



Industrial Management & Data Systems

Management accounting system for hospitals: a research framework

Salah A. Hammad Ruzita Jusoh Elaine Yen Nee Oon

Article information:

To cite this document:

Salah A. Hammad Ruzita Jusoh Elaine Yen Nee Oon, (2010), "Management accounting system for hospitals: a research framework", *Industrial Management & Data Systems*, Vol. 110 Iss 5 pp. 762 - 784

Permanent link to this document:

<http://dx.doi.org/10.1108/02635571011044777>

Downloaded on: 30 March 2016, At: 23:22 (PT)

References: this document contains references to 123 other documents.

To copy this document: permissions@emeraldinsight.com

The fulltext of this document has been downloaded 2441 times since 2010*

Users who downloaded this article also downloaded:

(2013), "Decentralization, perceived environmental uncertainty, managerial performance and management accounting system information in Egyptian hospitals", *International Journal of Accounting & Information Management*, Vol. 21 Iss 4 pp. 314-330 <http://dx.doi.org/10.1108/IJAIM-02-2012-0005>

(2013), "Strategic management accounting practices in hospitals: Empirical evidence on their dissemination under competitive market environments", *Journal of Accounting & Organizational Change*, Vol. 9 Iss 3 pp. 336-369 <http://dx.doi.org/10.1108/JAOC-12-2011-0065>

(2008), "The effectiveness of management accounting systems: Evidence from functional managers in a developing country", *Managerial Auditing Journal*, Vol. 23 Iss 2 pp. 187-219 <http://dx.doi.org/10.1108/02686900810839866>



Access to this document was granted through an Emerald subscription provided by emerald-srm:232579 []

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.



IMDS
110,5

762

Received 2 December 2009
Revised 6 February 2010
Accepted 17 February 2010

Management accounting system for hospitals: a research framework

Salah A. Hammad, Ruzita Jusoh and Elaine Yen Nee Oon
University of Malaya, Kuala Lumpur, Malaysia

Abstract

Purpose – The purpose of this paper is to propose a framework to examine the relationship between contextual factors, management accounting system (MAS) and managerial performance within the health care industry. In particular, it aims to uncover the contextual factors influencing the design of MAS that would enhance managerial performance in Egyptian hospitals.

Design/methodology/approach – The premise of contingency theory is utilized to identify the contextual factors that may influence the use of MAS; namely organizational strategy, technology, structure, external environment, and size. The mediating role of MAS on the impact of managerial performance is examined through the extent to which managers use the four information characteristics associated with the design of MAS: scope, timeliness, aggregated, and integrated.

Findings – This framework provides clarity in linking the perceived usefulness of MAS information characteristics to managerial performance that has been viewed as problematic by past studies.

Research limitations/implications – The Egyptian hospital industry is chosen as the ideal setting to investigate the relationship between contextual factors, MAS and managerial performance because of its complexity and continuous inept administration despite years following its reform.

Practical implications – This framework helps practitioners develop new approaches in designing MAS within the health care sector.

Originality/value – This framework adds invaluable insights to the existing literature regarding performance implications of MAS design and functionality, especially within the health care sector.

Keywords Management accounting, Management effectiveness, Contingency planning, Health services, Egypt

Paper type Conceptual paper

1. Introduction

Egypt is the largest and most populous country in the Middle East and North Africa. In the 1970s and 1980s, it enjoyed rapid economic growth, benefiting from the effects of the oil boom in the region and rising revenues from the Suez Canal operations. However, in the late 1980s, economic imbalances and reduced growth in neighbouring oil economies led to a substantial deterioration in economic performance. In the early 1990s, Egypt started a gradual program of economic adjustment and privatization (HassabElnaby *et al.*, 2003; Rannan-Eliya *et al.*, 1997). In 1994, the Egyptian government passed Decree 304 initiating its health care reform. The reform required changing the manner in which public hospitals operate in Egypt by challenging and encouraging public hospital staff to accept private sector practices. It aims to shift public hospitals' image from being merely health care institutions to multi-products organizations. Despite the health care reform, the Egyptian government and citizens recognize that the performance of public health sector is still less than adequate (Hassan, 2005; Mostafa, 2005; Zineldin, 2006).



Private hospitals, on the other hand, face pressures from firms, insurance companies and households to become more cost efficient. Rannan-Eliya (1995) found that 56 percent of total health spending was utilized by private sector providers. In 2005, World Health Organization (WHO) reported that private expenditure on health constitutes 62 percent of total health care expenditure. Moreover, private hospitals in Egypt struggled to remain profitable at 60-70 percent occupancy rates (Gericke, 2004). Thus, improved quality of health care was crucial for survival in this changing environment (Zineldin, 2006). The privatization and reform of the healthcare sector in Egypt has also resulted in increased competition in the Egyptian market. As such, effective implementation of information systems should improve organizational performance, since better information used is expected to lead to better decision making (Seliem *et al.*, 2003).

One important tool to enhance performance in hospitals is the management accounting system (MAS). Kettelhut (1992) suggested that there are three basic requirements for hospitals accounting systems. First, it must continue to support traditional tasks like tracking patients, billing, payroll, and other accounting functions. Second, it must be used to increase hospital marketing effectiveness. Third, it must be used to measure and improve hospital efficiency. Ramsey (1994) proposed that accounting systems should serve three purposes:

- (1) promote cost efficiency within the hospital without sacrificing the institution's service quality;
- (2) allow the hospital to maximize its resources through service line management; and
- (3) highlight opportunities for continuous improvement within the hospital's operations.

Despite the important role of MAS in hospitals, van Triest and Elshahat (2007) investigated the use of managerial and costing information in Egypt and found that the use and sophistication of managerial and costing information in Egypt is limited. No advanced accounting techniques seem to be applied and activity-based costing concepts are largely unknown. The purpose of managerial and costing information focuses more on pricing decisions rather than performance measurement, process improvement, or cost reductions (van Triest and Elshahat, 2007). While Simon (2007) suggested that a sophisticated MAS is not automatically associated to superior performance, he concluded that superior performance is the product of an appropriate fit between the identified contingent factors and MAS. Thus, the objective of this paper is to propose a research framework on contextual factors that influence the use of MAS and the mediating role of MAS on the relationship between these contextual factors and managerial performance.

The proposed research framework aims to contribute to the management control systems literature that can be used to fill the empirical gap that exists within developing countries. To date, very little research has empirically examined the relationship between contextual variables and MAS and their impact on organizational or managers' performance within the hospital industry (Abernethy and Brownell, 1999; Abernethy and Lillis, 2001; Cardinaels *et al.*, 2004; Counte and Glandon, 1988; Devaraj and Kohli, 2000; Hill, 2000; Hill and Johns, 1994; Kim, 1988; Lawrence, 1990; Pizzini, 2006). In particular, Pizzini (2006) specifically mentioned that hospital industry provides an ideal setting to investigate the performance effects of cost system-design as it also represents complex organizations and contributes significantly to the gross domestic product (GDP).

In line with health care reforms, Abernethy and Lilis (2001) argued that hospitals provide a suitable empirical setting where a diversity of structural arrangements and strategic orientations are both readily observable and recognized as having implications for other elements of control systems. Further, the majority of past studies examined variables in isolation. The proposed research framework will provide contribution on the development of hospital MAS by investigating various contextual variables in a single model and at the same time using MAS as a mediating variable. This research will also help practitioners develop new approaches in designing the MAS within the health care sector.

The remainder of this paper discusses the theoretical linkage between contextual variables, MAS and managerial performance, which in turn lead to the hypotheses development and proposed research framework.

2. Background on Egypt's health care system dilemma

In Egypt, the major health care provider in government sector is the ministry of health and population (MOHP), which runs a nationwide system of health services, ranging from outpatient clinics to large urban-based hospitals, and providing a mix of inpatient and outpatient care. These services are administered on a decentralized basis, with most service facilities run by Egypt's governorates, which are the major sub-national governmental authorities in Egypt (Rannan-Eliya *et al.*, 2000). There are other health facilities and hospitals that are affiliated to other different ministries such as defense, transport, aviation, electricity, interior, and university medical teaching hospitals. These type of health facilities either offer free curative services or charge a certain fixed fee to those who can afford it. Government-owned hospitals are the only choice available to low-income groups who constitute the majority of Egypt's population. These hospitals are however, hampered by the huge demand and the government's failure to keep up with escalating costs, financial constraint, inefficient use of available resources and ineffective management (Rannan-Eliya *et al.*, 2000; WHO, 2009).

Further, the health insurance organization (HIO) is also the major government financier and provider of care. This is a compulsory social insurance agency, levying mandatory payroll contributions on all formal sector workers, their employers, and public pensioners. The health insurance system covers about 50 percent of the population (34.8 million) including governmental workers, retired workers, students, and pre-school children. HIO spend about 1.65 billion Egyptian pounds in 2003 to provide its services to the population. The main problems facing the HIO in Egypt are the large numbers of regulations and the unrealistic rates of premium that have been fixed and unchanged since 1964 (WHO, 2009).

Another provider of health care is the private sector, where in Egypt it plays an important role in delivering health care. The private sector consists of both non-profit non-governmental organization (NGO) providers, as well as for-profit providers, such as private medical clinics, private hospitals and pharmacies. Competition within the private sector has induced the provision of optimum care and hence, the private sector became highly rated in the region over the years (Rannan-Eliya *et al.*, 1997; WHO, 2009).

In summary, Egypt has a highly pluralistic health care system, as shown in Table I, with various government, public and private providers and financing agents (Rannan-Eliya *et al.*, 1997). The health care system in Egypt is quite complex, coupled with inept governance. Health policies and strategies are not supported by evidence and regulatory mechanisms are not well developed. While efforts are being made

Table I.
Health care statistics
in Egypt (2007)

	Government	Private	Public	Total
Hospitals	1,179	679	20	1,878
Beds	1,14,645	18,264	1,021	1,33,930
Physicians	46,653	11,007	480	58,140
Nurses	96,031	10,486	723	1,07,240
Clinics without inpatient	3,672	174	28	3,874
Physicians	18,586	1,501	232	20,319
Nurses	51,016	593	281	51,890

Source: Arab Republic of Egypt: Central Agency for Public Mobilization and Statistics, www.capmas.gov.eg

to decentralize the health system to district level, co-ordination between the MOHP and other related agencies and ministries remains weak (WHO, 2009).

Despite of the growth of public and private hospitals in Egypt since 1974, the quality of services provided to patients remains low, mainly due to lack of professional training and usage of modern technology (Mostafa, 2005). Although Egypt did achieve substantial reductions in child mortality, its overall health care performance remains poor in comparison with other countries at its income level[1]. In fact, the health care system in Egypt is currently facing considerable challenges such as weak managerial skills and inadequate health information system for non-communicable disease surveillance, stewardship, and decision making (Rannan-Eliya *et al.*, 1997; WHO, 2009; Zineldin, 2006).

Since hospitals consume the most resources available to health care sectors in developing countries, WHO issued a manual for all officials involved in the management and funding of hospitals within the developing and transitional economies. This manual seeks to help managers make the best use of hospital resources and facilitate in understanding the costs of various activities in order to improve efficiency. This manual also helps to guide national policy makers in determining which curative care is best delivered in hospitals in terms of its efficiency (Shepard *et al.*, 1998).

3. Literature review

3.1 Management accounting system

The Financial Accounting Standards Board in the statement of financial accounting concepts No. 2 defined "accounting" as being an information system with the primary objective of providing useful information to decision makers (Romney and Steinbart, 2003). The amount and quality of information available to managers is a good barometer of organizational health. Managers who are capable of processing relevant information quickly can plan for the future, communicate direction efficiently and capitalize more effectively on emerging problems and opportunities (Chong and Eggleton, 2003; Simons, 2000). Chapman (1998) suggested that accounting is one of the most significant and pervasive forms of information processing found in organizations. Hence in reality, the organization's MAS is a major source of accounting information (Sharma *et al.*, 2006).

Although important, accounting information has limitations, therefore it is an imperfect control tool. Designers of accounting information systems are responsible for acquiring a deeper understanding of the information requirements of specific tasks to enable the provision of more relevant information (Otley, 1995; Preston, 1995).

Numerous studies to date employ concepts and measures of the information characteristics associated with MAS that was developed by Chenhall and Morris (1986) (Abernethy and Guthrie, 1994; Chong, 1996; Chong and Chong, 1997; Gul, 1991; Gul and Chia, 1994; Mia and Chenhall, 1994; Moores and Yuen, 2001; Soobaroyen and Poorundersing, 2008). Four broad information characteristics identified by Chenhall and Morris (1986) are:

- (1) scope;
- (2) timeliness;
- (3) aggregation; and
- (4) integration.

These four characteristics were adopted by previous studies in operationalising MAS and will be used in a similar manner in our proposed research framework.

According to Chenhall and Morris (1986), scope refers to the dimensions of focus, quantification and time horizon. Narrow scope information is concerned with events internal to the organization which provides financial and historic information. In contrast, broad scope information includes external, non-financial and future-oriented information. Timeliness refers to the ability of MAS to provide information on request from systematically collected information. Consequently, a manager's ability to respond quickly to events is likely to be influenced by the timeliness of the MAS. Aggregation of information provides summarized information that covers periods of time or diverse management areas of interest such as responsibility centers or functional areas (Chenhall and Morris, 1986). In addition, aggregated information enables managers to process larger quantities of information and condenses information into a format that can be processed quickly. This increases the overall amount of information that can be processed within a given period of time. Integration of information puts together data that crosses functional boundaries. An important aspect of organizational control is the coordination of the various segments within a sub-unit. Consequently, MAS characteristics which may assist coordination would include the specification of targets which account for the effects of interacting segments and information on the impact that decision in one area have on operations throughout the sub-unit (Chenhall and Morris, 1986).

3.2 Managerial performance

The major function of an MAS is to support managerial decision making and control (Abernethy and Bouwens, 2005). These expectations, derive from economic models of decision-making state that in uncertain conditions, the provision of better information results in improved resource allocation and increased the likelihood of an enhanced positive outcome (Baines and Langfield-Smith, 2003). In other words, a conditional association assumes that better information facilitates more effective managerial decisions, which leads to enhanced organizational performance (Baines and Langfield-Smith, 2003; Chenhall, 2003).

The relationship between MAS and performance has been subjected to extensive empirical investigation (Chenhall and Moers, 2007). However, the distinction between performance that is "controllable" and "uncontrollable" is not clear-cut (Otley, 1995). Existing literature suggests that accounting information can serve two roles in affecting performance in organizations: a decision influencing role and a decision facilitating role (Baiman, 1982; Baiman and Demski, 1980; Tiessen and Waterhouse, 1983). The primary role

of MAS is to provide managerial and accounting information to facilitate managers' decision making. Prior studies (Abernethy and Guthrie, 1994; Chong, 1998; Mia, 1993; Mia and Chenhall, 1994) have provided empirical evidence of how the decision-facilitating role of MAS can enhance managerial performance, subject to an appropriate "fit" existing between contextual variables and the design of the MAS (Govindarajan, 1988; Perera *et al.*, 1997).

Scope and timeliness of information are likely to affect managerial performance positively. For example, given the dynamic nature of the business environment, both broad scope and timely information will assist managers in making more informative decisions which will result in improved performance (Gordon and Narayanan, 1984). Chenhall and Morris (1986, p. 31) emphasized the importance of studying this relationship when they state that:

Perhaps, most importantly, the effect of different types of MAS on managers' performance should be investigated. It is hoped that such approaches will enhance our abilities to understand what types of MAS are appropriate in different situations and, as a result, to improve the likelihood that MAS will help managers improve their performance and that of their organizations.

3.3 Contingency theory

The universalistic approach argues that optimal control design applies in all settings and firms. The universalistic control approach was a natural extension of scientific management theory. The principles of scientific management imply that there is a best way to design operational processes in order to maximize efficiency. Extending this principle to management control systems implies that there must be a control system that can best maximize management effectiveness. On the other hand, the situation-specific approach argues that the factors affecting each control system are unique, thus general rules and models cannot be applied. The contingency theory approach is situated between these two boundaries.

According to contingency theory, the appropriateness of different control systems depends on the settings of the business. Moreover, the term contingency means that something is true only under specific conditions. As such, there is no "contingency theory," but rather a variety of theories which may be used to explain and predict the conditions under which a particular MAS is found or where they are associated with enhanced performance (Anthony and Govindarajan, 2007; Chenhall, 2003).

Fisher (1995) argued that the ultimate goal of contingent accounting research should be to develop and test a comprehensive model that includes multiple elements of accounting systems, contingent variables and outcome variables. Hence, the fundamental principle of contingency theory is that "fit" has a positive impact on performance due to certain combinations of MAS and contingency factors. Consequently, it is assumed that both high and low performing companies exist because of more or less consistent combinations of an organization's MAS characteristics and contextual factors (Abernethy and Lillis, 2001; Anthony and Govindarajan, 2007; Chia, 1995; Devaraj and Kohli, 2000; Fisher, 1998; Gul and Chia, 1994; Perrow, 1967; Selto *et al.*, 1995; Sharma *et al.*, 2006; Simon, 2007).

There are various forms of theoretical fit that have been used to classify contingency-based research in MAS: selection, interaction and systems approach (Drazin and van de Ven, 1985). Selection studies examine the way contextual factors relate to aspects of MAS with no attempt to assess whether this association is linked to performance (Bouwens and Abernethy, 2000; Cardinaels *et al.*, 2004; Chenhall and Morris, 1986; Davila, 2005; Gerdin, 2005; Jusoh *et al.*, 2008; Jusoh and Parnell, 2008; Khandawalla, 1972;

Lal and Hassel, 1998; Merchant, 1985; Pavlatos and Paggios, 2009). Interaction studies examine how contextual factors moderate the relationship between MAS and performance (Abernethy and Guthrie, 1994; Chang *et al.*, 2003; Chia, 1995; Chong, 1996; Gul, 1991; Hyvnen, 2007; Jusoh *et al.*, 2006; Jusoh and Parnell, 2008; Kim and Burton, 2002; Kim, 1988). Systems studies consider the way in which multiple aspects of MAS and dimensions of contextual factors combine in a variety of ways to enhance performance (Chenhall and Langfield-Smith, 1998; Govindarajan, 1988; Miles and Snow, 1978; Simon, 2007).

3.3.1 Contingency factors. A company's accounting system is a significant element of its organizational structure and the particular features of an appropriate system will depend on the circumstances that the company faces (Otley, 1980). Chapman (1997) argued that the relationship between accounting and the contextual variables surrounding organizations is a worthwhile study in order to provide meaningful interpretation of accounting information.

Management accounting research using contingency perspective has attempted to relate a range of contextual variables such as strategy (Abernethy and Guthrie, 1994; Boulianne, 2007; Chenhall and Langfield-Smith, 1998; Kober *et al.*, 2007; Simons, 1987), technology (Chenhall and Morris, 1986; Chong, 1996; Chong and Eggleton, 2003), organizational structure (Abernethy and Bouwens, 2005; Bouwens and Abernethy, 2000; Chia, 1995; Davila, 2000; Gerdin, 2005; Pizzini, 2006) environmental uncertainty (Chong and Chong, 1997; Fisher, 1996; Gordon and Narayanan, 1984; Govindarajan, 1984; Gul, 1991; Gul and Chia, 1994; Lal and Hassel, 1998), size (Cadez and Guilding, 2008; Davila, 2005; Haldma and Lääts, 2002; Pavlatos and Paggios, 2009), and culture (Awasthi *et al.*, 1998; Chow *et al.*, 1996, 1997, 1998, 1999, 2001; Harrisson and McKinnon, 2007; Tsui, 2001; van der Stede, 2003), with the design of MAS and managerial performance. The majority of these studies were conducted within the manufacturing industry. However, similar studies seem lacking in the service industry context, particularly in health organizations.

For the purposes of the proposed research framework, several contingency factors have been identified to have an influence on the MAS of hospitals. They are organizational strategy, technology, organizational structure, external environment, and organizational size. These contextual variables were chosen due to their extensive coverage in the MAS literature dealing with studies in the manufacturing context, yet they receive little attention in studies within the health industry.

For simplicity purposes, the following sections directly discuss the theoretical linkage between the chosen contextual variables, MAS and managerial performance. Several hypotheses are proposed on the mediating role of MAS on the relationship between these contextual variables and managerial performance.

3.4 Strategy, MAS, and managerial performance

The logic for linking MAS to strategy is based on the following propositions developed by Anthony and Govindarajan (2007):

- Different organizations generally operate in different strategic contexts.
- Different strategies require different task priorities, key success factors, skills, perspectives, and behaviors for effective execution.

- Control systems are measurement systems that influence the behavior of the people whose activities are being measured.
- Thus, a continuing concern in the design of control systems should be whether the behavior induced by the system is consistent with the strategy.

Empirical evidence indicates that strategies of defender, harvest, and cost-leadership do not require sophisticated information systems while those of prospector, build and product differentiation do (Chenhall, 2003; Langfield-Smith, 1997). On the contrary, in the context of hospitals, Pizzini (2006) found hospitals that followed low-cost strategy had the strongest association with more cost-system functionality. She argued that hospitals that follow a differentiation strategy are expected to focus their resources on clinical care to the detriment of cost systems. On the other hand, hospitals that follow a low-cost strategy will have more functional cost systems because managers will require more information to control costs (Pizzini, 2006).

According to Miles and Snow (1978), firms pursuing a prospector-type strategy locate and exploit product and market opportunity by monitoring a wide range of environmental conditions and events. Their product domain is continuously developing, and technologies employed are typically flexible to enable quick reactions to changing demands in the market place. As a result, external, non-financial and future-oriented information would be appropriate for managers. Thus, broad scope information would be perceived to be more useful for decision-making. In contrast, Miles and Snow (1978) argued that defender type firms operate in a stable and narrow product market. They emphasized efficiency rather than innovation. The stability of their market is congruent with the reliance on historical information. Their narrow product domain reduces the need for extensive monitoring of the external environment conditions. Consequently, narrow scope information would be appropriate for managers of defender-type firms. Analyzers sustain a stable core of products and services while attempting to be the leaders for some products based on concepts already introduced by prospector-type businesses. Thus, for a set of products, analyzers act as seconds in the market (Boulianne, 2007; Chong and Chong, 1997; Miles and Snow, 1978; Simons, 1987).

From a contingency perspective, accounting theoreticians have claimed that the MAS must fit the unit's strategic-type to achieve performance (Chenhall and Langfield-Smith, 1998; Simons, 1987). Although there is little empirical research linking organizational strategy to MAS in hospitals, research in other industries generally contends that strategy influences MAS (Langfield-Smith, 1997). The findings of Abernethy and Guthrie (1994) indicated that the effectiveness of business units is dependent on a match between the design of the information system and the firm's strategic posture. Information systems which have the characteristics of a broad scope system were found to be more effective in firms employing a strategy of continuous product or market development and innovation (prospectors), than in firms which were protecting a comparatively narrow and stable product-market (defenders). This implies that the broad scope information acting as an intervening construct between strategy and performance may be due, in part, to the indirect effect of the extent to which managers use broad scope information for decision making (Chong and Chong, 1997).

A study by Abernethy and Brownell (1999) found that hospitals undergoing strategic change (a more prospector type of strategy), used budgets interactively, and focused on dialogue communication and learning, exhibit enhanced hospital performance.

In addition, Boulianne (2007) found that for prospector strategic-types, and to a lesser extent for defender strategic-types, broad-scope information is associated with higher performance. Managers of prospector and defender units need external, non-financial and future-oriented information for decision-making, which represents an evolution in defenders' information needs.

Hence, based on the above arguments, the following hypothesis is developed:

- H1.* There is an indirect relationship between strategic types (prospector, defender, and analyzer) and managerial performance through the extent to which managers use MAS that provides broad, timeliness, aggregated, and integrated information.

3.5 Technology, MAS, and managerial performance

Technology has many meanings in organization behavior. At a general level, technology refers to how the organization's work process operates in relation to its hardware, materials, people, software, and knowledge. Three generic types of technology that are important to MAS identified from the organizational literature are complexity, task uncertainty, and interdependence (Chenhall, 2003; Otley, 1995). Galbraith (1977) suggested that task uncertainty can be defined as the difference between the amount of information needed to complete a task and the amount of information already possessed. Perrow (1967) proposed two basic dimensions of task uncertainty: variability and analyzability. Task variability refers to the number of exceptions or problems in the task while task analyzability is the difficulty of finding solutions to problems. Therefore, high task analyzability requires increased information exchange necessary to resolve ambiguities, while task variability affects the amount of information required to handle unexpected events (Ghani, 1992).

In hospital context, continued advances in technology require continual rethinking of diagnostic, treatment protocols, and clinical decision-making rules. This increases the rate of change and uncertainty, which in turn leads to greater specialization of function and greater competitions among specialties (Shortell, 1983). Galbraith (1977) suggested that the greater the task uncertainty, the greater the amount of information that must be processed among decision makers during task execution in order to achieve a given level of performance. Chapman (1997) advocated that the role of accounting systems in general, may depend on the level of uncertainty whereby in low-uncertainty situations, accounting systems function as "answer machines," but they may become "learning machines" when uncertainty increases.

Some studies (Chang *et al.*, 2003; Chong, 1996; Chong and Eggleton, 2003; Mia and Chenhall, 1994) have focused on the importance of task characteristics and MAS design on managerial performance. For example, Mia and Chenhall (1994) suggested that differentiation of activities into areas such as marketing and production is an organizational response to manage uncertainty. They found that the association between the extent of managers' use of broad scope information and performance was stronger for managers of marketing than production activities. Moreover, Chong (1996) found that under a high task uncertainty situation, the extent of use of broad scope information led to effective managerial decisions and improved managerial performance. In contrast, under low task uncertainty situations, the extent of use of broad scope information led to information overload which was dysfunctional to managerial performance. Furthermore, Chong and Eggleton (2003) argued that, under high task uncertainty situations, it would

be appropriate for managers to utilize more broad scope information to cope with the complexities of the decision-making environment. The use of more broad scope information would help to reduce task uncertainty, thereby enhancing decision quality, which in turn, should improve their performance. Conversely for all these results, in a developing country context, Soobaroyen and Poorundersing (2008) found non-significant intervening effect for MAS between task uncertainty and managerial performance (except that there is a significant but negative relationship between task uncertainty and aggregated MAS information).

Another dimension of technology that is proposed for this research is interdependence. Interdependence refers to the exchange of output that takes place between segments within a sub-unit (Chenhall and Morris, 1986). Thompson (1967) distinguishes between pooled, sequential and reciprocal forms of interdependence among firms' sub-units. Pooled dependence is the lowest form. In this type of dependence, departments are relatively autonomous in that very little work flows between them, while sequential dependence involves the outputs of one unit becoming the inputs of another. This implies that one unit cannot act before receiving the input from the preceding unit. Finally, reciprocal dependence represents the highest form of interdependence, the movement of work back and forth between units characterizes this type (Bouwens and Abernethy, 2000).

Chenhall and Morris (1986) found that the kind of information perceived as useful by managers in interdependent organizations is broad scope and timely information. Macintosh and Daft (1987) examined the relationship between departmental interdependence and three elements of control: the operating budget, periodic statistical reports, and standard operating procedures. It was found that under conditions of "pooled interdependent," departments emphasized standard operating procedures; "sequentially interdependent," departments emphasized budgets and statistical reports; and "reciprocally interdependent," departments de-emphasized formal control and emphasized more subjective forms of control. They concluded that the role of the control system reflected a fit between the need for information created by interdependence and the supply of information provided by the control system.

In addition, Bouwens and Abernethy (2000) found a positive indirect relationship between customization and the MAS information characteristics (scope, integration, aggregation, and timeliness) acting through departmental interdependence. They commented that managers recognize the importance of receiving more sophisticated information to manage the interdependencies that stem from the pursuit of customization. More recently, the findings of Gerdin (2005) results provided some support for the expected relationships between departmental interdependence, organizational structure and MAS design in manufacturing departments.

Hence, based on the above arguments, the following hypothesis is developed:

- H2.* There is an indirect relationship between technology (task uncertainty and interdependence) and managerial performance through the extent to which managers use MAS that provides broad, timeliness, aggregated, and integrated information.

3.6 Organizational structure, MAS, and managerial performance

Structure establishes roles and responsibilities that guide actions (Fisher, 1995). According to Simons (2000), managers in an organization seek to impose structure for two principal reasons: first, to facilitate workflows and second, to focus attention.

The former relates to the physical flow of materials and information, while the latter to where people focus their time and energy. The contingency theory of organizational structure is important in the design of control systems because structure is an important control mechanism and is the precursor of the contingency theory of management accounting (Otley, 1995). Therefore, designers of MAS have been concerned with formulating MAS that are consistent with organizational structure.

Pugh *et al.* (1969) empirically identified examples of structure mechanisms that are commonly used in contingency-based research, including specialization, centralization, standardization, formalization, configuration and flexibility. Centralization is defined as the level of position at which a decision making takes place (Kim and Burton, 2002). A centralized organization is designed so that unit managers have narrow spans of attention. Simons (2000) found that in centralized organizations, senior managers ensure that subordinates do not become distracted by information and events that could pull their attention away from maximizing efficiency through specialization.

In contrast, decentralization refers to the level of autonomy delegated to managers. Decentralization provides managers with greater responsibility over planning and control activities as well as greater access to information not available to the corporate body (Waterhouse and Tiessen, 1978). Decentralized organizations are designed so that managers have wide spans of attention. This is essential when business strategy demands quick and agile response to customers and markets. In a decentralized organization, business units are market-based, with employees of the unit interacting directly with customer and markets (Simons, 2000). Abernethy and Bouwens (2005) demonstrated the importance of decentralization choices on the effective implementation of accounting innovations.

In hospitals context, Abernethy and Lillis (2001) argued that the decision to delegate both clinical and financial management to clinical units will be influenced by the cognitive and coordinative demands imposed by a strategic focus on service innovation. These demands are likely to be best met by increasing the autonomy granted to clinical units over output and resource management decisions. They argued that hospitals that do not pursue service innovation face less diversity and changes in their clinical mix, have fewer information requirements, and thus, may not face the information constraints associated with a centralized structure.

Some studies found that managerial performance was associated with the interaction between decentralization and each of the MAS information characteristics namely broad scope, timely, aggregated, and integrated information (Chia, 1995; Choe, 1998; Gul and Chia, 1994). Bruns and Waterhouse (1975) found that large organizations with sophisticated technologies that are decentralized have been associated with a strong emphasis on formal MAS. Chang *et al.* (2003) found that performance can be improved in decentralized organizations when broad-scope, timely and aggregated information is provided. In addition, studies on the interaction effects of perceived environmental uncertainty (PEU) and decentralization on MAS (Gul and Chia, 1994), of decentralization and MAS on managerial performance (Chia, 1995) and of task uncertainty and MAS on managerial performance (Chong, 1996), suggested that, when an organization is confronted by high uncertainty, a decentralized structure is required, and consequently a more sophisticated MAS and reports can help reduce uncertainty and improve managerial decision making. The findings of Chia (1995) indicated that in organizations where there are high degrees of decentralization, the presence of high degrees of sophistication in the information characteristics have a positive effect on managerial performance.

Thus, the positive effects of the MAS information characteristics become greater when the degree of decentralization is increased. Conversely, in organizations where the degree of decentralization is low, the presence of a high degree of sophistication of the MAS information characteristics have a negative effect on managerial performance. Recently, in the context of developing countries, Soobaroyen and Poorundersing (2008) found significant intervening effects for MAS between decentralization and managerial performance. They found that decentralization policies appear effective through the availability of broader scope, timely, highly aggregated and highly integrated MAS information that are provided at the functional level, which led to a combined positive effect of managerial performance (Soobaroyen and Poorundersing, 2008).

Hence, based on the above arguments, the following hypothesis is developed:

- H3.* There is an indirect relationship between decentralization and managerial performance through the extent to which managers use MAS that provides broad, timeliness, aggregated, and integrated information.

3.7 External environment, MAS, and managerial performance

Environmental change has dramatically affected health care and other industries. Environmental changes include changes in customers, technology, competitors, economic structure, and regulatory structure (Kettelhut, 1992). Therefore, the external environment is a power contextual variable that is at the foundation of contingency-based research (Otley, 1995). Uncertainty may be the most widely researched aspect of the external environment. With regards to organizational design, early contingent research focus on the effects of uncertainty on organizational structure (Chenhall, 2003). In conditions of high environmental uncertainty, organizations are required to produce greater volumes and varieties of information in order to plan and respond to changes in the environment. For example, organizations will need information about the future, the past, events within the organization and external events (Libby and Waterhouse, 1996; Preston, 1995).

Environmental uncertainty has been identified as an important contextual variable in accounting information system (Gordon and Miller, 1976) and management information system design (Khandawalla, 1972; Waterhouse and Tiessen, 1978). Hoque (2004) argued that companies with different operating environments will have different strategic initiatives that may require different management information systems designs to enhance organizational performance.

In hospital context, some studies found that a firm's external environment influences the cost-system functionality within the hospitals (Hill, 2000; Kettelhut, 1992; Pizzini, 2006). Hospitals that operate in markets with strong competition and/or significant penetration from manage-care organizations face greater external pressure to control costs and therefore require more extensive and detailed cost information (Hill, 2000; Kettelhut, 1992).

Gul (1991) confirmed that the effects of MAS on performance were dependent on environmental uncertainty. Under high levels of uncertainty, sophisticated MAS had a positive effect on performance but under low levels, it had a negative effect. He argued that to evaluate competitive actions or market demand, broad scope economic and non-economic information which is external to the firm becomes essential. He demonstrated that managers who need to respond rapidly to changes in competitive environment and market demand, found timely and frequent information particularly useful. He concluded that it is only when there is an appropriate "fit" between high PEU and sophisticated MAS that superior performance can be achieved. In contrast, when PEU

levels are low, a positive relationship between sophisticated MAS and performance is unlikely. Consequently, providing managers with such sophisticated information when PEU levels are low may be dysfunctional and may hamper performance.

Further, Lal and Hassel (1998) argued that the usefulness of MAS information is seen to be affected by the interactive patterns between the individual, organizational and environmental levels. They suggested that managers of large firms with high tolerance of ambiguity perceive sophisticated information to be most useful when the environment is uncertain.

Hence, based on the above arguments, the following hypothesis is developed:

- H4.* There is an indirect relationship between PEU and managerial performance through the extent to which managers use MAS that provides broad, timeliness, aggregated, and integrated information.

3.8 Hospital size, MAS, and managerial performance

Many researchers found that company size is positively related to accounting sophistication and control systems (Choe, 1996; Guilding, 1999; Haldma and Lääts, 2002; Libby and Waterhouse, 1996; Merchant, 1981, 1984). Furthermore, the larger the size of the company, the lower the costs of processing information (Guilding, 1999). In hospital context, larger hospitals will benefit more from functional cost systems because they can potentially spread the fixed costs of system development over more beds (Hill, 2000).

Increased organizational size or number of employees typically brings decentralized structuring of activities and more decision-making autonomy at the lower levels in the organization (Harrison and McKinnon, 2007). Moreover, firm size affects both the internal and external complexity of the organization, resulting in managers responding to internal and external uncertainties by acquiring information they perceive to be useful (Lal and Hassel, 1998).

Hence, based on the above arguments, the following hypothesis is developed:

- H5.* There is an indirect relationship between hospital size and managerial performance through the extent to which managers use MAS that provides broad, timeliness, aggregated, and integrated information.

4. Research framework

From the foregoing discussion on the literature and the theoretical linkage between the studied variables, the following research framework is proposed (Figure 1).

The research framework depicts the relationships between independent variables (strategy, technology, organizational structure, external environment, and hospital size) and intervening variable (MAS), and between intervening variable and dependent variable (managerial performance). This theoretical framework linking contextual variables to managerial performance through the use of MAS is typically explained by the indirect relationships in which the type of strategies, level of technology, the type of structure, level of environment uncertainty, and hospital size; can enhance managerial decision making and performance when MAS produces information that is broad, timely, integrated, and aggregated.

Since management accounting information can help managers identify important issues, solve problems, and evaluate performance, it is important in all types of organizations such as manufacturing, merchandising and service. It is also important

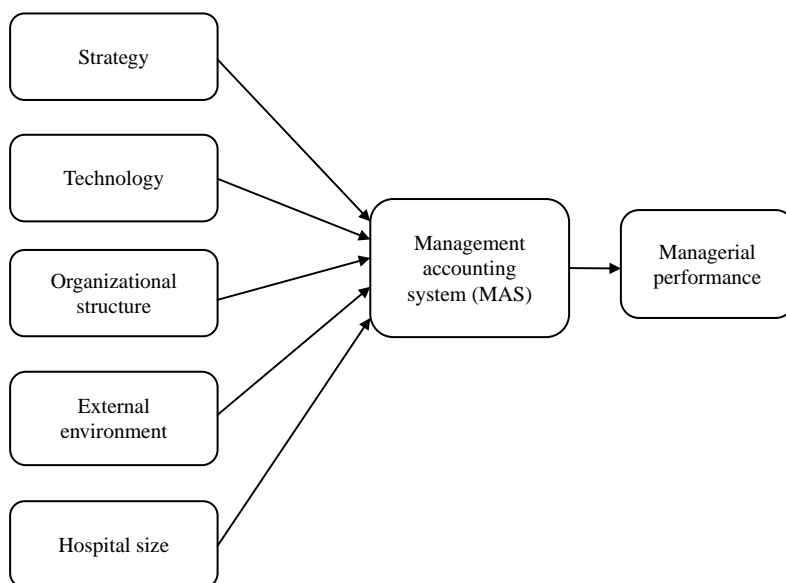


Figure 1.
Contingency model of
management accounting
system

in both for-profit and not-for-profit organizations. In support of this, Mowen and Hansen (2006) noted that regardless of the organizational form, managers must be able to use accounting information. Specifically, managers use management accounting information to help them make different types of decisions including developing organizational strategies, creating operational plans, and monitoring organizational performance (Anthony, 1989; Drury, 2000; Hussain and Gunasekaran, 2001).

Although accounting information has an important role to play, any such information is an imperfect control tool and has to be utilised in a way which takes into account its limitations and circumstances. As such, accounting information systems designers need to develop a deeper understanding of the information requirements of specific tasks so as to enable the provision of more relevant information (Clegg, 2000; Otley, 1995; Preston, 1995). In this regard, many researchers argue that the main issues that have contributed to the limited success of management information systems in the health care sector, particularly in developing countries, is the failure to meet managers' needs or functional requirements; overestimation of the information to be included in the system; and the underestimation of management input (Braa *et al.*, 2007; Diamond and Khemani, 2006; Kimaro and Nhampossa, 2005).

In the context of hospitals, the health care literature strongly suggests the use of highly refined cost systems to enable hospital managers to respond to growing pressure to control costs in this rapidly changing industry (Hill and Johns, 1994; Pizzini, 2006). Pizzini (2006) argued that the health care industry provides the opportunity to sample from a large number of complex organizations that operate under similar circumstances, offering relatively standardized services. Furthermore, Chenhall (2003) suggested that there is a need for more contingency-based research in the service and not-for-profit organizations, as such entities become increasingly important in most economies.

In response to the foregoing arguments, the proposed research framework was developed to focus on the hospital sector in Egypt because of the rapid growth of the service sector in Egypt. By being the largest sector in terms of total GDP, the services sector plays a dominant role in the Egyptian economy. The proposed framework provides guidance for future empirical studies to be conducted in Egyptian hospitals, given the large number and complexity of hospitals in Egypt, the increase in environmental uncertainty, and presumably the lesser use of sophisticated MASs. Since the Egyptian health care industry is still going through the process of reform, Egyptian hospitals presents a suitable empirical setting whereby changes in the structural arrangements and strategic orientations can be observed, thereby contributing to the development of MASs design. Abernethy and Lillis (2001) suggested a similar view in their study on Australian hospitals.

Studies in Egypt would be expected to reveal interesting and unique findings that may be different from those studies done in the Western countries. In particular, such studies could provide invaluable insight on the current condition of the structural arrangement of public hospitals, their strategic choices, and the breadth of accounting information provided to hospital administrators following the Egyptian health care reform in 1994.

5. Conclusion

The goal of this paper is to investigate the impact of contextual variables on MAS design in Egyptian hospitals which suffer complexity and continuous inept administration despite years following its reform in 1994. Based on the MAS dimensions (scope, timeliness, aggregation, and integration) defined by Chenhall and Morris (1986), a contingency-based intervening model is proposed whereby the extent of use of MAS plays a significant intervening role between organizational strategy, technology, organizational structure, external environment, and hospital size, on managerial performance. It is expected that the direct relationships between the antecedent variables and managerial performance will be minimal, if not insignificant, when using MAS as a mediating variable.

The proposed research framework aims to provide guidance on cross-sectional empirical evidence conducted in the Egyptian health care industry. Empirical findings in Egypt would most likely be different from those in Western countries, thereby contributing to the literature. As such, the proposed framework can be used to fill the empirical gap that exists within developing countries. In this regard, the empirical findings resulting from the use of the proposed framework will contribute to the limited literature currently prevailing in the design of MASs and other related organizational design issues. Such contribution is crucial, especially within the health care industry as it is one of the fastest growing and the most significant sectors of many economies (Ezzamel and Willmott, 1993; Mensah, 2000; Sheila *et al.*, 1999). In addition, such empirical findings would enhance the understanding of how different elements of organizational designs and contexts fit together with MAS to enhance managerial performance. The important contextual variables or conditions that influence the managerial performance will also be uncovered. This will help practitioners develop new approaches in designing MAS within the Egyptian health care sector. More importantly, this paper attempts to reveal whether MASs that provides broad, timely, integrated, and aggregated information is essential in linking contextual variables to managerial performance. Future empirical studies using the proposed framework will fill an important gap in the literature in the context of developing countries, as they

represent the systematic attempt to gauge the nature of the Egyptian hospitals in terms of their strategic orientation, technology, structure, environment uncertainty, and size.

Note

1. Approximately 6.3 percent of Egyptian GDP was spent on healthcare in 2006. Per capita spending was US\$78. This level of spending is lower in comparison to most developing countries, despite Egypt's higher income level WHO (2008, 2009). WHO country page www.who.int/countries/egy/en/

References

- Abernethy, M.A. and Bouwens, J. (2005), "Determinants of accounting innovation implementation", *Abacus*, Vol. 41 No. 3, pp. 217-40.
- Abernethy, M.A. and Brownell, P. (1999), "The role of budgets in organizations facing strategic change: an exploratory study", *Accounting, Organizations and Society*, Vol. 24 No. 3, pp. 189-204.
- Abernethy, M.A. and Guthrie, C.H. (1994), "An empirical assessment of the "fit" between strategy and management information system design", *Accounting & Finance*, Vol. 34 No. 2, pp. 49-66.
- Abernethy, M.A. and Lillis, A.M. (2001), "Interdependencies in organization design: a test in hospitals", *Journal of Management Accounting Research*, Vol. 13, pp. 107-29.
- Anthony, R.N. (1989), "Reminiscences about management accounting", *Journal of Management Accounting Research*, Vol. 1, pp. 1-20.
- Anthony, R.N. and Govindarajan, V. (2007), *Management Control Systems*, McGraw-Hill, New York, NY.
- Awasthi, V.N., Chow, C.W. and Wu, A. (1998), "Performance measure and resource expenditure choices in a teamwork environment: the effects of national culture", *Management Accounting Research*, Vol. 9 No. 2, pp. 119-38.
- Baiman, S. (1982), "Agency research in managerial accounting: a survey", *Journal of Accounting Literature*, Vol. 1, pp. 154-213.
- Baiman, S. and Demski, J.S. (1980), "Economically optimal performance evaluation and control systems", supplement, *Journal of Accounting Research*, Vol. 18, pp. 184-220.
- Baines, A. and Langfield-Smith, K. (2003), "Antecedents to management accounting change: a structural equation approach", *Accounting, Organizations and Society*, Vol. 28 Nos 7/8, pp. 675-98.
- Boulianne, E. (2007), "Revisiting fit between AIS design and performance with the analyzer strategic-type", *International Journal of Accounting Information Systems*, Vol. 8 No. 1, pp. 1-16.
- Bouwens, J. and Abernethy, M.A. (2000), "The consequences of customization on management accounting system design", *Accounting, Organizations and Society*, Vol. 25 No. 3, pp. 221-41.
- Braa, J.r, Hanseth, O., Heywood, A., Mohammed, W. and Shaw, V. (2007), "Developing health information systems in developing countries: the flexible standards strategy", *MIS Quarterly*, Vol. 31 No. 2, pp. 381-402.
- Bruns, W.J. and Waterhouse, J.H. (1975), "Budgetary control and organization structure", *Journal of Accounting Research*, Vol. 13 No. 2, pp. 177-203.

- Cadez, S. and Guilding, C. (2008), "An exploratory investigation of an integrated contingency model of strategic management accounting", *Accounting, Organizations and Society*, Vol. 33 Nos 7/8, pp. 836-63.
- Cardinaels, E., Roodhooft, F. and Herck, G.V. (2004), "Drivers of cost system development in hospitals: results of a survey", *Health Policy*, Vol. 69 No. 2, pp. 239-52.
- Chang, R.D., Chang, Y.W. and Paper, D. (2003), "The effect of task uncertainty, decentralization and AIS characteristics on the performance of AIS: an empirical case in Taiwan", *Information & Management*, Vol. 40 No. 7, pp. 691-703.
- Chapman, C.S. (1997), "Reflections on a contingent view of accounting", *Accounting, Organizations and Society*, Vol. 22 No. 2, pp. 189-205.
- Chapman, C.S. (1998), "Accountants in organizational networks", *Accounting, Organizations and Society*, Vol. 23 No. 8, pp. 737-66.
- Chenhall, R.H. (2003), "Management control systems design within its organizational context: findings from contingency-based research and directions for the future", *Accounting, Organizations and Society*, Vol. 28 Nos 2-3, pp. 127-68.
- Chenhall, R.H. and Langfield-Smith, K. (1998), "The relationship between strategic priorities, management techniques and management accounting: an empirical investigation using a systems approach", *Accounting, Organizations and Society*, Vol. 23 No. 3, pp. 243-64.
- Chenhall, R.H. and Moers, F. (2007), "The issue of endogeneity within theory-based, quantitative management accounting research", *European Accounting Review*, Vol. 16 No. 1, pp. 173-96.
- Chenhall, R.H. and Morris, D. (1986), "The impact of structure, environment, and interdependence on the perceived usefulness of management accounting systems", *Accounting Review*, Vol. 61 No. 1, pp. 16-35.
- Chia, Y.M. (1995), "Decentralization, management accounting system (MAS) information characteristics and their interaction effects on managerial performance: a Singapore study", *Journal of Business Finance & Accounting*, Vol. 22 No. 6, pp. 811-30.
- Choe, J.-M. (1996), "The relationships among performance of accounting information systems, influence factors, and evolution level of information systems", *Journal of Management Information Systems*, Vol. 12 No. 4, pp. 215-39.
- Choe, J.-M. (1998), "The effects of user participation on the design of accounting information systems", *Information & Management*, Vol. 34 No. 3, pp. 185-98.
- Chong, V.K. (1996), "Management accounting systems, task uncertainty and managerial performance: a research note", *Accounting, Organizations and Society*, Vol. 21 No. 5, pp. 415-21.
- Chong, V.K. (1998), "Testing the contingency "fit" between management accounting systems and managerial performance: a research note on the moderating role of tolerance for ambiguity", *The British Accounting Review*, Vol. 30 No. 4, pp. 331-42.
- Chong, V.K. and Chong, K.M. (1997), "Strategic choices, environmental uncertainty and SBU performance: a note on the intervening role of management accounting systems", *Accounting & Business Research*, Vol. 27 No. 4, pp. 268-76.
- Chong, V.K. and Eggleton, I.R.C. (2003), "The decision-facilitating role of management accounting systems on managerial performance: the influence of locus of control and task uncertainty", *Advances in Accounting*, Vol. 20, pp. 165-97.
- Chow, C.W., Kato, Y. and Merchant, K.A. (1996), "The use of organizational controls and their effects on data manipulation and management Myopia: a Japan vs US comparison", *Accounting, Organizations and Society*, Vol. 21 Nos 2/3, pp. 175-92.

- Chow, C.W., Lindquist, T.M. and Wu, A. (2001), "National culture and the implementation of high-stretch performance standards: an exploratory study", *Behavioral Research in Accounting*, Vol. 13, pp. 85-109.
- Chow, C.W., Shields, M.D. and Wu, A. (1999), "The importance of national culture in the design of and preference for management controls for multi-national operations", *Accounting, Organizations and Society*, Vol. 24 Nos 5/6, pp. 441-61.
- Chow, C.W., Harrison, P., Lindquist, T. and Wu, A. (1997), "Escalating commitment to unprofitable projects: replication and cross-cultural extension", *Management Accounting Research*, Vol. 347, p. 361.
- Chow, C.W., Hwang, R.N.-C., Liao, W. and Wu, A. (1998), "National culture and subordinates' upward communication of private information", *The International Journal of Accounting*, Vol. 33 No. 3, pp. 293-311.
- Clegg, C.W. (2000), "Sociotechnical principles for system design", *Applied Ergonomics*, Vol. 31 No. 5, pp. 463-77.
- Counte, M.A. and Glandon, G.L. (1988), "Managerial innovation in the hospital: an analysis of the diffusion of hospital cost-accounting systems", *Hospital and Health Services Administration*, Vol. 33 No. 3, pp. 371-84.
- Davila, T. (2000), "An empirical study on the drivers of management control systems' design in new product development", *Accounting, Organizations and Society*, Vol. 25 Nos 4/5, pp. 383-409.
- Davila, T. (2005), "An exploratory study on the emergence of management control systems: formalizing human resources in small growing firms", *Accounting, Organizations and Society*, Vol. 30 No. 3, pp. 223-48.
- Devaraj, S. and Kohli, R. (2000), "Information technology payoff in the health-care industry: a longitudinal study", *Journal of Management Information Systems*, Vol. 16 No. 4, pp. 41-67.
- Diamond, J. and Khemani, P. (2006), "Introducing financial management information systems in developing countries", *OECD Journal on Budgeting*, Vol. 5 No. 3, pp. 97-132.
- Drazin, R. and van De Ven, A.H. (1985), "Alternative forms of fit in contingency theory", *Administrative Science Quarterly*, Vol. 30 No. 4, pp. 514-39.
- Drury, C. (2000), *Management & Cost Accounting*, Thomson Learning, London.
- Ezzamel, M. and Willmott, H. (1993), "Corporate governance and financial accountability: recent reforms in the UK public sector", *Accounting, Auditing & Accountability Journal*, Vol. 6 No. 3, pp. 109-32.
- Fisher, C. (1996), "The impact of perceived environmental uncertainty and individual differences on management information requirements: a research note", *Accounting, Organizations and Society*, Vol. 21 No. 4, pp. 361-9.
- Fisher, J. (1995), "Contingency-based research on management control systems: categorization by level of complexity", *Journal of Accounting Literature*, Vol. 14, pp. 24-48.
- Fisher, J.G. (1998), "Contingency theory, management control systems and firm outcomes: past results and future directions", *Behavioral Research in Accounting*, Vol. 10, pp. 47-65, Supplement.
- Galbraith, J.R. (1977), *Organization Design*, The Wharton School, University of Pennsylvania Addison-Wesley, Reading, MA.
- Gerdin, J. (2005), "Management accounting system design in manufacturing departments: an empirical investigation using a multiple contingencies approach", *Accounting, Organizations and Society*, Vol. 30 No. 2, pp. 99-126.

- Gericke, C.A. (2004), "Comparison of Health Care Financing Arrangements in Egypt and Cuba: Lessons for Health Reform in Egypt", Berlin University of Technology, Berlin.
- Ghani, J.A. (1992), "Task uncertainty and the use of computer technology", *Information & Management*, Vol. 22 No. 2, pp. 69-76.
- Gordon, L.A. and Miller, D. (1976), "A contingency framework for the design of accounting information systems", *Accounting, Organizations and Society*, Vol. 1 No. 1, pp. 59-69.
- Gordon, L.A. and Narayanan, V.K. (1984), "Management accounting systems, perceived environmental uncertainty and organization structure: an empirical investigation", *Accounting, Organizations and Society*, Vol. 9 No. 1, pp. 33-47.
- Govindarajan, V. (1984), "Appropriateness of accounting data in performance evaluation: an empirical examination of environmental uncertainty as an intervening variable", *Accounting, Organizations and Society*, Vol. 9 No. 2, pp. 125-35.
- Govindarajan, V. (1988), "A contingency approach to strategy implementation at the business-unit level: integrating administrative mechanisms with strategy", *Academy of Management Journal*, Vol. 31 No. 4, pp. 828-53.
- Guilding, C. (1999), "Competitor-focused accounting: an exploratory note", *Accounting, Organizations and Society*, Vol. 24 No. 7, pp. 583-95.
- Gul, F.A. (1991), "The effects of management accounting systems and environmental uncertainty on small business managers' performance", *Accounting and Business Research*, Vol. 22 No. 85, pp. 57-61.
- Gul, F.A. and Chia, Y.M. (1994), "The effects of management accounting systems, perceived environmental uncertainty and decentralization on managerial performance: a test of three-way interaction", *Accounting, Organizations and Society*, Vol. 19 Nos 4/5, pp. 413-26.
- Haldma, T. and Lääts, K. (2002), "Contingencies influencing the management accounting practices of Estonian manufacturing companies", *Management Accounting Research*, Vol. 13 No. 4, pp. 379-400.
- Harrison, G. and McKinnon, J. (2007), "National culture and management control", in Hopper, T., Northcott, D. and Scapens, R. (Eds), *Issues in Management Accounting*, Prentice-Hall, Upper Saddle River, NJ, pp. 93-116.
- HassabElnaby, H.R., Epps, R.W. and Said, A.A. (2003), "The impact of environmental factors on accounting development: an Egyptian longitudinal study", *Critical Perspectives on Accounting*, Vol. 14 No. 3, pp. 273-92.
- Hassan, M.K. (2005), "Management accounting and organisational change: an institutional perspective", *Journal of Accounting & Organizational Change*, Vol. 1 No. 2, pp. 125-40.
- Hill, N.T. (2000), "Adoption of costing systems in US hospitals: an event history analysis 1980-1990", *Journal of Accounting & Public Policy*, Vol. 19 No. 1, pp. 41-71.
- Hill, N.T. and Johns, E.L. (1994), "Adoption of costing systems by US hospitals", *Hospital and Health Services Administration*, Vol. 39 No. 4, pp. 521-37.
- Hoque, Z. (2004), "A contingency model of the association between strategy, environmental uncertainty and performance measurement: impact on organizational performance", *International Business Review*, Vol. 13 No. 4, pp. 485-502.
- Hussain, M.M. and Gunasekaran, A. (2001), "Activity-based cost management in financial services industry", *Managing Service Quality*, Vol. 11 No. 3, pp. 213-23.
- Hyvnen, J. (2007), "Strategy, performance measurement techniques and information technology of the firm and their links to organizational performance", *Management Accounting Research*, Vol. 18 No. 3, pp. 343-66.

- Jusoh, R. and Parnell, J.A. (2008), "Competitive strategy and performance measurement in the Malaysian context", *Management Decision*, Vol. 46 No. 1, pp. 5-31.
- Jusoh, R., Ibrahim, D.N. and Zainuddin, Y. (2006), "Assessing the alignment between business strategy and use of multiple performance measures using interaction approach", *The Business Review*, Vol. 5 No. 1, pp. 51-60.
- Jusoh, R., Ibrahim, D.N. and Zainuddin, Y. (2008), "Selection approach to assessing the alignment between business strategy and use of multiple performance measures in Malaysian manufacturing firms", *Asian Journal of Business and Accounting*, Vol. 1 No. 1, pp. 67-92.
- Kettelhut, M.C. (1992), "Strategic requirements for IS in the turbulent healthcare environment", *Journal of Systems Management*, Vol. 43 No. 6, pp. 6-10.
- Khandawalla, P.N. (1972), "The effect of different types of competition on the use of management controls", *Journal of Accounting Research*, Vol. 10 No. 2, pp. 275-85.
- Kim, J. and Burton, R.M. (2002), "The effect of task uncertainty and decentralization on project team performance", *Computational and Mathematical Organization Theory*, Vol. 8 No. 4, pp. 365-84.
- Kim, K.K. (1988), "Oranizational coordination and performance in hospital accounting information systems: an empirical investigation", *The Accounting Review*, Vol. 63 No. 3, pp. 472-89.
- Kimaro, H.C. and Nhampossa, J.L. (2005), "Analyzing the problem of unsustainable health information systems in less-developed economies: case studies from Tanzania and Mozambique", *Information Technology for Development*, Vol. 11 No. 3, pp. 273-98.
- Kober, R., Ng, J. and Paul, B.J. (2007), "The interrelationship between management control mechanisms and strategy", *Management Accounting Research*, Vol. 18 No. 4, pp. 425-52.
- Lal, M. and Hassel, L. (1998), "The joint impact of environmental uncertainty and tolerance of ambiguity on top managers' perceptions of the usefulness of non-conventional management accounting information", *Scandinavian Journal of Management*, Vol. 14 No. 3, pp. 259-71.
- Langfield-Smith, K. (1997), "Management control systems and strategy: a critical review", *Accounting, Organizations and Society*, Vol. 22 No. 2, pp. 207-32.
- Lawrence, C.M. (1990), "The effect of ownership structure and accounting system type on hospital costs", *Research in Governmental and Nonprofit Accounting*, Vol. 6, pp. 35-60.
- Libby, T. and Waterhouse, J.H. (1996), "Predicting change in management accounting systems", *Journal of Management Accounting Research*, Vol. 8, pp. 137-50.
- Macintosh, N.B. and Daft, R.L. (1987), "Management control systems and departmental interdependencies: an empirical study", *Accounting, Organizations and Society*, Vol. 12 No. 1, p. 49.
- Mensah, Y.M. (2000), "Accounting issues in health care", *Journal of Accounting & Public Policy*, Vol. 19 No. 1, pp. 3-7.
- Merchant, K.A. (1981), "The design of the corporate budgeting system: influences on managerial behavior and performance", *Accounting Review*, Vol. 56 No. 4, pp. 813-29.
- Merchant, K.A. (1984), "Influences on departmental budgeting: an empirical examination of a contingency model", *Accounting, Organizations and Society*, Vol. 9 Nos 3-4, pp. 291-307.
- Merchant, K.A. (1985), "Budgeting and the propensity to create budgetary slack", *Accounting, Organizations and Society*, Vol. 10 No. 2, pp. 201-10.
- Mia, L. (1993), "The role of MAS information in organisations: an empirical study", *The British Accounting Review*, Vol. 25 No. 3, pp. 269-85.

- Mia, L. and Chenhall, R.H. (1994), "The usefulness of management accounting systems, functional differentiation and managerial effectiveness", *Accounting, Organizations and Society*, Vol. 19 No. 1, pp. 1-13.
- Miles, R.E. and Snow, C.C. (1978), *Organizational Structure Strategy and Process*, Mc Graw-Hill, New York, NY.
- Moore, K. and Yuen, S. (2001), "Management accounting systems and organizational configuration: a life-cycle perspective", *Accounting, Organizations and Society*, Vol. 26 Nos 4-5, pp. 351-89.
- Mostafa, M.M. (2005), "An empirical study of patients' expectations and satisfactions in Egyptian hospitals", *International Journal of Health Care Quality Assurance*, Vol. 18 No. 7, pp. 516-32.
- Mowen, M.M. and Hansen, D.R. (2006), *Management Accounting the Cornerstone for Business Decisions*, Thomson South-Western, Mason, OH.
- Otley, D. (1980), "The contingency theory of management accounting: achievements and prognosis", *Accounting, Organizations and Society*, Vol. 5 No. 4, pp. 413-28.
- Otley, D. (1995), "Management control, organizational design and accounting information systems", in Ashton, D., Hopper, T. and Scapens, R.W. (Eds), *Issues in Management Accounting*, Prentice-Hall, Upper Saddle River, NJ.
- Pavlatos, O. and Paggios, I. (2009), "A survey of factors influencing the cost system design in hotels", *International Journal of Hospitality Management*, Vol. 28 No. 2, pp. 263-71.
- Perera, S., Harrison, G. and Poole, M. (1997), "Customer-focused manufacturing strategy and the use of operations-based non-financial performance measures: a research note", *Accounting, Organizations and Society*, Vol. 22 No. 6, pp. 557-72.
- Perrow, C. (1967), "A framework for the comparative analysis of organizations", *American Sociological Review*, Vol. 32 No. 2, pp. 194-208.
- Pizzini, M.J. (2006), "The relation between cost-system design, managers' evaluations of the relevance and usefulness of cost data, and financial performance: an empirical study of US hospitals", *Accounting, Organizations and Society*, Vol. 31 No. 2, pp. 179-210.
- Preston, A. (1995), "Budgeting, creativity and culture", in Ashton, D., Hopper, T. and Scapens, R.W. (Eds), *Issues in Management Accounting*, Prentice-Hall, Upper Saddle River, NJ, pp. 273-97.
- Pugh, D.S., Hickson, D.J. and Hinings, C.R. (1969), "An empirical taxonomy of structures of work organizations", *Administrative Science Quarterly*, Vol. 14 No. 1, pp. 115-26.
- Ramsey, R.H. (1994), "Activity-based costing for hospitals", *Hospital and Health Services Administration*, Vol. 39 No. 3, pp. 385-96.
- Rannan-Eliya, R.P. (1995), *National Health Accounts of Egypt*, Harvard School of Public Health, Boston, MA, pp. 1-61.
- Rannan-Eliya, R.P., Blanco-Vidal, C. and Nandakumar, A.K. (2000), *The Distribution of Health Care Resources in Egypt: Implications for Equity*, Harvard School of Public Health, Boston, MA, pp. 1-39.
- Rannan-Eliya, R.P., Nada, K.H., Kamal, A.M. and Ali, A.I. (1997), *Egypt National Health Care Accounts 1994-1995*, Harvard School of Public Health, Boston, MA, pp. 1-77.
- Romney, M.B. and Steinbart, P.J. (2003), *Accounting Information Systems*, Pearson Education, Upper Saddle River, NJ.
- Seliam, A.A.M., Ashour, A.S., Khalil, O.E.M. and Millar, S.J. (2003), "The relationship of some organizational factors to information systems effectiveness: a contingency analysis of Egyptian data", *Journal of Global Information Management*, Vol. 11 No. 1, pp. 40-71.

- Selto, F.H., Renner, C.J. and Young, S.M. (1995), "Assessing the organizational fit of a just-in-time manufacturing system: testing selection, interaction and systems models of contingency theory", *Accounting, Organizations and Society*, Vol. 20 Nos 7-8, pp. 665-84.
- Sharma, R., Jones, S. and Ratnatunga, J. (2006), "The relationships among broad scope MAS, managerial control, performance, and job relevant information: a concomitant analysis", *Review of Accounting and Finance*, Vol. 5 No. 3, pp. 228-50.
- Sheila, S., Stephen, H. and Mark, F. (1999), "The next decade of health spending: a new outlook", *Health Affairs*, Vol. 18 No. 4, pp. 86-95.
- Shepard, D.S., Hodgkin, D. and Anthony, Y. (1998), "Analysis of hospital costs: a manual for managers", paper presented at the Health Systems Development Program World Health Organization, Institute for Health Policy Heller School, Brandeis University Waltham, Geneva.
- Shortell, S.M. (1983), "Physician involvement in hospital decision making", in Gray, B.H. (Ed.), *New Health Care for Profit: Doctors and Hospitals in a Competitive Environment*, National Academies Press, Washington, DC, pp. 73-100.
- Simon, C. (2007), "A configuration form of fit in management accounting contingency theory: an empirical investigation", *The Business Review*, Vol. 7 No. 2, pp. 220-41.
- Simons, R. (1987), "Accounting control systems and business strategy: an empirical analysis", *Accounting, Organizations and Society*, Vol. 12 No. 4, pp. 357-74.
- Simons, R. (2000), *Performance Measurement and Control Systems for Implementing Strategy: Text and Cases*, Prentice-Hall, Upper Saddle River, NJ.
- Soobaroyen, T. and Poorundersing, B. (2008), "The effectiveness of management accounting systems: evidence from functional managers in a developing country", *Managerial Auditing Journal*, Vol. 23 No. 2, pp. 187-219.
- Thompson, J.D. (1967), *Organizations in Action*, McGraw Hill, New York, NY.
- Tiessen, P. and Waterhouse, J.H. (1983), "Towards a descriptive theory of management accounting", *Accounting, Organizations and Society*, Vol. 8 Nos 2/3, pp. 251-67.
- Tsui, J.S.L. (2001), "The impact of culture on the relationship between budgetary participation, management accounting systems, and managerial performance: an analysis of Chinese and Western managers", *The International Journal of Accounting*, Vol. 36 No. 2, pp. 125-46.
- van der Stede, W.A. (2003), "The effect of national culture on management control and incentive system design in multi-business firms: evidence of intracorporate isomorphism", *European Accounting Review*, Vol. 12 No. 2, pp. 263-85.
- van Triest, S. and Elshahat, M.F. (2007), "The use of costing information in Egypt: a research note", *Journal of Accounting & Organizational Change*, Vol. 3 No. 3, pp. 329-43.
- Waterhouse, J.H. and Tiessen, P. (1978), "A contingency framework for management accounting systems research", *Accounting, Organizations and Society*, Vol. 3 No. 1, pp. 65-76.
- WHO (2008), *World Health Statistics*, WHO Press, World Health Organization, Geneva.
- WHO (2009), *Country Cooperation Strategy for WHO and Egypt 2005-2009*, World Health Organization Regional Office for the Eastern Mediterranean, Cairo.
- Zineldin, M. (2006), "The quality of health care and patient satisfaction: an exploratory investigation of the 5Qs model at some Egyptian and Jordanian medical clinics", *International Journal of Health Care Quality Assurance*, Vol. 19 No. 1, pp. 60-92.

About the authors

Salah A. Hammad is a Lecturer at the Accounting Department, Faculty of Commerce, Tanta University. He is currently pursuing his PhD at the Faculty of Business and Accountancy, University of Malaya, Malaysia. Salah A. Hammad is the corresponding author and can be contacted at: shammad2005@yahoo.com

Ruzita Jusoh is currently the Head of the Department of Management Accounting and Taxation, Faculty of Business and Accountancy, University of Malaya. She teaches Management Accounting and supervises a number of PhD students, including Mr Salah A. Hammad.

Elaine Yen Nee Oon is currently a Lecturer at the Department of Management Accounting and Taxation, Faculty of Business and Accountancy, University of Malaya.

This article has been cited by:

1. Haleh Ayatollahi, Zahra Nazemi, Hamid Haghani. 2016. Patient Accounting Systems: Are They Fit with the Users' Requirements?. *Healthcare Informatics Research* **22**, 3. [[CrossRef](#)]
2. Salah A. Hammad Accounting Department, Faculty of Commerce, University of Tanta, Tanta, Egypt Ruzita Jusoh Department of Management Accounting & Taxation, University of Malaya, Kuala Lumpur, Malaysia Imam Ghozali Faculty of Economics, Deponegoro University, Deponegoro, Indonesia . 2013. Decentralization, perceived environmental uncertainty, managerial performance and management accounting system information in Egyptian hospitals. *International Journal of Accounting & Information Management* **21**:4, 314-330. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
3. Simon Cadez Faculty of Economics, University of Ljubljana, Ljubljana, Slovenia Chris Guilding Centre for Tourism, Sport and Service Innovation, Griffith University, Gold Coast, Australia. 2012. Strategy, strategic management accounting and performance: a configurational analysis. *Industrial Management & Data Systems* **112**:3, 484-501. [[Abstract](#)] [[Full Text](#)] [[PDF](#)]
4. Carla Marina Pereira de Campos, Lúcia Lima Rodrigues, Susana Margarida Faustino Jorge The Role of Management Accounting Systems in Public Hospitals and the Construction of Budgets: 366-389. [[CrossRef](#)]