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The Mediating Effect of Management Accounting System on the Relationship between Competition and Managerial Performance

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Abstract

Purpose - This study examined the effect of interaction between market competition and MAS characteristics on managerial performance. Scope of the study is concentrated on Iranian financial organizations and managers of these organizations were identified as respondents for the questionnaire survey.

Design/methodology/approach - This study used the SmartPLS to analyze the data and the model of study was estimated with structural equation modeling (SEM). It follows the recommended two-stage analytical procedures of SEM: assessing confirmatory measurement models (factor analysis) and confirmatory structural models (path analysis).

Findings - The study uncovered the existence of direct relationships between competition and MAS, and between MAS and managerial performance. The study also confirmed that the relationship between competition and managerial performance is mediated by MAS. The findings provide valuable insight to guide managers in financial organizations to improve their performance through suitable MAS by considering internal and environmental factors. Recommendations on how to improve MAS and managerial performance are provided accordingly.

Originality/value - Prior researches confirm that there is no unique and universal management accounting system (MAS) for all organizations, since this depends on internal firm characteristics and environmental features. However, there has been a lack of empirical evidence on MAS researches in the service organizations.

Keywords: Competition; Management Accounting System; Managerial Performance; Financial Organizations.

Introduction

World economy is experiencing unexpected changes from the dynamics of competition (Urquidi and Ripoll, 2013). Due to these changes, corporate managers are working in a more and more complicated environment (Chung *et al*., 2012). In this situation, firms find themselves obligated to redefine the fundamentals of their businesses (Urquidi and Ripoll, 2013). To manage successfully in this situation, managers require to implement a sophisticated information system that supplies them with adequate and essential business information (Bouwens and Abernethy, 2000; Chung *et al*., 2012). MAS is a kind of system that can support managers to access and use necessary information to achieve firm's objectives and consequently improve their managerial performance (Chung *et al*., 2012).

MAS plays a key service role in most organizations by supplying useful information. Companies should include MAS information quality as a key performance measure of the accounting function (Walker *et al*., 2012; Fleischman *et al*., 2010). Management accounting departments should examine how they can increase their quality of information to improve user decision making and productivity of organizations (Walker *et al*., 2012). Therefore, the characterization of MAS in terms of its features is an important aspect of the present study-which takes the research of Chenhall and Morris (1986) as a theoretical basis. Many studies until now have utilized theory and instrument of MAS characteristics that was expanded by several authors (i.e. Agbejule, 2005; Hammad, *et al*., 2010; Tillema, 2005). According to Chenhall and Morris (1986), the information provided by MAS can be regarded based on its four information characteristics which are; scope, integration, timeliness and aggregation.

An extensive review of theoretical and empirical literature indicates that there is no unique and universal MAS for organizations, since this depends on internal firm characteristics and environmental features (Chenhall, 2003). Hence, the contingency approach of management accounting proposes that organizations can operate more efficiently if they employ and utilize a MAS which cope with their organization and environmental conditions (Hoque, 2011). The basic rule of contingency approach is that "fit" has a positive influence on performance because this approach assumes that organizations operate efficiently if they apply and employ structures and processes that fit with environmental factors (Brandau *et al*., 2013; Mayr, 2012).

While prior management accounting studies have examined the relationships among environments, organizational characteristics, MAS, and performance (e.g. Abdel-kader and Luther, 2008; Bouwens and Abernethy, 2000; Cheng, 2012; Chong and Egelton, 2003; Erserim, 2012; Jermias and Gani, 2004; Mat, 2010; Tsui, 2001), there has been little systematic empirical examination of whether managerial performance is influenced by competition and changes in MAS characteristics. This study fills this knowledge gap in current management accounting research. It makes several contributions to our understanding

of the antecedents or environmental conditions under which MAS might be used to impact performance.

Firstly, the contingent factors used in prior studies on MAS were mainly (1) perceived environmental uncertainty (PEU) (Abdel-kader and Luther, 2008; Mat, 2010; Erserim, 2012), (2) task uncertainty (Chong and Egelton, 2003), (3) Budgetary participation (Tsui, 2001; Cheng, 2012), (4) Strategy (Bouwens and Abernethy, 2000; Jermias and Gani, 2004) and (5) Culture (Liu and O'Farrell, 2013; Yao *et al*., 2010). It can be observed that previous studies concentrated more on the contingent variables like perceived environmental uncertainty (PEU), budgetary participation and strategy. There is no any systematic empirical studies have been conducted to examine whether managerial performance is influenced by changes in MAS characteristics and competition.

Secondly, modern MAS and control systems may not be similarly effective in different countries (Etemadi *et al*., 2009). Importing modern management accounting methods and techniques, and using them in a developing country may not be as effective as in advanced countries because of different national and organizational cultures (Etemadi *et al*., 2009). Similarly, the environmental factors for business in a developing country are different from those in an advanced country relating to market competition, access to manufactured inputs, human resources, infrastructure, governmental rules and laws. Especially, Iran, which is categorized as a developing country, provides an interesting cultural contrast to western countries because of the new emphasis on Islamic laws and values after its political revolution in 1979 (Etemadi *et al*., 2009). However, most studies on MAS (Abdel-Kader and Luther, 2008; Agbejule, 2005; Bouwens and Abernethy, 2000; Emsley, 2005; Erserim, 2012; Stergiou *et al.,* 2013; Susanto, 2010; Tsui, 2001) have concentrated on firms in the US, Singapore, Australia, Finland and Turkey with lack of evidence on how MAS changes in Iranian firms' perspective. Therefore, empirical evidence from Iran would provide significant insights into the role of contingent variables in the implementation of MAS across national boundaries.

Thirdly, to date, there are few empirical studies focusing on the four characteristics of MAS. Most of them concentrated on one or two characteristics of MAS, mostly on the broad scope dimension. Even though, the broad scope is the most important one among the MAS characteristics, it is better to consider other characteristics. It must be determined that the information provided by MAS is in a timely manner, integrated and aggregated to be used by decision makers and managers in an organization (Bouwens and Abernethy, 2000; Agbejule, 2005). This study considers all of these four characteristics of MAS and investigates the potential overlap between them and how they affect managerial performance.

Fourthly, most of the previous studies considered MAS as an independent variable (Tsui, 2001; Mia and Patiar, 2001; Chong and Eggleton, 2003; Agbejule, 2005; Susanto, 2010) or dependent variable (Emsley, 2005; Abdel-Kader and Luther, 2008; Mat, 2010;

Erserim, 2012; Stergiou *et al*., 2013). Only a few of them (Jermias and Gani, 2004; Cheng, 2012) studied the mediating role of MAS. Hence, this is necessary to search more about the mediating role of MAS. This study uses the mediating or the intervening notion of contingency theory (Baines and Langfield-Smith, 2003; Hoque, 2011; Mayr, 2012) to examine whether changes in MAS characteristics mediate, or intervene the relationship between competition and performance.

Fifthly, managerial performance may have to be distinguished from the financial performance of the unit for which the manager is responsible. The nature of managerial activities (e.g. planning, investigating, coordinating…) strongly affects the significance of information as each managerial activity has particular information requirements and there is no ordered or systematic way to perform these activities (Laitinen, 2008). Empirical evidence for the direct effect of MAS on managerial performance is rather lacking, as the exact nature of MAS information and performance relationships is ambiguous (Baines and Langfield-Smith, 2003).

Finally, the service sector has been known as the main contributor in the economy, specifically, financial organizations which play a key role in the economy (Rasid *et al*., 2011). They are crucial to the allocation of resources in a modern economy. Because of the high level of competition, service organization must be proactive to offer high quality services with low price and on time . However, MAS for the financial service sector, has received limited attention. In spite of the fact that some MAS studies have been carried out in the service sector, the financial service organizations have mostly been ignored (Arroteia *et al.,* 2012; Jauhari, 2012). Furthermore, there is no study that examines the relationship between competition and MAS and the effect of the changes in MAS on managerial performance in the financial sector.

This study is presented as follows: Section 2 discusses the theoretical background and existing literature, then develops the hypotheses and suggests a research model based on the theoretical background. Section 3 describes the research methodology. Section 4 presents the research results and the empirical evaluation of the research model. Section 5 addresses the conclusions and limitations of the research and directions for future research.

Literature Review

This study used contingency approach as an analytical framework to study the effect of competition as a contingent variable on characteristics of MAS and managerial performance in financial institutions. This contingent factor was selected because of its wide coverage in the MAS literature coping with researches in the manufacturing sector; so far it has received low attention in researches in the financial section.

The following parts of the current study directly argue about the theoretical relationship among competition, MAS and managerial performance. This study acknowledges that various factors affect MAS and MAS affects many other factors. But, to narrow the scope of this research, it concentrates on this contingent variable (competition) due to the following consideration: (a) On the basis of previous studies, linkage between contingent variable and MAS and its effect on managerial performance; and (b) Considering current economic conditions and situations that surround financial institutions in Iran, this contingent variable has been notified to have an effect on the MAS. For instance, liberalization in the financial sector and increasing in the number of private financial organizations (CBI, 2013) resulted in intensified competition in the market.

Relationship between Competition and MAS on Performance

In the recent decades, globalization has changed the environmental factors surrounding organizations with an increase in uncertainty and higher market competition. Increasing competition level causes turbulence, stress, risk and uncertainty for companies. It demands that companies mount appropriate responses to the threats and opportunities in the competitive condition, and that they design and use appropriate MAS for this purpose (Laitinen, 2008). The use of MAS is important to allow the optimization of the decision-making processes by managers, due to the fact of them facing a high level competition (Santos *et al.*, 2012). Therefore, competition may influence the design of MAS in an organization and may also lead to the firm's needing to re-evaluate its current organizational design and strategies to cope with the uncertainty in the competitive environment (Laitinen, 2008).

The relevant literature suggests that managers' information processing and usage are determined to a great extent by the level of competition they perceive in organizational environment. It is argued that because of the personalized nature of the business in the service sector, managers in the industry perceive a high degree of uncertainty in their functions. Hence, they would have a particular need for information. A sophisticated MAS (broad in scope, timely, integrated and aggregated) is able to provide essential information for managers, as MAS form an integral part of a business's information and control systems supporting management decision-making to increase performance of management (Hoque, 2011; McManus, 2013; Mia and Patiar, 2001; Santos *et al.*, 2012).

On the basis of this discussion, MAS can be used to efficiently deal with the competitive factors. Therefore, relevant MAS information can help an organization's manager in evaluating the product attributes, price, and costs of the substitute products in the market. MAS can help a firm to discover opportunities for enhancing customer value; therefore, maintaining existing customers and increasing market share (Hoque, 2011). Hence, the use of the MAS helps firms' managers to make better decisions and enhance managerial performance. The above discussion results in the Hypotheses 1 and 3 as following:

H₁: There is a direct and positive relationship between competition and use of MAS.

H₁ₐ: There is a direct relationship between competition and the use of broad scope MAS.

H₁ᵦ: There is a direct relationship between competition and the use of timely MAS.

H₁c: There is a direct relationship between competition and the use of integrated MAS.

H₁d: There is a direct relationship between competition and the use of aggregated MAS.

Relationship between MAS and Managerial Performance

It has been suggested by management accounting scholars that the organizations operate more effectively when they apply and utilize MAS that cope with their organizational and environmental condition (Etemadi *et al.*, 2009; Hoque, 2011). In this condition MAS is expected to help organizations to survive in a competitive and changing environment by providing useful information for planning, controlling, monitoring and decision-making. Thus, this information will then be used to improve managerial performance (Ismail and Isa, 2011).

The main role of MAS is to support managers' decision-making, planning and control. This prospect, originates from economic model of decision making states that in uncertain environments, the achievement to useful information lead to enhanced resource allocation and raised the possibility of an improved positive outcome (Hammad *et al.*, 2010). In other words, a conditional association presumes that useful information helps managers in making effective decisions, which improves managerial performance (Baines and Langfield-Smith, 2003; Chenhall, 2003; Hammad *et al.*, 2010). Therefore, the use of MAS information by managers can assist them in making more accurate decision, which will lead to improvement in performance (Ismail and Isa, 2011).

MAS in a firm supplies managers with information for learning about problems, about outcomes and about opportunities, leading to accurate and appropriate decision-making in response. Well designed and sophisticated MAS is likely to supply managers with information suitable for setting performance objectives, performance assessment standards and feedback on performance leading to enhanced managerial performance. A MAS is considered sophisticated when it generates information that is broad in scope, high timeliness, high aggregation, and high integration (Rasid *et al.*, 2011).

This study treats managerial performance at a macro (organization) level, as a management-related outcomes corresponding to the entire organization. The reason for treating management performance at the macro level reflects that MAS usage is rarely

personalized to specific individual user requirements. Rather, in the design of MAS for an organization, some common denominator is chosen to allow multiple purpose use of MAS information and data by all interested management users (Colson, 1980). Realizing the usefulness of MAS, the current study also hypothesizes the positive relationship between the use of MAS and performance. Hence, the above discussion results in the Hypotheses 2 and 3 as following:

H₂: There is a direct relationship between the use of MAS and managerial performance.

H₂ₐ: There is a positive relationship between the use of broad scope MAS and managerial performance.

H₂ᵦ: There is a positive relationship between the use of timely MAS and managerial performance.

H₂ᵨ: There is a positive relationship between the use of integrated MAS and managerial performance.

H₂ᵩ: There is a positive relationship between the use of aggregated MAS and managerial performance.

The Effects of MAS on the Relationship between Contingent Factors and Managerial performance

The previous sections discussed about the direct effect of market competition on MAS and the positive effect of MAS on performance. Chang *et al*. (2003) in their study hypothesized that, if, decentralization and task uncertainty are correlated to MAS and MAS is correlated to performance, then decentralization and task uncertainty affect performance acting through MAS. In other research, Ismail and Isa (2011) hypothesized that advanced manufacturing technology is correlated to MAS and MAS are correlated to performance, then there is an indirect effect of advanced manufacturing technology acting through MAS on performance. Mia and Clarke (1999) concluded that, if, the perceived intensity of market competition is correlated to MAS and MAS is correlated to performance, then there is an indirect relationship between perceived intensity of market competition and performance through MAS.

Therefore, based on the previous section and following these researchers this can be mentioned that there is a direct effect of competition on MAS and MAS on performance; therefore, there is an indirect effect of competition on managerial performance acting through MAS, which results in hypothesis 3:

H₃: There is a positive indirect relationship between competition and managerial performance, acting through the mediating role of MAS.
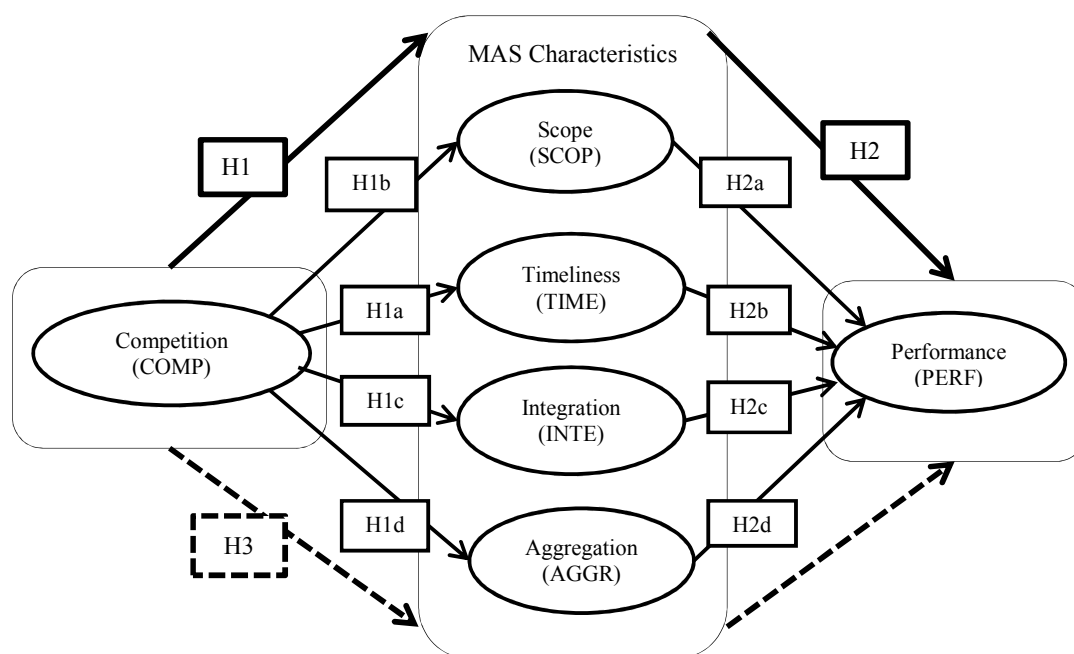
Figure I. Conceptual Model
Note: --->= Indirect relationship, →= Direct relationship

Methodology

Data was collected using self-administrated questionnaires. A pilot study was conducted to refine the measurement scales. A sample of 30 financial organization was chosen to pre-test and complete the questionnaire. The sample was randomly selected: 5 were from banks, 7 from insurances and 18 from funds and investment organizations in Iran. The sample was selected in such a way that the respondents had similar characteristics with the type of respondents who would participate in the actual study. The test of Cronbach's alpha was used to check the questionnaire reliability. A Cronbach's coefficient alpha of 0.7 or more is an acceptable reliability coefficient (Hair *et al.*, 2011). The results of the reliability analyses were found to be above 0.7, indicating that the variables and dimensions of the study had acceptable reliabilities; the questionnaire always received reliable and consistent answers.

Data was collected using questionnaires that were personally addressed to finance managers, chief accountants, chief controllers, or CFOs (chief financial officers) of financial

organizations in Iran, from July 2014 to October 2014. This study considered the whole population of 185 financial organizations in Iran as the subject of study to avoid low response rate. Therefore, because the size of the target population is small, this study used total population sampling as a type of purposive sampling technique that involves examining the entire population that have a particular set of characteristics. They were listed on the websites of Central Bank, Central Insurance and Securities and Exchange Organization (SEO). For the first step, each firm secretary was phoned to collect the name and contact details of the finance manager, chief accountant, chief controller, or CFO. Each respondent was then invited via telephone to participate in the study. One-hundred-fifty-five firms expressed interests in participating in the study and requested the details about the study in writing along with a copy of the survey instrument. Secondly, for the participating firms, the respondents were contacted mostly through direct visit to the firm to deliver the survey package followed by either a phone call or e-mail to ask for their assistance in gathering the essential information. The survey package included a copy of the survey and a cover letter, addressed personally to the respondents in each organization, explaining the purpose of the study; a tear-off section allowing respondents to provide their name and address for a copy of the survey results, while ensuring anonymity.

Among the 185 questionnaires distributed, 146 were successfully completed and returned, achieving an effective response rate of 78%. This high response rate was because of two main reasons: Firstly, all of these organizations are located or at least have a central office in Tehran city and mostly concentrated in several streets in the city. Therefore, contacting with them was easy and time saving. Secondly, researcher personally referred to these organizations and all questionnaires were hand delivered to respondents. Finally, because researcher referred to respondents personally, there were no outliers or missing values.

A non-response bias analysis was performed through the chi-square test to compare the responses of the early and late waves of the returned questionnaires. The chi-square statistic was calculated to determine whether the distribution of the responses from the two groups into respondent's job position, experience, age and gender, type and size of organization differed significantly. Using the chi-square test and $p > 0.01$, the results show that no significant differences were found between the two groups in those demographic variables. These results collectively suggest that non-response bias may not be a serious problem between the first-wave and the second-wave responses.

Further, the independent-samples t-test and one-way analysis of variance (ANOVA) were performed on demographic variables, to test for statistically significant disparities in main variables. These demographic variables are size of organization (which includes four items i.e. less than 100, between 100 to 499, between 500 to 999, and more than 1000 employees), type of organization (which includes three items i.e. banking, insurance and investment) and job position. The results of the one-way ANOVA and F-ratio show that the p-values for size of organization, type of organization and job position were found to be greater

than 0.05, which means there was no significant difference in competition, technology, structure, MAS characteristics and performance across size of organization, type of organization and job position. In addition, no significant differences between the respondents and non-respondents were found on the basis of firm size and industry grouping. Taken together, these results suggest no response bias in the empirical data of this study.

Table I. Profile of respondents

Demographic variable		Frequency	Percentage
Type of Organization	Banking	25	17.1
	Insurance	25	17.1
	Investment	96	65.8
Size of organization	Less than 100 employees	26	17.8
	100-499 employees	56	38.4
	500-999 employees	44	30.1
	More than 1000 employees	20	13.7
Job position of respondent	Finance Managers	18	12.3
	Chief Accountants	49	33.6
	Chief Controllers	54	37.0
	Chief Financial Officers (CFOs)	25	17.1
Experience of respondent	Less than 5 years	22	15.1
	5 to 10 years	80	54.8
	More than 10 years	44	30.1
Gender of respondent	Male	106	72.6
	Female	40	27.4
Age of respondent	Less than 30	26	17.8
	30 to 45	74	50.7
	More than 45	46	31.5

The organizations' profiles are with regard to their type of activity, their size and job position of the respondent. The summarized demographic profile of the respondents is presented in Table I. Data was collected from three different types of financial organizations, including: banking, insurance and investment. Among all surveyed organizations, banks and insurances account for 34.2% (both 25 organizations equally) and investment organizations account for 65.8% (96 organizations). The size of organizations was measured by the number of employees. The respondent worked primarily for small and medium organizations (less than 500 employees) (56%). A total of 44 organizations (30.1%) and 20 organizations (13.7%) have numbers of employees between 500-999 and more than 1000 respectively. With

regard to respondent in companies, the final sample included 18 Managers of the finance department (12.3%), 49 Chief Accountants (33.6%), 54 Chief Controllers (37%) and 25 CFOs- Chief Financial Officers (17.1%). The majority of respondent were chief accountant or group controller who are specialists in management accounting context.

Measurement of Main Variables

The present study adopted and aligned the measurement of the main variables from previous studies in accordance. Next, a pilot study was conducted to refine the measurement scales. The questionnaire of this study was tested through pre-testing and taking the opinion of experts and academicians. In this section the measurements of main variables of the study are presented.

Market Competition. To assess the intensity of market competition, this study employs a five-item instrument of market competition, which was developed by *Khandawalla* (1972) and adopted by Mia and Chenhall (1994), Williams and Seaman (2001) and Hoque (2011). In this study, slight changes were made to the wording to make sure that the instrument was applicable to the context of the study.

MAS Characteristics. MAS characteristics were measured based on Chenhall and Morris (1986) and widely used by other MAS researchers (e.g. Agbejule, 2005; Bouwnes and Abernethy, 2000; Cheng, 2012; Chong and Eggleton, 2003; Chung *et al*., 2012; Susanto, 2010). In this study, the aim was to measure the extent of use of all the dimensions of MAS. Managers are asked to rate the 'extent of use' of MAS information in their daily decision making activities by considering these information characteristics (scope, integration, timeliness and aggregation) on a five-point Likert scale. In this study, the instrument is changed in several ways. First, following Bouwnes and Abernethy (2000) slight changes were made to the wording to make sure that the instrument was applicable to the context of the current research. Second, a dimension in relation to departmental costs was inserted to the instrument for measuring integration appropriately. These changes characterize a different approach from previous use (Chenhall and Morris, 1986).

Table II. Measures and items

Construct	Item	Measurement items	References
Competition	COM1	Competition for materials, parts and equipment	*Khandawalla* (1972), Hoque (2011), Susanto (2010)
	COM2	Competition for technical personnel such as engineers, accountants, programmers	
	COM3	Competition in promotion, advertising, selling, distribution, etc.	
	COM4	Competition in quality and variety of products	
	COM5	Price competition in their main line of business	
Scope	SCOP1	Information which relates to possible future events	Cheng (2012), Chenhall and
	SCOP2	Qualification of the likelihood of future events occurring	

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	SCOP3	Non-economic information such as customer preferences, employee attitudes, labour relations	Morris (1986), Chung *et al.* (2012), Etemadi *et al.* (2009), Susanto (2010)
	SCOP4	Information on broad factors external to the organization,	
	SCOP5	Non-financial information that relates to the productivity information	
	SCOP6	Non-financial information that relates to market information	
Timeliness	TIME1	Information that is provided immediately upon request	Agbejule (2005), Chenhall and Morris (1986), Etemadi *et al.* (2009), Susanto (2010)
	TIME2	Information that is given automatically upon its receipt into information system or as soon as processing is completed.	
	TIME3	Reports that are provided frequently on a systematic, regular basis (daily/ monthly etc.)	
	TIME4	Relevant information that is reported without delay after occurrence of certain event	
Integration	INTE1	Information on precise targets for the activities of all departments within organization	Agbejule (2005), Bouwnes and Abernethy (2000), Chenhall and Morris (1986)
	INTE2	Information that relates to the impact of different departments' decisions on performance of overall organization	
	INTE3	Cost and price information of the departments in organization	
	INTE4	Information on the impact of decisions on organization, and the influence of other departments' decisions on area of responsibility	
Aggregation	AGGR1	Information provided in the different sections or functional areas in organization	Agbejule (2005), Bouwnes and Abernethy (2000), Chenhall and Morris (1986)
	AGGR2	Information on the effect of events on particular time periods	
	AGGR3	Information which has been processed to show the influence of events on different functions	
	AGGR4	Information on the effect of different departments' activities on summary reports	
	AGGR5	Information on formats suitable for input into decision models	
	AGGR6	Information in forms which enable managers to conduct "what-if" analysis.	
Managerial Performance	PERF1	Planning	Agbejule (2005), Chong and Eggleton (2003), Etemadi *et al.* (2009), Tsui (2001)
	PERF2	Investigating	
	PERF3	Coordinating	
	PERF4	Evaluating	
	PERF5	Supervising	
	PERF6	Staffing	
	PERF7	Negotiating	
	PERF8	Representing	
	PERF9	Overall Performance: e.g. growth of revenue, profit, market share	

Managerial Performance. Managerial performance is measured by an instrument using a self-evaluation questionnaire which has been applied widely and found to be applicable in the MAS researches (Agbejule, 2005; Chong and Eggleton, 2003; Etemadi *et al.*, 2009; Tsui, 2001). Performance on eight items relating to different managerial activities including: planning, investigating, coordinating, evaluating, supervising, staffing, negotiating, and representing, plus one overall performance dimension. Respondents were asked to rate on a five-point Likert scale their own perceived performance on eight items relating to different

managerial activities plus one overall performance dimension. An overall score calculated by averaging the nine sub-dimensions was used as a measure for managerial performance. In this study, following Chong and Eggleton (2003) one more dimension in relation to overall performance was inserted to the instrument for measuring managerial performance properly. These changes characterize a different approach from previous use (Etemadi *et al*., 2009; Tsui, 2001).

Results

Descriptive statistics

This section discusses the results for the competition, dimensions of MAS (scope, timeliness, integration and aggregation), and managerial performance in terms of their descriptive statistics and normality of data. These statistics are helpful to identify out-of-range values, estimate means and standard deviations. Table III summarizes the descriptive statistics for all constructs. Generally it is found that there is relatively high level of market competition in organizations' environment (mean scores between 3.389-3.589). This might be due to the increasing in the number of private-owned banks and financial organization, and the increasing in the diversity of financial services which is supported by implementing advanced technologies.

In regard to MAS, respondents to the survey were initially requested to indicate the level of usage of MAS information (with regard to its different characteristics). Generally it is found that there are relatively high level of MAS information usage related to its different characteristics; scope, timeliness, integration and aggregation. In relation to scope of MAS, the findings reveal a high level of implementation of broad scope MAS (mean scores between 3.424 and 3.547). The results demonstrate that organizations do use MAS information which is broad in scope. The results of mean scores reveal higher than moderate level of usage of timely MAS, as the range of the mean is between 3.390 and 3.418. It illustrates that organizations implement a MAS which provides timely information.

In relation to integration of MAS, the results reveal a high level of integrated information usage, as the range of mean scores is between 3.411 and 3.513. The findings indicate that integrated MAS information is very important for managers in decision making and planning. There are moderate levels of MAS usage in regard to aggregated information which deal with brief information that is gathered from different periods of time or different functional areas mean between 3.315 and 3.342. It illustrates that MAS in financial organization provides aggregated information which is important for managers. In addition, the respondents were asked how they rated managerial performance of their organization. Generally it is found that there is relatively high level of managerial performance in organizations (mean scores between 3.369 and 3.595). It illustrates that management in financial organizations could make and perform effective decisions and managerial activities by using available information and by considering environmental situations.

Normality Test

In Table III results of Kolmogorov-Smirnov and the Shapiro-Wilk's tests show all are significant, thus confirming deviation from normality (Pallant, 2013). When this happens, the researcher needs to use non-parametric methods, such as PLS-SEM and the Mann-Whitney U test, to compare independent samples (Ho, 2014). Therefore, in this study PLS-SEM (as a nonparametric statistical model) was chosen for data analysis as it does not have the same assumptions of multivariate normality, a choice which was made for the same reason in prior management and management accounting literature (Laitinen, 2011; Hammad *et al.*, 2012).

Table III: Descriptive statistics for constructs and items

Constructs	Items	Range	Mean	Std. Deviation	Kolmogorov-Smirnov		Shapiro-Wilk	
		Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Competition	COM1	1-5	3.404	0.680	.289	.000	.796	.000
	COM2	1-5	3.369	0.599	.321	.000	.748	.000
	COM3	1-5	3.342	0.689	.300	.000	.819	.000
	COM4	2-5	3.589	0.711	.259	.000	.831	.000
	COM5	2-4	3.424	0.585	.310	.000	.728	.000
Scope	SCOP1	1-5	3.424	0.768	.258	.000	.856	.000
	SCOP2	2-5	3.438	0.598	.302	.000	.763	.000
	SCOP3	2-5	3.493	0.666	.332	.000	.778	.000
	SCOP4	1-5	3.500	0.716	.285	.000	.822	.000
	SCOP5	1-5	3.547	0.715	.258	.000	.827	.000
	SCOP6	2-5	3.452	0.599	.299	.000	.763	.000
Timeliness	TIM1	1-5	3.390	0.727	.259	.000	.839	.000
	TIM2	1-5	3.417	0.721	.280	.000	.834	.000
	TIM3	1-5	3.418	0.767	.262	.000	.855	.000
	TIM4	1-5	3.417	0.785	.257	.000	.862	.000
Integration	INTE1	1-5	3.424	0.693	.264	.000	.819	.000
	INTE2	2-5	3.417	0.672	.281	.000	.813	.000
	INTE3	1-5	3.513	0.697	.269	.000	.818	.000
	INTE4	1-5	3.411	0.691	.272	.000	.819	.000
Aggregation	AGG1	1-5	3.411	0.767	.266	.000	.855	.000
	AGG2	2-5	3.335	0.656	.325	.000	.800	.000
	AGG3	1-5	3.315	0.672	.324	.000	.803	.000
	AGG4	1-5	3.328	0.655	.322	.000	.795	.000
	AGG5	1-4	3.390	0.636	.297	.000	.749	.000
	AGG6	2-5	3.424	0.652	.297	.000	.786	.000
Performance	PER1	1-5	3.424	0.768	.258	.000	.856	.000
	PER2	1-5	3.369	0.684	.294	.000	.816	.000
	PER3	3-5	3.582	0.640	.318	.000	.744	.000
	PER4	1-5	3.541	0.705	.285	.000	.811	.000
	PER5	2-5	3.500	0.590	.322	.000	.752	.000
	PER6	2-5	3.424	0.548	.356	.000	.716	.000
	PER7	3-5	3.506	0.541	.339	.000	.691	.000
	PER8	2-5	3.472	0.553	.331	.000	.723	.000
	PER9	3-5	3.595	0.670	.320	.000	.748	.000

Model Testing

To verify the theoretical research model and hypotheses, SmartPLS 2.0 (Ringle *et al.*, 2014) was used in the analysis of the structural equation model (SEM). PLS is an SEM tool that uses a component-based approach for estimation, so it places minimal restrictions on sample size and residual distribution, and is especially useful in areas where there is weak theory and limited understanding of relationships among variables. PLS model is analyzed and interpreted in two stages: (1) Measurement model (outer model) that displays the relationships between the constructs and the indicator and assesses the reliability and validity of the measurement model; (2) Structural model (inner model) that represents the constructs and displays the relationships (paths) between the constructs (Hulland, 1999).

PLS is best used with the casual steps approach that relies on regression analysis. The path coefficients generated by PLS provide an indication of relationships and can be used similarly to the traditional regression coefficients (Gefen *et al.*, 2000). To test for mediation, a series of regression analyses was performed as recommended by Baron and Kenny (1986). The following regression equations were used:

$$Z = a_0 + \beta_1 X + e \qquad Y = a_0 + \beta_2 X + e \qquad Z = a_0 + \beta_3 X + \beta_4 Y + e$$

X= Competition (independent); Y= MAS Characteristics (mediator); Z= Managerial Performance (dependent)

To establish mediation, three conditions must hold. First, the independent or predictor variables (competition) must significantly affect the dependent or criterion variable (managerial performance) in the first equation. Second, the independent variables must significantly affect the mediator (MAS characteristics) in the second equation. Third, the mediator must significantly affect the dependent variable in the third equation. Fourth, the relationship between the independent and dependent variables must be significantly reduced when the mediator is added. In addition, the Sobel test is used to ensure that the indirect effect is significant. The significance of the reduction of the relationship between the independent and dependent variables has to be assessed mathematically (Mackinnon *et al.*, 2002). The significance is measured by the following formula:

$$z - \text{value} = a * b / \sqrt{(b^2 * s_a^2 + a^2 * s_b^2)}.$$

a= unstandardized regression coefficient between independent variable and mediator; b= unstandardized regression coefficient between mediator and dependent; s_a and s_b= standard error of a and b respectively.

Step One: Analysis of Measurement Model

To assess the measurement model, relationships among observed variables and latent constructs were drawn, and the PLS algorithm with the path weighting scheme was used (Esposito *et al.*, 2010; Chin, 2010). This study assessed the measurement model by examining for: individual item reliability; matrix of loadings and cross-loadings; convergent validity; internal consistency; and discriminant validity. Internal consistency considers two elements for evaluation: Cronbach's Alpha and Composite Reliability. Composite reliability assumes that indicators have different loadings and prioritizes indicators that have high reliability to the latent variable, unlike Cronbach's Alpha that assumes that all indicators are equally reliable to the latent variable (Chin, 2010). The composite reliability and Cronbach's Alpha values for the measures must be greater than 0.70 cut-off point. Indicator reliability was also reviewed. Hair *et al.* (2014) recommend indicator loadings of 0.7 or higher. The results indicate acceptable values for both Composite Reliability (0.88 to 0.95) and Cronbach's Alpha (0.84 to 0.93). All constructs show Internal Consistency Reliability.

To establish convergent validity, the outer loadings of the indicators, as well as the Average Variance Extracted (AVE) were evaluated. Higher outer loadings indicate that the associated indicators have much in common. AVE is defined as the grand mean value of the squared loadings of the indicators associated with the construct. An AVE value of 0.50 and higher indicates a sufficient degree of convergent validity, meaning that the latent variable explains more than half of its indicators' variance (Hair *et al.*, 2014). Outer loadings are expected to be 0.70 or higher and AVE results in Table IV are above 0.50, ranging from 0.60 to 0.85. On both outer loadings and AVE, the all constructs show convergent validity.

Table IV. Item Loading, Composite Reliability and AVE

Construct	Item	Factor loading	Communality	R^2	Cronbach's Alpha	Composite reliability	AVE
COMP	COM1	0.724673	0.609754	N/A	0.841899	0.886279	0.608855
	COM2	0.800022					
	COM3	0.762586					
	COM4	0.839931					
	COM5	0.772374					
SCOP	SCOP1	0.727104	0.646972	0.452880	0.890984	0.916259	0.646942
	SCOP2	0.891407					
	SCOP3	0.780513					
	SCOP4	0.754792					
	SCOP5	0.855403					
	SCOP6	0.804937					
TIME	TIM1	0.869182	0.797151	0.397103	0.916003	0.940102	0.797171
	TIM2	0.847175					

	TIM3	0.922172					
	TIM4	0.930065					
INTE	INTE1	0.949260	0.846281	0.142794	0.938913	0.956340	0.846362
	INTE2	0.960363					
	INTE3	0.801617					
	INTE4	0.958718					
AGGR	AGG1	0.833076	0.695139	0.318942	0.908790	0.930958	0.782001
	AGG2	0.920331					
	AGG3	0.909487					
	AGG4	0.907247					
	AGG5	0.747396					
	AGG6	0.648803 (Removed)					
PERF	PER1	0.771626	0.616726	0.596244	0.923022	0.935235	0.616566
	PER2	0.805953					
	PER3	0.777419					
	PER4	0.749075					
	PER5	0.850068					
	PER6	0.774992					
	PER7	0.847143					
	PER8	0.770522					
	PER9	0.710979					

Discriminant validity is typically assessed by two measures, the Fornell-Larcker criterion and cross loadings. The Fornell–Larcker criterion assesses whether a latent construct shares more variance with its assigned indicators than with another latent variable in the structural model (Hair *et al*., 2011; Hair *et al*. 2012). In statistical terms, if the square root of AVE for a construct is higher than the correlations between it and any other construct in the model, discriminant validity is established (Fornell and Larcker, 1981). For the second criterion of discriminant validity, an indicator's loading with its associated latent construct should be higher than its loadings with all the remaining constructs (i.e. cross loadings) (Hair *et al*., 2011; Hair *et al*., 2012).

Table V. Fornell and Larker criterion results

	AGGR	**COMP**	**INTE**	**PERF**	**SCOP**	**TIME**
AGGR	0.58014					
COMP	0.522029	0.57069				
INTE	0.668299	0.379891	0.71622			
PERF	0.549894	0.570256	0.526174	0.58014		
SCOP	0.510520	0.673652	0.381918	0.666756	0.71847	
TIME	0.545522	0.633163	0.616998	0.735014	0.746120	0.73536

Table VI. Measurement items loading and Cross Loadings- all constructs

	AGGR	COMP	INTE	PERF	SCOP	TIME
AGG1	**0.844377**	0.515464	0.565669	0.673562	0.477473	0.486185
AGG2	**0.951371**	0.440290	0.627957	0.427176	0.444825	0.492967
AGG3	**0.940200**	0.407067	0.607977	0.395234	0.416167	0.449994
AGG4	**0.934428**	0.421428	0.603508	0.399640	0.443481	0.462473
AGG5	**0.731295**	0.472105	0.531681	0.429809	0.438614	0.489208
COM1	0.445407	**0.728597**	0.410022	0.532206	0.545835	0.667210
COM2	0.350336	**0.796155**	0.256644	0.325514	0.417265	0.346358
COM3	0.349188	**0.762861**	0.132522	0.354319	0.495251	0.376895
COM4	0.478600	**0.842221**	0.404081	0.528728	0.597209	0.612006
COM5	0.360402	**0.766985**	0.175091	0.400595	0.525902	0.328990
INTE1	0.663165	0.338256	**0.949413**	0.389898	0.349531	0.578675
INTE2	0.663578	0.376019	**0.960500**	0.396454	0.353273	0.592727
INTE3	0.494486	0.321237	**0.801304**	0.663582	0.335545	0.498945
INTE4	0.647154	0.351354	**0.958862**	0.388750	0.352063	0.592200
PER1	0.403259	0.607968	0.372885	**0.772156**	0.710764	0.900054
PER2	0.357213	0.514807	0.356286	**0.806492**	0.670377	0.744989
PER3	0.535663	0.303590	0.636839	**0.778101**	0.402947	0.447243
PER4	0.580492	0.402050	0.553505	**0.749690**	0.344488	0.430536
PER5	0.380229	0.469371	0.310648	**0.849449**	0.562777	0.582640
PER6	0.326144	0.382424	0.311084	**0.773591**	0.414712	0.421458
PER7	0.426539	0.474615	0.334443	**0.846550**	0.529646	0.512420
PER8	0.357318	0.512914	0.290759	**0.769040**	0.433456	0.424364
PER9	0.551094	0.248483	0.586860	**0.711961**	0.448378	0.448848
SCOP1	0.409589	0.606740	0.372885	0.771659	**0.727371**	0.897016
SCOP2	0.319163	0.560182	0.253906	0.606577	**0.891286**	0.605756
SCOP3	0.411448	0.489591	0.314526	0.463676	**0.780590**	0.492972
SCOP4	0.431816	0.429803	0.283962	0.373854	**0.754928**	0.460407
SCOP5	0.519600	0.573961	0.350048	0.416578	**0.855377**	0.544278
SCOP6	0.383647	0.527678	0.239301	0.433950	**0.804539**	0.436197
TIM1	0.564665	0.551942	0.685177	0.522046	0.601522	**0.869318**
TIM2	0.599384	0.525777	0.766688	0.516377	0.583801	**0.847316**
TIM3	0.409053	0.585376	0.399433	0.766456	0.729441	**0.922063**
TIM4	0.426189	0.594195	0.441274	0.767208	0.726067	**0.929960**

As shown in Table VI reveals that all Cross Loadings for each of the constructs are indeed greater than all of its loadings on other constructs. The square root of each construct's AVE is indeed greater than its highest cross correlation. Results obtained for the Cross-Loadings and the Fornell-Larcker Criterion show that all constructs have discriminant validity (see Table V and VI). Based on the above analysis, the measurement model of the study has high reliability and validity.

Step Two: Analysis of Structural Model

The structural model analyzes the relationships between latent variables. In the analysis of the structural model, the paths' significance was determined by evaluating the T- statistic using the bootstrapping technique with 1000 samples. All constructs were reflective. The bootstrap approach is a nonparametric approach for estimating the precision of the PLS estimates (Chin, 2010). In addition, to assess the predictive power of the structural model, R^2 values of the endogenous constructs were examined. This represents the amount of variance in the construct explained by the model (Chin, 2010).

Concerning with the path between COMP construct and SCOP construct (Hypothesis 1a), the beta coefficient is positive and statistically significant at p-value< 0.001 (β= 0.673 t= 13.38). The paths from COMP construct to TIME and INTE constructs (Hypothesis 1b and 1c) were also found to be significant at p-value< 0.001. The beta path coefficients show positive and direct relationships (β= 0.633, t= 12.76 and β= 0.379, t= 5.15). The significant beta path coefficient (significant at p-value< 0.001) was found on the relationship between COMP and AGGR (β= 0.522; t= 11.59). The above findings (significant relationships in H1a, H1b, H1c and H1d) give evidence of further and full support of a direct and positive relationship between the COMP construct and MAS construct (Hypothesis 1).

The beta coefficient from SCOP construct to PERF construct (Hypothesis 4a) is positive and statistically significant at p-value < 0.01 (β= 0.2246, t= 2.65). The path linking TIME construct to PERF construct (Hypothesis 4b) is also positive and very significant at p-value < 0.001 (β= 0.428 t= 3.78). In addition, Hypothesis 4d predicated a positive and direct relationship between AGGR construct and PERF construct was also supported at p-value < 0.05 (β= 0.141 t= 2.23). Only the path from INTE construct to PERF construct (Hypothesis 4c) was not supported (β= 0.073, t= 0.97). Therefore, the above findings (significant relationships in H4a, H4b and H4d) give evidence of further support of a direct and positive relationship between the MAS construct and PERF construct (Hypothesis 2).
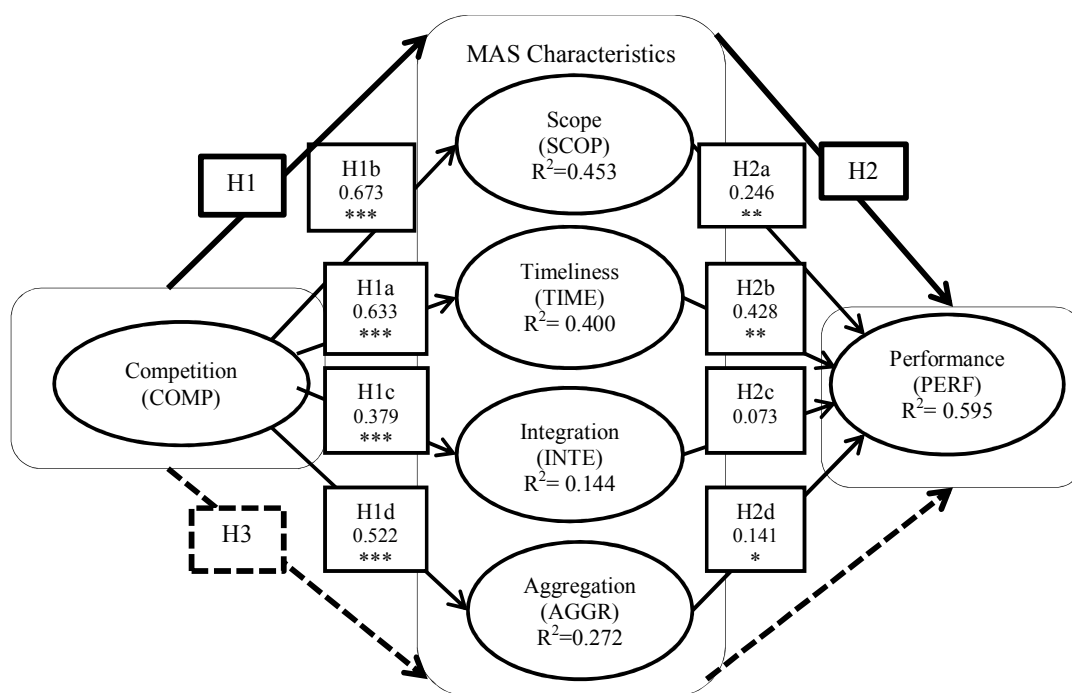

Figure II. Research model results

Note: * p< 0.05 **p< 0.01, ***p< 0.001, ---›= Indirect relationship →= Direct relationship

In addition, Hypothesis 3 predicted indirect relationship between COMP construct and PERF construct through the mediating role of MAS construct. As shown in the Table VII the Sobel test for indirect relationships between COMP and three sub-dimensions of MAS (SCOP, TIME and AGGR) are significant at p-value < 0.05 (β= 0.166, t= 2.60; β= 0.271, t= 3.62; β= 0.073, t= 2.19), which support Hypothesis 3 partially and indicates that MAS mediates the relationship between COMP and PERF.

The conceptual model produces acceptable R^2 values: SCOP (0.453), TIME (0.400), INTE (0.144), AGGR (0.272) and PERF (0.595) (see Figure II). The amounts of variance in endogenous constructs explained by all exogenous constructs are satisfactory and indicate model's predictive accuracy. As all of these R^2 are larger than the recommended levels, it is appropriate to examine the significance level of the paths associated with these variables.

Table VII. Results of hypotheses testing

Panel A: Direct relationships

Indep. variable	Dep. variable	Relevant hypothesis	Relevant path	Path coefficient	Standard error	t-value	P-value	Result
COMP	SCOP	H1a	COMP→SCOP	0.673652	0.050322	13.38689	0.00001	Supported
COMP	TIME	H1b	COMP→TIME	0.633163	0.049587	12.76868	0.00001	Supported
COMP	INTE	H1c	COMP→INTE	0.379891	0.073654	5.157777	0.00001	Supported
COMP	AGGR	H1d	COMP→AGGR	0.522029	0.045020	11.59558	0.00001	Supported
SCOP	PERF	H2a	SCOP→PERF	0.246927	0.092867	2.658933	0.00436	Supported
TIME	PERF	H2b	TIME→PERF	0.428724	0.113246	3.785786	0.00011	Supported
INTE	PERF	H2c	INTE→PERF	0.073005	0.074753	0.976623	0.16519	Not Supported
AGGR	PERF	H2d	AGGR→PERF	0.141165	0.063171	2.234655	0.01348	Supported

Panel B: Indirect relationships (Results of Sobel Test and Baron and Kenny method)

Indep. variable	Mediator	Dep. variable	Relevant path	Path coefficient	t-value	p-value	Result
COMP	SCOP	PERF	COMP→SCOP→PERF	0.166342	2.60810	0.00455	Supported
OMP	TIME	PERF	COMP→TIME→PERF	0.271452	3.62979	0.00014	Supported
COMP	INTE	PERF	COMP→INTE→PERF	0.027733	0.95954	0.16864	Not Supported
COMP	AGGR	PERF	COMP→AGGR→PERF	0.073692	2.19422	0.01410	Supported

Note: panel A shows the direct relationships between constructs in the theoretical model and Panel B shows indirect relationships between independent and dependent variables through a mediator which were tested by using Sobel's test (Mackinnon *et al.*, 2002).

Discussion and Conclusion

Empirical support for the relationship between market competition and MAS characteristics was found which indicate that the extent of market competition is directly associated with the emphasis on sophisticated MAS which provides broad scope, timely, integrated and aggregated information. A comprehensive MAS satisfies firms' managers' information requirements, as MAS forms an integral part of a business's information and control systems, supports managerial decision-making and increases managerial performance. This supports previous research in contingency theory (Hoque, 2011; McManus, 2013; Santos *et al.*, 2012; Tillema, 2005) and extends the results to the financial service industry.

The effects of competition on MAS characteristics were also explored in greater detail in research model (tested via Hypotheses 1a, 1b, 1c and 1d). It was predicted that the level of market competition is positively associated with MAS which is broad in scope (H1a), timely (H1b), integrated (H1c) and aggregated (H1d). The findings provide support for all these hypotheses which indicates that level of market competition has a positive association with broad scope, timely, integrated and aggregated MAS. This finding is also consistent with the findings of previous MAS studies (e.g. Hoque, 2011; Tillema, 2005). An interpretation of this finding is that when the level of competition in the environment increases, firms become less stable and managers face market uncertainty; therefore they would demand a greater amount of MAS information. They use broad scope, timely, integrated and aggregated MAS to assist them in their daily operations as well as in making decisions for the benefit of their organizations.

Hypothesis 2 proposed that MAS has a positive direct influence on managerial performance. In research model, this relationship was found to be significant. This result indicates that the use of sophisticated MAS causes improvement in managerial performance. This finding is consistent with previous researches in management accounting (Baines and Langfield-Smith, 2003; Etemadi *et al.*, 2009; Hammad *et al.*, 2010; Hoque, 2011; Ismail and Isa, 2011; Rasid *et al.*, 2011). Relating to different MAS characteristics, the findings of the relationship between scope and performance (H2a), between timeliness and performance (H2b), and between aggregation and performance (H2d) provide further support for Hypothesis 2. The results indicate that scope, timeliness and aggregation of MAS significantly influence managerial performance. The direct and positive association between MAS and managerial performance suggests that, the use of sophisticated MAS by managers can help them in making more correct decisions, which will cause enhancement in performance (Baines and Langfield-Smith, 2003; Hammad *et al.*, 2010). This means, a conditional association presumes that useful information helps managers in making effective decisions, which improves managerial performance.

The research model proposes that MAS mediates the relationship between competition and managerial performance (H3). Based on the mediation analysis through Sobel Test and

Baron and Kenny four-step process, MAS was found to mediate fully the link between competition and managerial performance. This finding is also consistent with the findings of prior management accounting studies (Hoque, 2011). It is argued that high level of market competition causes turbulence, risk and uncertainty. The use of MAS is important to allow the optimization of the decision- making processes by managers in competitive condition. A comprehensive MAS satisfies managers' information requirements, and supports decision-making and increases managerial performance (Hoque, 2011; McManus, 2013; Mia and Patiar, 2001; Santos *et al.*, 2012).

In this study, the scope, timeliness and aggregation of information, which is provided by MAS, play an important role in improving managerial performance in a condition with high competition. The broader the scope and the more the timeliness and aggregation of MAS information, the better the organization could achieve its performance targets. This finding is consistent with previous researches (e.g. Mia, 2000; Mia and Winata, 2008). It means that if managers use more non-financial, external, future oriented, timely and aggregated information that are provided by MAS, the higher the chances of meeting their performance targets. For example, external information on economic conditions and possibility of certain event occurs could help managers to find ways to achieve the desire performance targets. Additionally, information should be provided in a timely manner to cope with the frequent changes in the environment. Hence, managers are advised to use external, non-financial, future-oriented, timely and aggregated information on managing their operations and monitoring markets and rivals.

This study provides a better understanding of the relationships between competition, MAS characteristics and managerial performance within the context of financial organizations. The results provide financial organizations' managers with some useful aspects relating to the function of MAS, which can be used to enhance their managerial performance. The results may provide Iranian policy makers with some direction in terms of reorganizing Iranian financial organizations and identifying the important elements for improved performance.

This study has added new knowledge to the organizational change literature for service organizations, especially in the Iranian financial organizations. Although other studies have been conducted in other countries, they do not specifically test using a structural model. Moreover, different economic and cultural characteristics between Iran and other countries mean the findings of this study provide a better understanding of how changes in financial organizations take place in a different developing economic setting. The observed positive relationships between competition and MAS are necessary, if they are to align with the changes in environment, to achieve superior managerial performance. Therefore, the results of this study provide useful insights and helpful guidelines to financial organizations, especially those managers who are responsible for making sure that their organization move forward at a proper rate.

This study contributes to both practical and theoretical knowledge, but the results contain several potential limitations. First, the sample population of this study was narrowly focused on Iranian financial organizations and may not be a true representation of all Iranian industries. Second, this study uses a selection of constructs (contingent variables) based on previous literature like: Hoque (2011), Mia and Winata (2008), Chung *et al*. (2012) and Etemadi *et al*. (2009). It is possible that there are other important constructs that can affect MAS and managerial performance. Third, the survey also required that managers assess factors attributing to use of MAS and managerial performance at a single point in time. This could result in bias in the survey results.

Future research directions are discussed to mitigate the effect of the limitations. First, future research should revalidate the measurement scales developed through this study and expand the sample size by including other service sectors. Second, future research should collect survey information from multiple respondents from each participating organizations using the instrument developed in this study to enhance the reliability of the research findings. Third, future study can examine the impact of other factors such as organizational culture, firm size on MAS.

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