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IS CHARACTERISTICS AND EFFECTIVENESS IN PRIVATE AND PUBLIC EGYPTIAN COMPANIES

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Key Words

Information Systems; Information Systems Characteristics; Systems Effectiveness; User Information Satisfaction; Systems Usage; Information Systems Maturity.

Abstract

This study explores whether information systems (IS) characteristics vary across the Egyptian private and public manufacturing companies, and whether ownership type influences the relationship of top management support, user involvement, and IS maturity to systems effectiveness. Dissimilarities between the two groups were found in data entry methods, location of data processing facilities, number of years the systems were used, and size of the IS unit. Ownership type was found to be a significant contingency factor that influences the relationship between the organizational factors and user information satisfaction (UIS). These findings provide important guidelines for a more effective management of information technology (IT) resources in the Egyptian public and private manufacturing companies.

Introduction

The fundamental objective of information systems (IS) investment is to improve individual and group decision-making performance, and ultimately organizational effectiveness (Raymond, 1990). The issue of information systems effectiveness has generated much debate and consequent research interest over the years. However, consistent findings on the determinants of IS effectiveness have yet to emerge. One possible reason for such inconsistency is that IS problems are perhaps country-specific and are related to the country's unique political, legal, economic, cultural, and technological characteris-

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tics. Research findings obtained from organizations operating in a Western environment cannot necessarily be generalized to other environments (e.g., Aharoni and Burton, 1994; Rosenzweig, 1994; Deans *et al.*, 1991).

On the other hand, a large part of IS literature is based on experiences of the private sector in developed countries (Jain, 1997; Seneviratne, 1999) and is, therefore, of limited relevance to IS management in the public sector in developing countries. Critical environmental and organizational differences between private and public organizations (e.g., Bozeman and Bretschneider, 1986; Bretschneider, 1990; Bretschneider and Wittmer, 1993; Margetts and Willcocks, 1994; Rainey *et al.*, 1976) may lead to differences in IS characteristics and practices, and may have implications for their respective capacity to manage IT effectively. This problem is further complicated by the disparity in the information technology (IT) development level between developed and developing countries and the dissimilarity in issues related to IS management in public and private sectors.

Effective management of IS requires identifying the issues that might be unique to certain cultures (Deans and Ricks, 1991; Palvia and Saraswat, 1992) and certain organizational types. Managerial practices, managerial climate, and management systems tend to differ as a result of ownership type in Egyptian companies. These differences are likely to be reflected in IS issues because of their nature, usage motivation, and required large investments. However, none of the few studies that investigated information systems practices, characteristics and effectiveness in the Egyptian context (e.g., Khalil and Elkordy, 1997, 1999; Noshi, 1995) addressed the possible differences in these IS related issues across private and public organizations. Hence, research is needed to know whether IS practices, characteristics and effectiveness vary with ownership type (public versus private).

This paper reports on the results of an investigation aimed at exploring the similarities/dissimilarities of IS characteristics between Egyptian private and public manufacturing companies, and whether ownership type influences the relationship between systems effectiveness and its organizational determinants-top management support, user involvement, and IS maturity. The paper is organized accordingly. A background of the research issues is presented first, followed by research methodology, research results, and a discussion of the results. The paper ends with conclusions.

Background

The role of the private sector is rapidly growing, compared to the public sector that has dominated

Egypt's economy for four decades (Dolezal Jr., 1999; Smith, 1999). IT is expected to contribute to the managerial modernization of Egyptian public and private companies, which are under pressure from global economic competitiveness, and face problems of low productivity. Yet, effective IT diffusion seems to be particularly daunting for developing countries.

Since IT is designed and produced in developed countries, it is likely to be culturally biased in favor of the developed countries' social and cultural systems. This bias is likely to create cultural and social obstacles for developing countries like Egypt to successfully transfer and use IT applications (Hill, Loch, and Straub, and El-Sheshai, 1998). In addition, IS in a global environment are influenced by different cultures, laws, IT infrastructure, and the availability and role of skilled personnel (Dasgupta, 1999).

Nevertheless, effective IS management in Egyptian public and private organizations requires that policy makers must be aware of IS issues that are specific to their companies, and to be familiar with the managerial actions that are appropriate to these issues. However, research on information systems effectiveness has traditionally focused on developing and testing frameworks and models in Western organizations with little consideration for how these frameworks and models can be applied and extended to developing countries. In particular, a large part of IS literature is based on experiences of the private sector in developed countries and is, therefore, of limited relevance to the design and implementation of IS in public organizations in developing countries.

Researchers suggest that there may be critical environmental and organizational differences between private and public organizations (e.g., Bozeman and Bretschneider, 1986; Bretschneider, 1990; Bretschneider and Wittmer, 1993; Margetts and Willcocks, 1994; Rainey *et al.*, 1976). Unique characteristics of public organizations include the absence of market incentives, the existence of multiple, conflicting goals; and a political context with a broader range of constituent groups, a higher level of accountability, lower work satisfaction and organizational commitment, and more rules, regulations, and constraints (Robertson and Seneviratne, 1995; Allison, 1984; Rainey *et al.*, 1976).

The differences between public and private organizations have implications for their respective capacity to effectively manage information technology and systems (Thong and Yap, 200). In public organizations, changes in work settings are more difficult to implement (Robertson and Senevir-

ante, 1995), the risk involved in IT development is more exacerbated (Margetts and Willcocks, 1994), and frameworks developed in the private sector for managing IT projects are less likely to succeed (Cats-Baril and Thompson, 1995; Bretschneider and Wittmer, 1993).

Furthermore, public IS managers often have to deal with greater levels of interdependence across organizational boundaries, to operate with higher levels of red tape, to use less tangible criteria for IT investment evaluation, to get more concerned with extraorganizational linkages rather than with internal coordination, and are usually placed lower in the organizational structure (Bretschneider, 1990). This constrained IS operating environment is expected to influence IS characteristics such as size, location, age, scope, task structuredness, human resources, and hardware and software resources.

Additionally, IS literature refers to numerous research efforts aimed at providing and testing frameworks and models that describe the potential impact of organizational factors (e.g., organizational size, degree of centralization, formalization, sufficiency of financial resources, top management support, user involvement, user training, and organizational maturity of IS) on systems effectiveness. Top management support, user involvement, and IS maturity are among the organizational variables that received much attention in prior systems effectiveness research.

Greater top management support for IS is expected to lead to more effective systems. However, prior investigations (e.g., Furest and Cheney, 1982; Igbaria, 1992; Doll, 1985; Ein-Dor and Segeve, 1978; Lee and Kim, 1992; Rockart and Crescenzi, 1984; Yap, Soh, and Roman, 1992) have yielded mixed results. Also, greater systems effectiveness is expected to result from increasing the maturity of the IS function (Raymond, 1990). Yet, a number of investigations aiming at testing the impact of IS maturity on systems effectiveness (e.g., Mahmood and Becker, 1985; Grover and Teng, 1992; Li, Rogers, and Chang, 1994; King and Sabherwal, 1992) have produced inconsistent results. Further, user involvement in design, development, and implementation of systems is believed to have a positive effect on such systems. Nevertheless, the empirical evidence does not consistently support these general normative arguments (e.g., Franze and Robey, 1986; Ives and Olson, 1984; Gallagher, 1974; Swanson, 1974; Edstrom, 1977; Olson and Ives, 1981; Furest and Cheney, 1982; Gyampah and White, 1993; Torkzadeh and Doll, 1994).

The problem of systems effectiveness research is further complicated by the lack of well-defined measures-e.g., dependent variables--of IS effectiveness. Without such well-defined dependent variables, much of the information systems effectiveness research becomes highly speculative (Delone and Mclean, 1992). The difficulty of developing direct and objective measures to assess a system's effectiveness has led researchers to adopt surrogate constructs that are more easily measurable. Different perspectives of systems effectiveness have been adopted and varying definitions and measures have been proposed (e.g., Li, 1997; Srinvasan, 1985). User information satisfaction (UIS) and systems use in improving decision making (SU) are two commonly used measures of systems effectiveness in prior IS research.

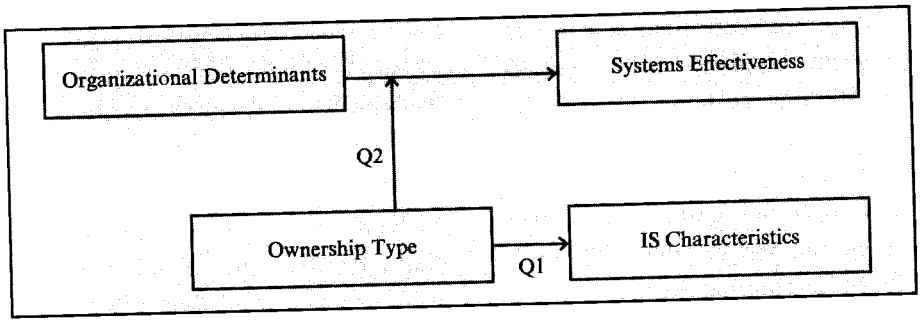
Given the inconsistent results of prior research on the organizational determinants of systems effectiveness in developed countries and the insufficient understanding of factors that lead to IS success/failure in developing countries (Jayasuriya, 1999), empirical evidence from non-Western developing countries are needed. Research findings obtained from organizations operating in a Western environment cannot necessarily be generalized to other environments where the social, economic, and cultural characteristics can be fundamentally different (e.g., Aharoni and Burton, 1994). Further, results from research on the private sector are of limited importance to IT management in the public sector when the two sectors are dissimilar (Jain, 1997).

None of the few studies on IS characteristics and effectiveness in Egypt (Khalil and Elkordy, 1997, 1999; Noshi, 1995) investigated the possible differences of IS characteristics and effectiveness between public and private organizations. This paper presents the findings of a study aimed at investigating IS characteristics in Egyptian public and private companies, and the possible influence of ownership type on the relationship of top management support, user involvement, and IS maturity to systems effectiveness. More specifically, this paper reports on our findings with regard to two questions (Figure 1):

Q1: Do IS characteristics differ across the private and public Egyptian manufacturing companies?

Q2: Does ownership type (public vs. private), as a contingency variable, influence the relationship of top management support, user involvement, and system maturity to systems effectiveness?

Figure 1
The Research Model



Our investigation adopted both user information satisfaction (UIS) and system use in improving decision-making (SU) as two measures of systems effectiveness. Further, the IS characteristics investigated in this study were chosen in light of IS theoretical frameworks and prior research models, as they are believed to directly and/or indirectly affect IS management and systems effectiveness. These characteristics include organizational location of the IS unit (Ein-Dor and Segev, 1978; Fraz and Robey, 1986), data entry methods (Ives, Hamilton, and Davis, 1980; Lucas, 1978; Fuerst and Cheny, 1982), data processing location (Ives, Hamilton, and Davis, 1980; Lucas, 1978), number of years the systems were used (Lee and Kim, 1992; Fuerst and Cheny, 1982), and the size of the IS unit (Ginzberg, 1980; Lee and Kim, 1992; Franz and Robey, 1986).

Methodology

1. Research variables:

1.1 System effectiveness (the dependent variables). Two measures of systems effectiveness, as dependent variables, were adopted: user information satisfaction (UIS) and system use in improving decision making (SU). Defined as the extent to which users believe that the system meets their information requirements, UIS was measured using the short-form scale of user satisfaction developed by Baroudi and Orlikwaski (1988). Additionally, SU, the extent to which users believe the system leads to improvement in decision making, was measured using the scale developed by Sanders and Courtney (1985).

1.2 The organizational variables (the independent variables). The three independent variables included in this investigation are top management support, user involvement, and IS maturity. Top management support, the extent to which the upper managerial levels provide an appropriate amount of support for IS, was measured using Lee and Kim's (1992) scale. IS maturity, defined

as the overall status of the IS function within the organizations, was measured using King and Sabherwal's (1992) scale. Finally, user involvement is defined as the extent to which users participate in the design, development, implementation, and operation of the system, and was measured using Franz and Robey's (1986) scale.

1.3 Contingency variables: Ownership type (private vs. public).

IS characteristics: In addition to the above research variables, six IS characteristics were identified: the organizational location of the IS unit, the desired organizational location for the IS unit as perceived by IS managers, data entry methods, location of data processing systems, number of years the systems were used, and size of the IS unit (measured by the number of employees).

2. Sampling

This study focuses on the manufacturing companies in the Egyptian public and private sectors as the primary population. To include a company in the sampling frame, its IS applications had to be fully operational for at least two years and their service extended to all departments and functions within the company.

The sampling frame included all manufacturing companies in the public or private sector located in Alexandria, Cairo, Six October City, Tenth Ramadan City, and New Amria City. The companies included in the sampling frame consist of textile, chemical, and electronic industries. Department Managers that use IS outputs were treated as key informants with respect to all variables in the study. The selected respondents have held managerial positions for a minimum of two years to make sure they have enough experience with the information systems in use. Departments included in the study represent a wide range of functional areas including finance, marketing, production, payroll, and inventory.

The sample contains data from 42 companies (23 public and 19 private). Two hundred and fourteen managers from the sampled companies participated in the study, with 115 (53.7%) from the public sector and 99 (46.3%) from the private sector.

3. Measures and data collection

IS managers in the selected companies were interviewed to gather data pertinent to IS characteristics. Also, a questionnaire was developed to serve as a data-taking instrument. The questionnaire was designed to gather information from user department managers concerning their perceptions about top management support, IS maturity, user involvement, user information satisfaction (UIS), and system use in improving decision making (SU).

The reliability of the multi-item scale in this questionnaire was determined by using the Cronbach alpha test, which measures internal consistency. The alpha level for each variable was higher than .80, which is the recommended minimum acceptable level for reliability in basic research (Ives and Olson, 1984).

The scales adopted in this study to measure top management support, user involvement, IS maturity, USI, and SU were used in previous studies' questionnaires and are considered to have high content validity (Yap, Soh and Raman, 1992). In addition, initial versions of each scale were piloted and revised before the final version was formulated.

Results

1. IS characteristics in public and private companies:

Table 1 summarizes IS characteristics in the private and public companies. The characteristics include the actual location of the IS unit in the organizational structure, the desired location of the IS unit in the organizational structure from the IS managers' point of view, data entry methods, location of data processing systems, number of years the systems were used, and the size of the IS unit.

Whether IS characteristics were contingent (dependent) on ownership type (public vs. private) was tested by the means of the Chi-Square test (for categorical data) and the t-test (for interval data). Chi-square was used with the data on the actual and desired organizational location of the IS unit, data entry methods, and the location of the data processing systems. On the other hand, t test was used with the data on the number of years the systems were used and the size of the IS unit (Table 1).

Both actual and desired organizational location of the IS unit were found to be independent of ownership type. It's noticeable that IS units in the private companies are approximately evenly distributed across three locations: within accounting and finance, independent unit reports to the CEO, and independent unit reports to accounting and finance. However, in 65% of the public companies, IS unit was reported to be within the accounting and finance unit. As to the desired organizational location of the IS unit, the majority of the respondents in the private (84%) and public (74%) companies prefer to have an independent IS unit that reports either to the CEO or to the accounting and finance manager.

As to data entry methods, the results indicate that the use of on-line, batch, or both methods for data entry depends on ownership type ($\chi 2 = 12.37$, $p < .01$). It's remarkable that 79% of private companies use only on-line data entry, compared to their public counterparts (26%). This observation may reflect a difference in the modernization level between IS

applications in the two sectors. IS applications in the private companies seem to be more recent and utilize more advanced IT than their public counterparts.

Table 1
A summary of IS characteristics in the Public and Private Sectors

Information system	Public sector		Private sector	
Characteristics	**No. of firms**	**%**	**No. of firms**	**%**
Location of the IS unit in the organizational structure:				
Within Act & Fin. Unit	15	65.22	7	36.84
Independent unit reports to the CEO	3	13.04	5	26.32
Independent unit reports to Act & Fin	5	21.74	6	31.58
Other	0	.00	1	5.26
Total	**23**	**100**	**19**	**100**
Statistics: Chi-Square	$\chi 2 = 2.96$	**df = 2**		
Desired location for the IS unit :				
Within Act & Fin unit	6	26.09	2	10.53
Independent unit reports to the CEO	9	39.13	6	31.58
Independent unit reports to Act & Fin	8	34.78	10	52.63
Other	0	.00	1	5.26
Total	**23**	**100**	**19**	**100**
Statistics: Chi-Square	$\chi 2 = 2.30$	**df = 2**		
Data entry methods:				
Batch	10	43.48	2	10.53
On-line	6	26.09	15	78.95
Batch and on-line	7	30.43	2	10.53
Total	**23**	**100**	**19**	**100**
Statistics: Chi-Square	$\chi 2 = 12.37^{**}$	**df = 2**		
Data processing:				
Centralization	12	52.17	3	15.79
Decentralization	7	30.43	14	73.68
Centralization & Decentralization	4	17.39	2	10.53
Total	**23**	**100**	**19**	**100**
Statistics: Chi-Square	$\chi 2 = 8.46^{*}$	**df = 2**		

* P < .05 ** P < .01

Table 1. Continued
A summary of IS characteristics in the Public and Private Sectors

Information system	Public sector		Private sector	
Characteristics	**No. of firms**	**%**	**No. of firms**	**%**
Number of years the systems were used:				
3-5	3	13.04	5	26.31
6-10	9	39.13	11	57.89
11-15	5	21.73	2	10.52
16-20	2	8.69	1	5.26
21-25	3	13.04	0	0.00
26-30	1	4.34	0	0.00
Total	**23**	**100**	**19**	**100**
Statistics: t Test		**t = 2.56***		
IS unit size (employees):				
1-5	1	4.34	8	42.10
6-6-10	5	21.73	5	26.31
11-15	3	13.04	3	15.78
16-20	3	13.04	2	10.52
21-25	4	17.39	1	00
26-30	4	17.39	0	00
31-35	0	00.00	0	00
36-40	1	4.34	0	00
41-45	0	0.00	0	00
46-50	0	0.00	0	00
51-55	0	0.00	0	00
56-60	1	4.34	0	00
61-65	1	4.34	0	00
Total	**23**	**100**	**19**	**100**
Statistics: t Test		**t = 3.81****		

* P < .05 ** P < .01

Similarly, the location of data processing systems was found to be dependent on ownership type ($\chi 2 = 8.46$, $p < .05$). Decentralization is clearly the mode of choice in processing data in private companies, where more than 74% of the companies reported to have decentralized data processing facilities. However, 52% of the public companies reported to have centralized data processing facilities,

and 30% reported to have a combination of centralized and decentralized data processing facilities.

As to the number of years the systems were used, the t-test results suggest that the number of years of systems use depends on ownership type ($t = 2.56$, $p < .05$). IS applications were in use for 10 years or less in 52% of the public sector companies, and 84% of the private sector companies. The results suggest that public companies tend to have more experience with IS applications than the private companies do. In other words, public companies adopted information systems applications earlier than the private companies.

Similarly, the size of the IS unit was found to be dependent on ownership type ($t = 3.81$, $p < .01$). Table 2 shows that 52% of the public companies, and 95% of the private companies were found to have IS units with 20 employees or less. Clearly, the average size of the IS unit is larger in the public companies than in their private counterparts.

2. The influence of ownership type on the relationship between the organizational determinants and systems effectiveness:

Table 2 summarizes the results of comparing the (independent) organizational variables of top management support, user involvement, and IS maturity and the dependent variables of UIS and SU based on ownership type (public vs. private). The t-test results indicate that, with the exception of IS maturity ($t = -2.19$, $P < .05$), no differences between public and private companies were statistically significant. Only IS maturity seems

Table 2
Results of t-test for the research variables between the public and private sector

Research Variables	Public sector			Private sector			t- test p (2-tail prob.)
	Mean	SD	SE	Mean	SD	SE	t value
Top management support	4.26	.59	.05	4.18	.64	.06	.91
User involvement	3.45	.82	.07	3.65	.82	.08	-.92
IS maturity	3.51	.74	.07	3.73	.71	.07	-2.19 *
User information satisfaction (UIS)	4.00	.63	.05	4.01	.55	.05	-.15
Systems use in improving decision making (SU)	4.03	.68	.06	4.04	.62	.06	-.14

* $P < .05$

to be higher among the public companies than the private companies.

In order to examine the impact of ownership type (public vs. private) on the relationship between the three organizational variables--top management support, user involvement, and IS maturity--and systems effectiveness measured by UIS and SU, a covariance analysis was performed (Table 3).

The results reported in Table 3 show a significant direct effect of the independent variables (top management support, user involvement, and IS maturity) on UIS ($F = 11.369$, $P < .001$). When the contingency variable (ownership type) was taken into account, the explained variance in UIS increased by 1.800 ($F = 8.456$, $p < .05$). Also, there is a significant direct effect of the independent variables (top management support, user involvement, and IS maturity) on SU ($F = 6.282$, $P < .001$). However, when ownership type was taken into account, as a contingency variable, the explained variance in SU increased by only .297, which is insignificant.

Table 3
Analysis of variance of the independent variables and ownership type as a contingency variable on IS effectiveness

Source of variation	Dependent variables	Sums of squares	DF	Means squares	F
Main effects (Top management support, user involvement, and IS maturity)	UIS	29.046	12	2.420	11.369**
Covariates (Contingency variables):					
Type of ownership		1.800	1	1.800	8.456*
Main effects (Top management support, user involvement, and IS maturity)	SU	25.146	12	2.096	6.282**
Covariates (Contingency variables):					
Type of ownership		.297	1	.297	.889

* $P < .05$, ** $P < .01$

Discussion

Overall, our findings suggest some similarities and differences in IS characteristics between the investigated public and private manufacturing Egyptian companies. No significant differences were found between the public and private companies in either the actual organizational location of the IS unit or the IS managers' preferred organizational location of the IS unit. However, significant differences were found between the public and private companies in data entry methods, location of data processing facilities, number of years the systems were used, and size of the IS unit. In addition, ownership type (public vs. private) was found to influence the relationship between the three organizational determinants (top management support, user involvement, and IS maturity) and user information satisfaction (UIS) as a measure of systems effectiveness.

It's notable that having IS as part of the accounting and finance function is the prevailing organizational structure among the companies, especially in the public sector. This is not a surprising finding, since public IS managers are usually placed lower in the organizational structure (Bretschneider, 1990). This organizational structure of the IS function in the public companies is increasingly becoming unpopular in IS literature and practice, and is particularly incompatible with the important role that IS must play in the modernization efforts of the Egyptian manufacturing companies.

The majority of IS managers in both public (74%) and private (%84) companies share the desire to have the IS function as an independent unit, and to elevate the organizational location of the IS unit to report either to the CEO or the head of the accounting and finance unit. The elevation of the IS functions in the organizational hierarchy is critical, since it helps secure more top management support and more resources to IS.

Contrary to the state of affairs in the private companies, public companies seem to depend mainly on centralized mainframe computers and legacy systems in support of their data and information processing operations. The majority of the private companies (74%) are reported to use only decentralized systems (e.g., minicomputers, microcomputers, intranets). The differences in the number of years the systems were used between the public and private companies further explain the differences between the two groups as to data entry methods (on-line vs. batch) and data processing systems (centralized vs. decentralized).

IS applications in the public companies are relatively older and, there-

fore, more obsolete, compared to their counterparts in the growing private sector. The Egyptian private sector has recently started to flourish, and its IS applications seem to be more modernized, decentralized, and use more of on-line data entry than IS applications in their public counterparts. This finding is in disagreement with those of Bretschneider and Wittmer (1993) who found the American public organizations to adopt more modern IT than private organizations.

Public and private organizations seem to differ in their propensity towards IT assimilation (Aggarwal and Mirani, 1999). Compared to smaller organizations, large organizations are expected to adopt state-of-the-art technologies and techniques significantly earlier than small organizations. However, this expectation may not be true for public organizations, even though they are relatively larger than their private counterparts. Compared to private organizations, public organizations generally experience more resistance to IT related changes, have more exacerbated risk involved in IT development, operate with higher levels of red tape, and use less tangible criteria for IT investment evaluation (Robertson and Senevirante, 1995; Margetts and Willcocks, 1994; Bretschneider, 1990). These unique characteristics, combined with financial difficulties, may have slowed down the adoption of modern IT applications in the Egyptian public companies.

Although IS units are relatively small in the two sectors, they tend to be smaller in the private companies. This finding may be indicative of the limited IS human resources that are required to support the development of new applications and maintenance and operation of the existing applications. The relatively small IS units in the private sector may be due to the fact that private companies are generally smaller than the public ones. Another plausible reason is that privatization could have led to smaller IS units as a result of the downsizing and the human resources reallocation policies that often accompany privatization.

Further, IS in the private companies were found to be less mature than IS in the public companies. Longer use of IS applications along with the required formal (and enforced) documentation standards contribute to the relatively higher IS maturity level in the public companies. One can look at this finding in light of the organizational literature, which suggests a correlation between organizational size and administration innovation. Given that maturity is a subset of innovation (Lehman, 1985), IS matur-

ity is expected to be higher in the public sector, since public companies tend to be larger and older than their private counterparts.

Shortage of resources may have resulted in the selection of low-cost IS solutions, which do not satisfy completely the needs and requirements of users. Egyptian companies, especially in the public sector, have had financial problems, and it has been difficult for them to secure the needed financial loans (Hasabou, Nasif, Abdelhy, Moustafa and Khalifa, 1993: 16). This financial predicament places unnecessary constraints on IS implementation efforts and may preclude the development and implementation of better IS solutions.

Finally, the differences in IS characteristics between public and private companies found in this investigation make ownership type (public vs. private) an important factor to consider when making IS policies and developing IS research models in an Egyptian context. For policy makers, the lessons learned from investigating information systems characteristics in the public sector may not be transferable without adaptation to the private sector. At the very least, the differences found in IS characteristics (data entry methods, location of data processing facilities, number of years the systems were used, IS size, and IS maturity) should require modification of many managerial prescriptions based on results from the public sector.

For researchers, ownership type was found to influence the relationship between the three organizational determinants (top management support, user involvement, and IS maturity) and user information satisfaction (UIS) as a measure of systems effectiveness. Public and private organizations differ in their managerial practices, managerial climate, and management systems (Bozeman and Bretschneider, 1986; Bretschneider, 1990; Bretschneider and Wittmer, 1993; Margetts and Willcocks, 1994; Rainey et al., 1976; Allison, 1984), and Egyptian organizations are of no exception. These differences appear to intervene in the relationship of the investigated organizational variables and systems effectiveness. Investigations of IS effectiveness in public and private Egyptian organizations may produce different results. Research models designed to investigate IS effectiveness in an Egyptian context are expected to include ownership type as a variable or a covariate.

Conclusions

Effective management of IS requires identifying the issues that might be unique to certain cultures. The present study took a step forward in

exploring IS characteristics in public and private organizations in an Egyptian context, and in investigating the effect of ownership type, as a contingency variable, on the relationship between organizational variables--top management support, user involvement, and IS maturity -- and IS effectiveness, measured by user information satisfaction (UIS) and systems usage in improving decision-making (SU).

Differences and similarities in IS characteristics were found between the investigated public and private manufacturing Egyptian companies. While no differences were found in the actual organizational location of the IS unit and the IS managers' preferred organizational location of the IS unit, differences were found in data entry methods, location of data processing systems, number of years the systems were used, and size of the IS unit. Also, ownership type (public vs. private) was found to intervene in the relationship between the three organizational determinants (top management support, user involvement, and IS maturity) and user information satisfaction (UIS) as a measure of systems effectiveness.

In most cases, IS units seem to be organizationally positioned improperly in the manufacturing companies in the two sectors. Batch rather than on-line data entry, centralized rather than decentralized data processing facilities, and antiquated rather than up-to-date applications, and larger rather than smaller IS units seem to be the norm in the investigated public companies. Consequently, restructuring to better position IS units, investment in new IT, upgrading of the existing systems and related human resources, and the formulation and enforcement of policies, procedures, and standards for systems development, implementation and use are challenges that must be dealt with. Egyptian companies, especially in the public sector, have to progress beyond the early stages of computing in order to develop and sustain competitive advantages.

The results of this study suggest that future investigations of IS effectiveness across public and private Egyptian organizations may produce different results. Future research models designed to investigate IS effectiveness should include ownership type in order to validate the results of this investigation. Also, future research is needed to investigate the impact of ownership type on IS characteristics and practices using research designs that control for other factors such as organizational size, experience with computer technology, current investment in computer technology, procurement practices, and task environment of the organization.

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الملخص

سمات نظم المعلومات وفاعليتها في شركات قطاعي الأعمال والخاص المصرية

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استهدفت هذه الدراسة تقديم إجابة عن السؤالين الآتيين: (١) هل تختلف سمات نظم المعلومات بين شركات قطاعي الأعمال والخاص المصرية؟ (٢) هل يؤثر نوع الملكية (عام وخاص) على العلاقة بين المتغيرات التنظيمية، ودعم الإدارة العليا لنظم المعلومات، والمشاركة في تصميم وبناء نظم المعلومات، والنضج التنظيمي لوحدات نظم المعلومات وبين فاعلية نظم المعلومات المستخدمة في الشركات المصرية؟ وللإجابة عن هذين السؤالين تم جمع بيانات عن متغيرات الدراسة باستخدام عينة من ٤٢ شركة (٢٣ من شركات الأعمال، ١٩ من الشركات الخاصة) وبمشاركة ٢١٤ مديراً (١١٥ من شركات الأعمال، ٩٩ من الشركات الخاصة). هذا وقد أظهرت نتائج الدراسة وجود اختلافات في نظم المعلومات بين القطاعين؛ من حيث طرق إدخال البيانات للنظم المستخدمة، ومركزية ولا مركزية إمكانات تشغيل البيانات والمعلومات، وعدد سنوات استخدام المعلومات، وحجم الوحدات الإدارية لنظم المعلومات. كما أظهرت نتائج الدراسة أيضاً وجود تأثير لنوع الملكية على العلاقات الإيجابية والقوية بين المتغيرات التنظيمية الثلاثة وفاعلية نظم المعلومات المستخدمة. وهذه النتائج يمكن الاسترشاد بها في تحقيق إدارة فاعلة لتقنيات نظم المعلومات النادرة في شركات قطاعي الأعمال والخاص المصرية.

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