

MANAGEMENT ACCOUNTING SYSTEM, INFORMATION QUALITY AND ORGANIZATIONAL PERFORMANCE: EVIDENCE FROM LIBYA

Naser B. Ghanem ¹
Suzana Sulaiman ²

¹ Accountancy Department, Faculty of Economic,
Azzaytuna University, Libya

² Faculty of Accountancy & Accounting Research Institute (ARI),
Universiti Teknologi MARA, Malaysia

ABSTRACT

The purpose of this study is to examine the extent to which management accounting system (MAS) success, defined in terms of MAS effectiveness and system end-user satisfaction's items, has an intervening effect on the relationship between information quality (IQ) and organizational performance (OP). A primary survey was conducted on a group of managers who are working in two different sectors in Libya. The two sectors are banks and petroleum companies. The result of this empirical study shows that the management accounting system usefulness is positively associated with IQ and mediates the indirect effect between IQ and OP. More specific, end users' satisfaction has a mediating impact on the relationship between IQ and OP. This study is limited to the effect of IQ as an independent variable on MAS effectiveness and OP on the Libyan banks and petroleum organizations. A cross-sectional study presented in this study can establish association but not causality.

Keywords: management accounting system effectiveness, information quality, organization performance, end users' satisfaction.

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INTRODUCTION

This study examines the adequacy of management accounting system effectiveness (MASE) in Libyan organizations. As the business environment has become increasingly unstable and unpredictable, business management has also become more complex. Competition, system sophistication, environments are just examples of what the management have to deal with nowadays. In order to manage the business and achieve organization efficacy, organizations need to consider some elements such as organization structure, management style and control system (Frezatti, Aguiar, Guerreiro & Gouvea, 2011; Govindarajan & Fisher, 1990). One of the control system is MAS. MAS is often combined with information on incidence, location, importance and success of management accounting change to provide some analytical insights into the variety and patterns of change within these organizations (Sulaiman & Mitchell, 2005). The type of MAS and the level of sophistication of MAS have been the focal point in the MAS literature in recent years. Many researchers indicates that organizations should introduce recently-developed MAS techniques (Tillema, 2005). This indication implies that in order to achieve success, organizations need to know the type and techniques of MAS that are appropriate to their internal requirements such as IQ, organizational coordination and control requirements and organizational goals. There are evidences on the use of more sophisticated MAS techniques in developing countries although the evidences remained mixed and not suggestive of usual evolution (Sulaiman, Ahmad & Alwi, 2005; Triest & Elshahat, 2007). However, the focus of this study is not on all factors that may impact MAS Effectiveness, but on one of the most important factors which is the level of IQ required by users. This study also chose MAS characteristics or techniques as they are the key factors to achieve success. From this point, the use of the term ‘MAS effectiveness’ will be referred to as the use of appropriate MAS techniques that could meet users’ satisfaction and increase MAS usefulness. In other words, the focal point is not the MAS itself, but on the effectiveness of the system that reflects the system usefulness and users’ satisfaction with the system.

MAS effectiveness (MASE) can be classified into user satisfaction factors and system usefulness factors. User satisfaction factors are content, accuracy, format and ease of use. The system usefulness factors are

timeliness, scope, aggregation and integration of which represent system quality and sophistication (Chenhall & Morris, 1986). IQ represents the information required by users to help them to clarify their point of view on the current issue between hands and to reduce the uncertainty depending on the knowledge and personality of the receiver. This paper seeks to link MASE to the benefit derived from MAS that usage on organizational performance. Organizations use MAS to help managers make the right decision that reflect organizational target. To do so, they need to measure the benefits of MAS and its techniques that could help them in their daily work which can be reflected in the organizations' financial and non-financial performance. The remainder of this paper is divided into three sections. Section two represents the definitions and measurements of MASE. Section three includes a review on the relationship between IQ and MASE. Finally, section four includes a review on the relationship between MASE and OP.

SIGNIFICANCE OF THE STUDY

This paper contributes to the management accounting literature by investigating the influence of information quality on organizational performance of Libyan organisations taking in consideration the mediating impact of MASE as a surrogate of the system and end users' satisfaction. Specifically, this study examines the effect of IQ on OP in the banking and petroleum sectors in Libya. These sectors are chosen because they are the ones that often adopt the most sophisticated systems (Leftesi, 2008; Twati, 2008). The general aim of this study is to increase the body of knowledge in understanding the influence of IQ and MASE (the consequences of the effect of various mechanisms of MAS) on OP. In spite of many years of extensive researches in the AIS and IS effectiveness, only few studies have examined MASE. The findings in these studies however, are equivocal which require more researches to be conducted. Stakeholders who are involved in the setting up of MAS will benefit from the findings in this study as it highlights some of the important factors such as contextual dimensions of IQ that impact MASE. Another contribution expected from this study is the findings in this study would add to the current literature on MASE from a developing country, such as Libya where the circumstances are completely different from the developed countries.

MANAGEMENT ACCOUNTING SYSTEM EFFECTIVENESS (MASE)

The most important concept of effectiveness that has been suggested in the management accounting literature is decision-makers' satisfaction and the perceived quality of information outputs provided by the system (Seddon, 1997). Effectiveness is concerned with attaining given results that could meet organizational objective. Pollanen (2005) indicates that effectiveness and efficiency constitute two rather distinct dimensions of performance. Anthony and Govindarajan (1998) defines effectiveness in terms of the relation between a responsibility center's outputs (MAS) and its objective. Contingency theory basically states that efficient organizational structures are not similar to organizational contextual factors such as technology and environment. The literature provides a suitable starting point for discussing the effect of organizational variables on MAS. Earlier studies have suggested that successful organizations must ensure that their control systems such as MAS is properly managed and differentially designed to cater their strategy and environment (Mile & Snow, 1978; Simons, 1987). However, this does not imply that the differences in the design of MAS can explain the variation in organizational performance (Gerdin & Greve, 2004). Few studies have highlighted this issue such as (Abernethy & Bouwens, 2005; Bailey & Pearson, 1983; Baines & Langfield-Smith, 2003; Chenhall & Euske, 2007; Chenhall & Morris, 1986; DeLone & McLean, 1992, 2003; Mia & Winata, 2008; Nicolaou, 2000; Pomberg & Pourjalali, 2009; Tillema, 2005) along with several other recent studies that have mentioned the importance of measuring system effectiveness and linking to the net benefit or effect that IS have on organizational performance OP.

MAS as a subset of management information system (MIS) is responsible for providing timely, accurate, financial and statistical reports for internal management decision making. It refers to collecting, recording, classifying and summarizing information to help managers plan, control and evaluate strategies that leads to the improvement of managerial performance (Bruggeman & Slagmulder, 1995). MASE is defined in terms of MAS usefulness (MASU) and end user satisfaction (EUS). The reason is to have a set of variables that can test the effectiveness of MASE in a comprehensive way. This is because system effectiveness has been measured using different collection of items which can be summarized into more than one group of

items namely, EUS & MASU. The significance of information quality and organizational variables to the design of MAS have been constructed. The organization must be thoroughly assessed and understood, and the objectives of having the system need to be identified.

END USER SATISFACTION (EUS)

The term user satisfaction has been widely and extensively used in the literature of IS, AIS and MAS. The study of EUS on end-user's perspective is essential for organization's system development process as well as system success. Study on EUS helps system designers and evaluators to understand the social and economic benefits of investing in information technology (Essex, Magal & Mateller, 1998). Mustafa, Sori, Ahmad & Mahussin (2010) indicates that it would be a big mistake if the system is left to be handled by end-users without prior auditing support during the system development.

In order for organizations to become more effective and efficient, there is a need for high quality information on the system and meeting end-user's need. End user satisfaction is defined in terms of perceptions of the system users on the extent that the information system at hand fulfils their selective information requirements (Ives, Olson & Baroudi, 1983). In the accounting literature, many factors and items have been developed and used by various studies to measure EUS. Instruments developed by (Doll & Torkzadeh, 1988) was found to be the most stable and reliable measurement of EUS in the general ledger system and computer simulation application on decision support system (Downing, 1999; Hendrickson, Glorfeld & Cronan, 1994; McHaney & Cronan, 1998). Content, accuracy, format, ease of use and timeliness are the instruments that have been developed by (Doll & Torkzadeh, 1988) and used extensively by researchers in measuring EUS. The following is a brief explanation to these factors:

1. *Content*: Content is one of EUS variable's dimensions. It illustrates that the information provided by MAS is sufficient, precise and meet users' needs.
2. *Accuracy*: It refers to the information corresponding to the reality and neutrality (Boritz, 2005). It also represents the information provided

by MAS is accurate and meet the requirements and user satisfaction in terms of information accuracy.

- 3. *Format*: Format represents that the way the information is displayed and the reports that MAS provides is clear and display in a useful format. The system users are also satisfied with the layout of the outputs.
- 4. *Ease of use*: Another dimension chosen to represent end-user satisfaction is the easiness of using and implementing the management accounting system in the organization. This dimension measures the system efficiency, the friendliness of the system and ease of use.

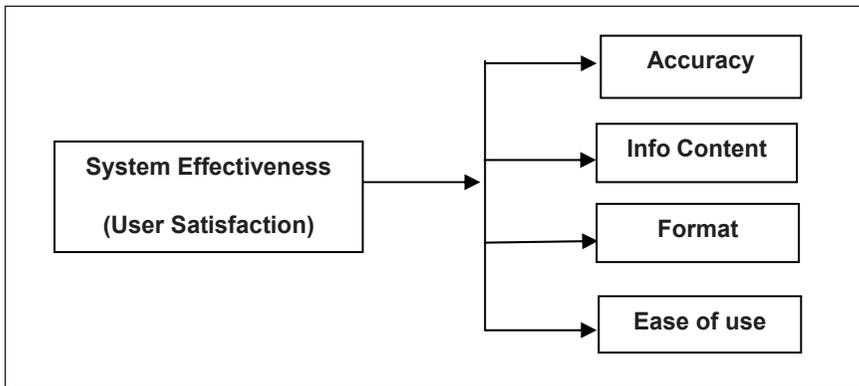


Figure 1: MAS Effectiveness (User Satisfaction) Dimensions
(Source: Adopted from Nicolaou, 2000)

INFORMATION QUALITY (IQ) AND MANAGEMENT ACCOUNTING SYSTEM EFFECTIVENESS (MASE)

Previous studies have suggested that organizations need management accounting control system such as MAS to help them in getting timely, accurate and relevant information on the extensive variety of issues such as quality, client services, productivity, satisfaction, profitability and other issues (Hoque & Hopper, 1997; Krishnan, 2005). IQ is difficult to define because of the inconsistency of the characteristics of information quality. However, the general definition of IQ is “information that is fit for use by

information consumers". Many different factors have been used to measure IQ (see Table 1 as an example). Accounting information is formed by an aggregation of data that is used as inputs to MAS. The quality of information provided is imperative to the success of the systems (Xu, 2009). Most of the studies that have focused on IQ include and measure other exogenous variables since IQ is just one of the components of measuring system success. In addition, the increased demand for high quality information is related to the growth of data warehouses and the direct access of information by users from many different resources available to them (Lee, Strong, Kahn & Wang, 2002).

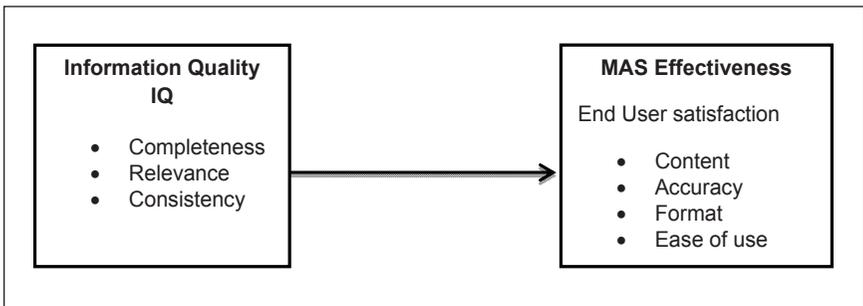


Figure 2: Information Quality and MAS Effectiveness Factors Relationship

If IQ is directly associated with MASE, which is measured by EUS, and change can be made to the level of effectiveness by increasing users' satisfaction with the system information outputs, then the organizational performance would apparently improves. Thus, the following hypothesis is developed:

H₁: The level of IQ is positively associated with user satisfaction as subunit of MASE.

ORGANIZATION PERFORMANCE (OP) AND MANAGEMENT ACCOUNTING SYSTEM EFFECTIVENESS MASE

Previous studies in the area of system success have mentioned that the reason of getting information from MAS is to provide the required information to users to help them make the right decision and achieve the organizational goals. This indicates that MAS as a provider of such information has to deal with organizational performance since the information will affect managers' performance via decision making. Most accounting researches of management accounting information that have examined the effect of information on organizational and environmental context explained the outcome effect based on the contingency theory (Chang, Chang & Paper, 2003).

From the contingent perspective, MAS are likely to perform more effectively if they implement and use MAS that suit their organizational and environmental situations (Chenhall, 2003; Otley, 1980). Studies such as Abernethy and Lillis (2001); Chenhall and Morris (1986) and Chia (1995) did not directly test the influence of MAS on organizational performance. Instead, they examined the moderating effect of the situational variable (Soobaroyen & Poorundersing, 2008). Under the contingency theory arguments, organizational performance is affected by specific and environmental factors.

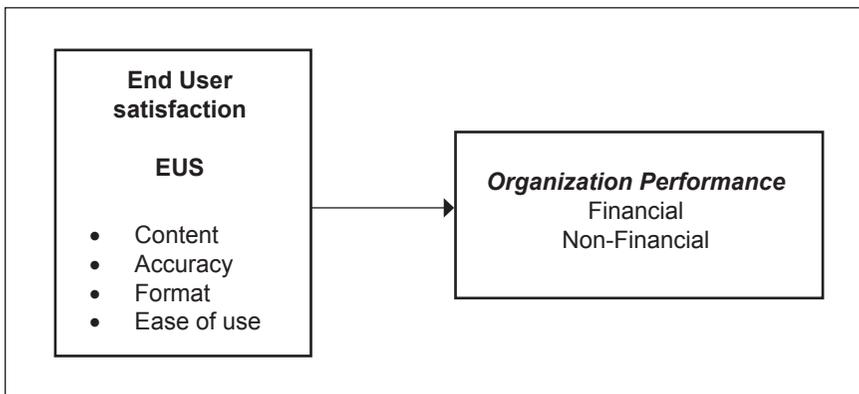


Figure 3: MAS Effectiveness and Organization Performance Factors Relationship

The following Hypotheses are developed to examine the effect of MASE on OP:

- H_2 : *There is a positive relation between the degree of MASE and Organization performance.*
- H_{2a} : *User satisfaction is positively associated with financial performance.*
- H_{2b} : *User satisfaction is positively associated with non-financial performance.*

In sum, the review of MAS and IS literature indicate that MASE mediates the relationship between IQ and OP as illustrated in Figure 3. IQ is an important factor of MAS success that users expect can provide the desired information quality from using the systems and hence, affect the financial and non-financial performance of the organization. The degree of information quality depends on users' attitude, level of education, productivity and other factors that are related to the individuals' decision making process. Previous studies have also contributed to the development of such a framework. However, most of these studies were conducted in the IS and AIS disciplines. This study relies on this literature to develop the MASE framework in this study.

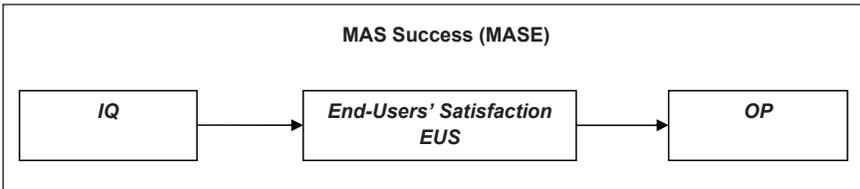


Figure 4: The Mediating Effect of MAS Effectiveness between IQ and OP

With regards to what have been mentioned above in the preceding paragraph, a hypothesis is developing to represent the mediating effect of EUS on OP:

Hypothesis 3: MAS Success (EUS) has a mediating impact on the relationship between information quality, formulated by Completeness, relevance, and consistency, and organization performance.

H_{3a}: EUS mediate the relationship between IQ and Financial Performance.

H_{3b}: EUS mediate the relationship between IQ and Non-Financial Performance.

RESEACH METHODOLOGY

There are many benefits of using questionnaire survey as a primary tool to collect data in social sciences. The most and best advantage of questionnaire survey is its ability to reach to a wide dispersed respondents in a relatively inexpensive compared to other techniques such as interview or experiment (Sekaran, 2006).

The sample selected in this study is the Libyan banks and petroleum companies. The criteria used for the selection of these two sectors is based on their use of sophisticated internal systems that made them ahead of the other sectors in Libya (Leftesi, 2008; Twati, 2008). Petroleum companies were selected from the National Oil Corporation directory¹ whilst banks were selected from the Libyan Central Bank directory². The field study recognizes two phases after the preparation of the survey. Since the numbers of organizations in both sectors are small (40 banks and 49 petroleum companies), each organization of both sectors was selected to be part of the sample. General Managers (GM), Chief Executive Officers (CEOs), Chief Financial Officers (CFOs), Chief Information Officer (CIOs) and Chief Technology Officers (CTOs) were selected as the major end-users of MAS's information and they were asked to indicate their opinions on the issues examined in this study. A pilot study took place before the distribution of the final survey.

In addition, interviews were conducted with 10 managers during the distribution of the pilot survey including two of each subgroup respondents. From the pilot study, amendments and editing were conducted to the primary survey which led to the exclusion of two items and rewording some questions to exclude ambiguity. During the pilot study, one problem relating to translation of the questionnaire from English to Arabic Language was

1 Petroleum companies were selected from National Oil Corporation website <http://en.noclibya.com.ly/index.php>

2 Banks were selected from Central Bank of Libya website <http://cbl.gov.ly/ar/>

encountered. During the interviews, many of the respondents complained about some expressions and vagueness that they found in some questions. Of consequence, this affected the accepted answers for some questions in the survey. The questionnaire was modified according to the result of this pilot study and the amended questionnaires were sent to more than 300 managers representing 89 organizations. Two hundred and forty five questionnaires were returned. Out of the 245 returned questionnaires (79%), 37 questionnaires were excluded due to incomplete. The completed questionnaires received by the end of the data collection phase are 208 representing a response rate of 70%. The ones who did not answer the survey or not interested in the study provide reasons as to why they were not interested. Among the reasons are time concern, company privacy and even no comments and no feedback s.

Table 1: Organization Profile

Items		Frequency	Percentage
Type of Industry	Banks	103	49.5%
	Oil & Gas	105	50.5%
Organization size	Small firms 1-100	9	4.3%
	Medium firms 101-500	35	16.8%
	Medium organization 501 - 1000	72	34.6%
	Large organizations > 1001	92	44.2%

Table 2 shows that the total respondents consist of 208 managers including 105 managers from petroleum organization and 103 managers from banks. Within the organizations, only 17 out of 208 respondents are females. One hundred and fifteen managers have Bachelor degree, 59 managers have master degree, 19 managers have PhD and 15 have diploma. Out of the 208 respondents, 31 of the respondents are GM, 59 CEOs, 69 CFOs and 49 CITO. One hundred and nineteen respondents have experience more than 74 years, 20 managers have less than 10 years and more than 5 years and only 15 managers have less than 5 years of experience

Table 2: Respondents Profile

Items		Frequency	Percentage	Group Response Rate
Gender	Male	191	91.8%	
	Female	17	8.2%	
Level of education	Degree	115	55.3%	
	Master	59	28.4%	
	PhD	19	9.1%	
	Other	15	7.2%	
Current position	GM general manager	31	14.9%	35%
	CEO chief executive officer	59	28.4%	80%
	CFO chief financial officer	69	33.2%	90%
	CITO chief info & IT officer	49	23.6%	65%
Years of experience	< 1 year	0	0%	
	From 1 to 5 years	15	7.2%	
	From 6 to 10 years	74	35.6%	
	More than 10 years	119	57.2%	

Source: from the survey

For sampling size adequacy, the Principal component analysis requires that the Kaiser-Meyer-Olkin Measure of Sampling Adequacy has to be greater than 0.50 for each individual variable as well as the set of variables. Therefore, anti-image test was applied to measure sample adequacy (MSA) for this study. The result shows that the sample size adequacy is marvellous (MSA is almost 0.90) for each individual variable and set of variables. The numbers are between 0.973 and 0.884. Therefore, the result shows that the sample size used in this study is acceptable. Table 3 shows the result of MSA test.

Table 3: Anti-image Matrices

Variables		Com	REL	CONS	CONT	ACC	FOR	EOU	FP	NFP
Anti-image Correlation	Completeness	.925 ^a	-.139	-.298	-.102	-.048	-.027	-.063	-.207	-.001
	Relevance	-.139	.916 ^a	-.122	.053	-.010	.046	-.217	-.315	-.129
	Consistency	-.298	-.122	.896 ^a	-.018	.104	-.138	-.066	-.123	-.017
	content	-.102	.053	-.018	.913 ^a	-.241	.017	-.182	-.274	-.182
	Accuracy	-.048	-.010	.104	-.241	.897 ^a	-.232	-.101	-.034	-.018
	Format	-.027	.046	-.138	.017	-.232	.937 ^a	-.231	-.091	-.156
	Ease Of Use	-.063	-.217	-.066	-.182	-.101	-.231	.900 ^a	.130	.039
	Financial_Per	-.207	-.315	-.123	-.274	-.034	-.091	.130	.889 ^a	-.219
	Non_F_Per	-.001	-.129	-.017	-.182	-.018	-.156	.039	-.219	.884 ^a

a. Measures of Sampling Adequacy(MSA) (marvellous sample adequacy)

Measurements of the Variables

The uses of the selected items that have been used widely and accepted by many researchers allow a comparative analysis to be performed. The model used in this study depends on the information system success model that were developed and introduced by DeLone and McLean (1992) and subsequently modified after 10 years (Delone & McLean, 2003). The model was again modified following Nicolaou's (2000) and Chenhall and Morris (1986)'s recommendations.

IQ is a concept that can be described in terms of system outputs that are useful to users. IQ as an independent variable of this study was measured in terms of information completeness, consistency and relevance. These items were adopted from DeLone and McLean (2003) and Gorla, Somers and Wong (2010). Some items were excluded due to inclusion in the EUS measurement and MASU measurement. For example: accuracy, timeliness and ease of use were used to measure MASE because they are more related and affected by the system. MASE was measured by End User Satisfaction (EUS). EUS is a concept that represents the system users' attitude of the information produced by MAS in terms of information content, accuracy, format and ease of use. These items were used to measure EUS following (Nicolaou, 2000). Timeliness was excluded as this study encompasses a part of the wider measurement of MASE.

OP is the independent variable in this study. OP was tested and analysed using two indicators. These two factors were used to measure OP; Financial performance (FP) and non-financial performance (NFP). Following the measurement developed by (Govindarajan, 1984) and adjusted by (Zahirul, 2011), 5 items adopted for FP and 8 items for NFP.

The descriptive statistics of the main variables were measured using SPSS software. Table 4 shows the descriptive statistics of these variables as it resulted from the field study.

Table 4: Descriptive Statistics of the Variable of the Study

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Information Quality	208	2.33	4.78	3.6309	.44548
User Satisfaction	208	2.56	4.71	3.6457	.43520
Financial Performance	208	2.00	4.40	3.2952	.54585
Non-F performance	208	2.00	4.00	2.9952	.49573
Valid N (listwise)	208				

RESEARCH FINDING

In order to test the model and hypotheses, AMOS (Arbuckle, 2006, 2010), SEM software and SPSS 19 was used. The result of the data analyses is illustrated in Table 5 that explains the correlation values. Table 6 illustrates the regression weight in which the MASE model is drawn in Figure 4 that shows the intervening effect of MASE between IQ and OP.

Table 5: Correlation Matrix

Variables	COM	REL	CONS	CONT	ACC	FOR	EOU	FP	NFP
Correlation Completeness	1.000								
Relevance	.441	1.000							
Consistency content	.492	.393	1.000						
Accuracy	.391	.324	.288	1.000					
Format	.236	.204	.121	.399	1.000				
Ease_use	.293	.254	.308	.305	.365	1.000			
Financial_Per	.284	.339	.259	.337	.285	.367	1.000		
Non_F_Per	.511	.539	.425	.512	.280	.339	.223	1.000	
	.317	.376	.277	.417	.243	.333	.198	.489	1.000

The high correlations value of each pair of variables in table 5 shows a strong relationship between endogenous and exogenous variable. Such result indicates that there is a relationship between the tested variables. System usefulness seems to be more effective than user satisfaction to mediate the effect of IQ on OP. The effect of MASE is more on financial performance compared to non-financial performance.

Table 6: Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
EUS	<---	IQ	.593	.105	5.626	***	
COM.	<---	IQ	1.011	.140	7.207	***	
CONS.	<---	IQ	.914	.135	6.780	***	
RELV.	<---	IQ	1.000				
EOS.	<---	EUS	1.000				
FOR.	<---	EUS	1.053	.167	6.307	***	
ACC	<---	EUS	1.233	.191	6.466	***	
CONT.	<---	EUS	1.165	.168	6.943	***	
FP.	<---	IQ	.347	.173	2.008	.045	
FP.	<---	EUS	.969	.238	4.075	***	
NFP.	<---	IQ	.205	.148	1.387	.166	
NFP.	<---	EUS	.479	.191	2.509	.012	

From the inferential statistics and fit of the model, the results in Figure 4 show a mediating effect of MASE between IQ and OP (designed model). The model consists of 3 latent variables in which IQ is the independent variable, OP is the dependent variable and MASE, presented in terms of EUS is the mediating variable. Each of these variables includes a group of indicators and each indicator has a collection of items (see methodology section above). The model indicates that IQ can explain MASE at 57% (square multiple correlation). IQ has a high relationship with MASE of 60% and MASE also has a high relationship with FP of 97%. Table 7 explains the acceptance of fit of the model. Chi square value is 624.824 and DF value is 541 which provide a value of 1.155 by dividing chi square by DF (accepted value is less than 5). CFI is almost equal to 1 (.985). MRSEA is less than 0.05 (0.027). Default AIC (872.824) is less than saturated AIC (1330) which is accepted.

The indices illustrated indicate an acceptable model fit. This model reaches the best indices after a long process of statistics tests using EFA, CFA, and other SEM analyses that lead to the exclusion of some items that show weak correlation. The result from CFA supports the finding resulted from EFA as both items deleted are outliers from the other items.

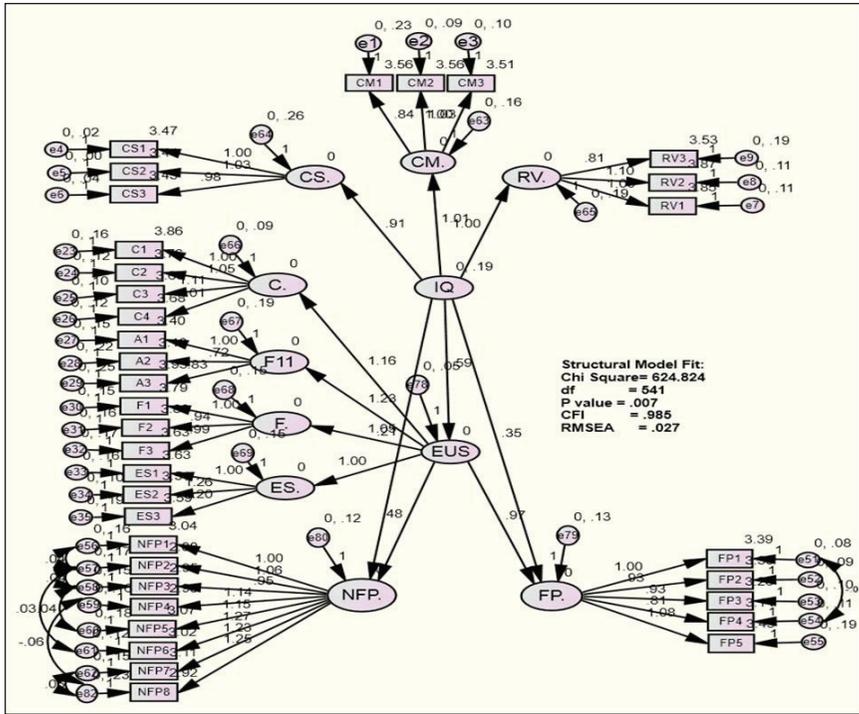


Figure 5: Results of the Primary Survey Test on MASE Mediating Effect (Structural Model)

Table 7: Indices of Fit for Structural Equation Model SEM (N=208)

Model/ Index	CMIN	DF	CMIN/DF	CFI	RMSEA	AIC	P value
Default Model	624.824	541	1.155	.985	.027	872.824	.007
Saturated Model	.000	0	N/A	1.000	N/A	1330.000	N/A
Criteria (accepted values)	N/A	N/A	Less than 5	More than .8	Less than .05	D model less than S model	Less than .05

Table 7 illustrates the indices of fit for SEM. All indices show accepted values of P value of 0.007, which is less than 0.05. RMSEA is also less than 0.05 with a p value of 0.027. Other indices also shows values in the desired value for the Model to be accepted. The result shows that MAS end users' satisfaction mediates the relationship between IQ and financial performance although there is insufficient evidence on the mediating effect of OCCR on non-financial performance.

CONCLUSION AND DISCUSSION

Analysing the survey data from Libyan organizations (banks and petroleum organizations) shows that the use of MAS information by managers can be considered quite satisfactory. Almost all managers show the importance of information provided by MAS. Previous studies in MAS have provided inconsistent findings relating to factors influencing the adoption of MAS in developing countries. The result of this study ties in with the recent evidence that the Libyan banks and oil companies have invested in new systems and other financial related software to access on broader, accurate, and formative information and easy to access to respond to increasing market requirements. The use of EUS as a measurement of MASE aimed to understand the effect of quality and sophisticated MAS techniques, and focuses on the users' perspective of MAS information basing on Nicolaou's (2000) conceptualizations. User satisfaction is effected by IQ, but that does not show any direct effect on NFP which was unanticipated in this study. Such result might relates to the size of respondents as the data collected for this study is limited or because of the instruments used in measuring the EUS. In other words, Figure 5 and table 6 have shown significant intervening effect for EUS on the relationship between IQ and FP in general. However, the results show that by using the control variable type of industry, EUS has an intervening impact in banking sector while no indirect impact in Petroleum sector.

On the other hand, MASE as a surrogate to EUS has a significant intervening impact on the effect of IQ on NFP although the results show a weak if no direct relationship between IQ and NFP. In contrast, FP has a direct relationship with IQ when being measured generally and in both sectors. The result for EUS test is similar to what is expected in this study. This may be related to the group who answered the survey and therefore, more research is needed to test the other variables that may affect user satisfaction and OP. The results also depend on human opinions that may provide different results by changing the respondents as they have different circumstances and thinking. Interestingly, Figure 5 shows that considering EUS as an observed variable for MASE, the result shows a high mediating effect and fit between IQ and OP via MASE.

This study extends previous studies in different ways. Firstly, this study reduces the gap in the area of MAS effectiveness. Secondly, this study adopts a contingent approach to identify the effect of a particular organization and individual variable on MASE.

Some limitations of the current study should be noted. The type and number of responses may limit the findings of this study although it is still within the developing environment context (Triest & Elshahat, 2007). Nonetheless, indices provided in table 3 show marvellous sample adequacy, an indication that the number of responses is sufficient enough to test the hypotheses in this study.

Future studies should consider incorporating other variables that have not been examined by researchers in this area. Some of the variables include system objectives and users' requirements such as organizational coordination and control requirements. Other variables can also be considered such as individual impact, task uncertainty effect and organizational impact. The researcher is working on measuring the effect of these variables as an extension to this study.

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