of IS strategic planning capability	- 0.2519	0.0095
Qualifications of outside personnel	- 0.2197	0.0243
Existing union/labor agreement	- 0.1919	0.0509
Loss/degradation of internal IS services	- 0.3450	0.0004
Difficulty to terminate agreement	- 0.2174	0.0274
Occurrences of additional costs	- 0.2282	0.0192

SUMMARY AND RECOMMENDATIONS

The results of this study indicate that 57 percent of the largest firms in Korea are outsourcing IS functions. Furthermore, 13 percent of these firms are considering doing so. Therefore, it is expected that the majority of these firms are going to outsource their IS functions in the future.

Many of the firms outsourcing IS functions have been doing so for either one to three years or more than five years and allocate less than 20 percent of their total corporate IS budget to outside IS service providers. Most utilize the services of either single or multiple providers and rely upon these providers for a range of services. However, it is recommended that whether or not a firm decides to outsource its IS functions, the management of IS can not be outsourced (Lacity and Hirschheim, 1993).

IS managers reported their perceived potential advantages and disadvantages from IS outsourcing. Those advantages rated most favorably are access to new IS technology, strategic use of information technology, focus in-house IS on core functions, and improved quality of IS services. Those disadvantages rated most favorably are qualification of outside personnel, data/systems security, occurrences of additional costs, and corporate strategy disclosure. These important advantages and disadvantages may be good determinants to make an organization's decision to outsource IS functions.

IS managers also reported the important factors firms must consider when choosing IS outsourcing service providers. These important factors are reliability, qualifications

of provider's personnel, timeliness of delivery of services, and responsiveness to outsourcing user. These results have implications for IS outsourcing users as well as service providers. Outsourcing service users have guidelines for selecting qualified IS service providers, while IS service providers also have guidelines for understanding and responding to their customer expectations in order to provide superior IS services.

The results of this study also indicate there are relationships between IS outsourcing success and outsourcing advantages (i.e., stabilizing IS costs, improved quality of IS services, IS technology cost savings, personnel cost savings) as well as disadvantages (i.e., cost/benefit unclear, loss or degradation of internal IS services, loss of IS strategic planning capability, loss of control of IS). These results have implications for IS outsourcing users. These important outsourcing advantages and disadvantages may be critical success factors from IS functional outsourcing. Since IS outsourcing has the potential for yielding significant advantages and disadvantages to user organizations, it is not a universal success or panacea. Success is not automatic but requires careful strategic planning and implementation (Palvia, 1995; Willcocks et al., 1995). Furthermore, what determines success is managing the relationship less as a contract and more as a strategic partnership (McFarlan and Nolan, 1995).

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