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# The Impact of Technology, Job Complexity and Religious Orientation on Managerial Performance

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## **Keywords**

Management accounting systems, technological advancement, job complexity, religious orientation, managerial effectiveness.



# The Impact of Technology, Job Complexity and Religious Orientation on Managerial Performance

Jesmin Islam<sup>1</sup> Majharul Talukder<sup>1</sup> and Hui Hu<sup>1</sup>

## Abstract

This paper explores the impact of technology, job complexity and religious orientation on the performance of managers in the financial services industries. Data were collected from bank managers representing Islamic and conventional banks in Bangladesh. Path models were used to analyse the data. The results provide support for the hypothesis that a management accounting systems (MAS) adequacy gap exists in the financial sector in a developing country such as Bangladesh. These Islamic and conventional banks also experienced varied outcomes regarding the impact of the MAS adequacy gap on managerial effectiveness. Significant results emerged concerning the direct influence of technology and job complexity on managerial effectiveness, although these findings again differed across religious and conventional banks. Significant intervening effects of both MAS adequacy gap and job complexity on the relationships between contingency factors and managers' effectiveness were also found. Overall the findings showed that the type of religious orientation in Islamic banks wielded an important influence on the sensitivity of the MAS adequacy gap. Religious orientation served as a control device for the relationships between job-related contingency factors and managerial effectiveness.

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**JEL Classification:** M40.

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## Introduction

This study is concerned with the behavioural effects of information generated by management accounting systems (MAS) within an organisational contingency theory framework. Contingency theory focuses on the performance effects of 'fit,' defined as the matching of two or more organisational factors of concern (Donaldson 2001). Studies on MAS designs have been done mostly in developed countries and in manufacturing organisations, while only very few studies have been undertaken in developing countries, specifically in service organisations and without any reference to religious contexts (Abernethy & Guthrie 1994; Chenhall & Morris 1986; Cleary 2009; Naranjo-Gil & Hartmann 2007).

No evidence has been found regarding the impact of MAS design on managerial effectiveness in organisations that operate in different value systems, particularly in terms of their religious orientation in the banking sector. Generally, religious orientation means banks adopting religious values that are basically Islamic principles, which should be adhered to when conducting business operations. In relation to the MAS design feature of 'information adequacy' little work has been done on this issue in any organisational context. Yet the adequacy of MAS information is expected to be of fundamental importance to how management planning, control and performance evaluation in businesses operating in the service sector in developing countries. MAS information is made available to and used by, bank managers. Now the question is whether MAS information systems have varied characteristics resulting from different religious orientation. This is a research question relevant to the transferability of MAS across organisations in the same industry. The aim of this study is to: firstly, contribute to new thinking in management accounting research, with particular reference to the design of MAS; and secondly, provide new evidence of the intervening effects of MAS information adequacy gaps on the relationship between contingency variables. These for the first time include religious orientation and outcome variables.

This study investigates the information systems existing in banks in an emerging Asian economy. Bangladesh, a developing country, is aiming to have a more sophisticated level of information technology in its banking industry. Bangladesh provides an ideal setting for examining the concepts of MAS information availability and usefulness. An aim of this study is to contribute to the body of knowledge about the application of contingency theory to management accounting systems and to identify some practical implications for the effectiveness of management accounting systems in banks in a developing country. This paper investigates the relationship between technology, job complexity, religious orientation and managerial effectiveness, and whether MAS information adequacy has an intervening effect on that relationship for people who work in Islamic and conventional banks. This aim leads to the following research objectives:

1. Explain the effects of contingency factors concerning job complexity on alternative forms of managerial effectiveness within the context of religious orientation, and investigate the intervening impact of aggregated dimension of MAS information adequacy of bank managers on this relationship.
2. Explain the effects of the contingency factors of technological advancement, and the organisation's religious orientation on managerial effectiveness and investigating the intervening effect of the aggregated dimension of MAS information adequacy on this relationship.

## Literature Review and Hypothesis Development

Studies based on contingency theory in management accounting provide the focal literature for this paper. This paper reviews the contingency theory literature, particularly the extensions of this literature to issues of MAS design and the religious values that can be present in an organisational setting. Gaps in this literature will be identified and how this paper seeks to address these gaps will also be considered.

Khan, Ahmed and Halabi (2010) state that contingency theory analyses organisational behaviour in which it is explained how contingent factors such as technology and the external environment influence the design and functioning of organisations. From a contingency perspective, there are a number of organisational factors such as role behaviour, culture, strategy, etc. which have been examined in existing literature (Yin & Zajac 2004; Zajac, Kraatz & Bresser 2000). Typically, contingency theory studies postulate that organisational outcomes are the consequences of a fit or match between two or more factors. Researchers such as Chenhall (2006) and Selto, Renner and Young (1995) believed that contingency theories facilitate an understanding of the broad issues of management controls. The results of Muafi's (2009) study show that there is a link between contingency variables (like role behaviour and organisational culture) and competitive strategy. Takeuchi (2009) tested a contingency performance prediction and revealed that human resource management policies and business strategy would affect a manufacturing company's performance. Waweru (2008) found that manufacturing businesses, which focus on differentiation strategies, have made significant changes in accounting control systems and MAS. Consequently, this study, in line with some management accounting studies, draws upon contingency theory as the grounding upon which to generate hypotheses. This theory suggests that particular features of an appropriate accounting system will be determined by the specific circumstances in which an organisation operates (Chenhall & Morris 1986; Kattan, Pike & Tayles 2007).

### *MAS Information Adequacy as a Control Subsystem*

Researchers in management accounting defined the characteristics of MAS information, as perceived by managers, in terms of its ability to make managers more effective. Four broad information characteristics generated by MASs were established by Chenhall and Morris (1986). These are broad scope, timely, aggregated and integrated information. Contingency research in MASs suggests that decision-makers tend to rate broad-scope information more highly as perceived environmental uncertainty (Chenhall & Morris 1986; Gul & Chia 1994) or task uncertainty (Chong 1996) increases. Broad scope MAS information involves information, which is internal and external, financial and non-financial ex-post and ex-ante information. Chenhall and Morris (1986) commented that managers who perceived greater environmental uncertainty would prefer timely information. In developing a conceptual framework consisting of these information characteristics, Chenhall and Morris (1986) argued that such a conceptualisation would provide a common ground for comparing MASs in different organisations.

The perceived job performance of Islamic bank managers is less to do with a marketplace evaluation of their financial decision-making, and more about their working relationship with their *Shariah Board* (SB). A study by Islam, Taylor and Islam (2000) suggested that a significant aggregated information gap existed in Islamic and conventional banks. In terms of the use of

MAS information, it is likely that an adequacy gap in the aggregation dimension would have the strongest impact on job performance. We expect that an Islamic bank manager is likely to be particularly sensitive to a lack of aggregated information about the preferences, actions and results of other players within and outside the organisation (especially the SB).

### *Religious Orientation as a Contingent Variable*

In this study the religious orientation of a bank is treated as a contingent variable. The religious orientation variable was studied as a dichotomous variable. Data was gathered from Islamic and conventional banks. No hypotheses were developed separately for the religious variable. The effect of religion was investigated using the two Islamic and conventional bank groups' scenarios. According to Hassan and Lewis (2007) religious values and ethical requirements have resulted in the Islamic banking system having to operate with a special form of corporate governance and contracting arrangements with stakeholders - in contrast to conventional commercial banks. It is expected that the information sought by, and systematically made available to, senior and middle-level managers in the Islamic and conventional banks, will therefore have different emphases.

Firstly, Islamic banks use the *mudharaba and musharaka* method of supporting businesses in which the bank shares profits and bears the losses of their business clients (Hasan 2009; Hutapea & Kasri 2010). This suggests that management would need relatively aggregated information about the day-to-day business operations and prospects of their clients. Such aggregated information would be expected to be even more important to Islamic bank managers who also operate according to the *mudharaba/ musharaka* mode of contracting with business clients in which the bank participates directly. In contrast, conventional bank managers who place more emphasis on the securing of collateral from business clients than entering into venture capital schemes with clients may be less demanding in their continuous availability of aggregated information.

Secondly, the presence of the *shariah* supervisory board, appointed by the shareholders, and having power to examine all information about the Islamic bank's transactions to determine if religious objectives are met, also suggests that information needs to be aggregated. The Islamic bank's management must take care in its decision to meet both religious and business objectives.

It is contended, therefore, that aggregated information would be perceived to be relatively more useful by managers in Islamic banks. Since prior evidence relating to the Islamic/conventional comparison is lacking about the aggregated dimensions of MAS information, the aggregated information dimension is included in the hypotheses that are empirically tested in this study.

### *Managerial Effectiveness*

The variables job satisfaction and a self-rated measure of managerial performance are used in this research to measure managerial effectiveness. These two variables have been widely used in the literature as surrogate measures of the effectiveness of management. First, the variable, job satisfaction, has been measured by Warr, Cook and Wall (1979). These researchers found the variable could be included in two separate concepts of extrinsic and intrinsic job satisfaction. The variable job satisfaction as measured by Warr et al. (1979) was also used by Taylor (1998).

According to Fargher et al. (2008) religious orientation affects the intrinsic job satisfaction of an organisation's employees. The instrument developed by Warr et al. (1979) is used in this study to measure the two dimensions of job satisfaction. The importance of job satisfaction is also well established in the literature (De Pietro & Schremser 1987; Judge et al. 2001; Parker 2007). Job satisfaction has been used in studies on the effects of budgetary participation (Adler & Reid 2008; Chenhall 1986). The relationships among job characteristics of professionalism, organisational commitment and job satisfaction were examined by Norris and Neibuhr (1983).

Furthermore there is a variable referred to as job performance (Farh & Dobbins 1989). This is a self-rated measure where managers can evaluate their own performance, their performance compared to their peers and their superiors' recent evaluation of their performance. The measure developed by Farh and Dobbins (1989) will be used in this study to measure job performance. Overall managerial effectiveness can be described according to the following results: high extrinsic and intrinsic job satisfaction and high self-rated job performance. Therefore, a direct relationship between the dimensions of MAS aggregated information adequacy gap and managerial effectiveness, which may differ between religious orientations, is hypothesised as follows:

*H1: The adequacy gap between perceived usefulness and availability of MAS information in its aggregated dimension is significantly negatively related to managerial effectiveness and will have different outcomes for Islamic and conventional banks.*

#### *Job Complexity as a Contingent Variable*

Job complexity is an important variable in contingency studies. Wood (1986) found that as tasks increased in complexity, the knowledge and skills necessary for task accomplishment also increased. He also argued that cognitive effects of participation might be most influential in complex tasks. Campbell and Gingrich (1986) found that in complex task situations, performance improved when participative goal setting was evident.

Mia (1989) studied the interactive effects of participation and job characteristics regarding job difficulty on managerial performance and work motivation in budgetary situations. Managerial performance was found to be excellent in situations where perceived participation was according to perceived level of difficulty. Brownell and Dunk (1991) found that in conditions of low task difficulty, participation combined with low budget emphasis was associated with effective managerial performance. Norris and Neibuhr (1983) discovered positive relationships between job characteristics of skill variety, task identity and task significance, on the one hand, and job satisfaction and managerial performance, on the other hand. In this study a hypothesis is formulated for determining whether there is a direct relationship between job complexity and managerial effectiveness.

*H2: Job complexity is significantly related to managerial effectiveness and the relationship will be different in the context of Islamic and conventional banks.*

Taylor (1998) argued that for a given level of job complexity, if the usefulness of information is substantially different from the availability of information, there will be a negative impact on managers' performance. It can also be argued that if job complexity is higher, the MAS adequacy gap will be greater and so will be the negative impact on managerial

performance. High task complexity and high MAS gaps in their various forms can also result in managers experiencing low job satisfaction. Therefore, there should not be miss-match between task complexity and MAS information gap because if there is, it can lead to low managerial performance and low job satisfaction. Therefore, Hypothesis H3 is formulated to investigate the intervening effects of MAS information adequacy gaps on the relationships between job complexity and managerial effectiveness. H3 is stated as follows:

*H3: There is a significant intervening effect of the MAS information adequacy gap on the relationship between job complexity and managerial effectiveness and the effect will be different in the context of Islamic and conventional banks.*

#### *Technological Advancement as a Contingent Variable*

Technology has been identified as a major explanatory variable of an effective accounting system. Perrow's (1967) definition of technology emphasised technology from a manufacturing perspective. His framework centered on two variables: the number of exceptional cases found in the raw materials; and the nature of the search process used when exceptional cases were identified. Changes in technology were found to be accompanied by changes in performance management systems (McNair & Mosconi 1989). Findings by Khandwalla (1977) showed that the correlations between technology and structural dimensions of vertical integration, delegation and authority and sophistication of control systems were stronger for effective firms than for ineffective firms. Roth and Velde (1989) have commented that financial institutions in various countries are adopting advanced technologies on a large-scale, and these changes affect both the nature and organisation of work. Khazanchi (2005) used the structural contingency theory in his study and found that the business and technological environment of small business is one of the critical factors in implementing communication technologies.

Despite work already having been done in this area, so far in the literature the direct effect of the variable of technological advancement existing in banks in a developing country has not been studied with reference to managerial performance in different religious or conventional groups. For research in developed countries, Pennings and Harianto (1992) have pointed out that there is a bias in research towards the manufacturing sector, which is remarkable in view of its declining role in Western countries. The banking technology in a developing country can be expected to strongly impact on the performance of bank managers. The relationship between technology and management effectiveness is expected to be moderated by the extent of the MAS information adequacy gap. In general, service technology is expected to have an impact on managerial effectiveness. Therefore the following hypothesis investigates such relationships:

*H4: Job-related technological advancement is significantly related to managerial effectiveness and will have different outcomes for Islamic and conventional banks.*

Woodward (1965) argued that the variations in different types of production techniques (unit production, small batch, large batch, mass production and process production) are factors that impact on the design of internal accounting systems. According to Perrow (1967), organisations with non-routine technologies are more likely to fit into more flexible and loosely structured arrangements. On the other hand, organisations with routine technologies would fit into the mechanical type of organisational arrangements. It has been suggested by Waterhouse



and Tiessen (1978) that managerial functions can be best understood by focusing on the environmental variable and the structure and processes of operating units will be understood by focusing on the technological variable. Hypothesis H5 investigates the intervening effects of MAS information adequacy gaps on the relationship between technological advancement and managerial effectiveness. H5 is stated as follows:

*H5: There is a significant intervening effect of the MAS information adequacy gap on the relationship between technological advancement and managerial effectiveness and this effect will be different when comparing Islamic and conventional banks.*

#### *Research Model*

Figure 1 shows the conceptual model of this study. The proposed conceptual model suggests that management should consider the technological, job complexity and religious orientation factors, and therefore develop an organisational MAS that will adequately deal with this scenario. In this proposed framework the MAS information adequacy has been taken in its aggregated dimension (identified by Chenhall & Morris, 1986), since it is the most appropriate dimension in which to investigate the contingency factors of religious orientation. Turning to the notion of religion as a contingency factor, Figure 1 treats this as a separate measurable concept of an organisation's religious orientation. In this study, organisations are grouped into Islamic and conventional banks. The extent to which the organisation is involved in meeting Islamic doctrines in the way it operates, will be a relevant influence on the job of the individual manager.

Figure 2 shows the theoretical perspectives and independent variables of this study. The theoretical perspective is represented by contingency theory. The independent external contingency variable is the organisation's religious orientation. The independent internal contingency variables are technological advancement, job complexity and MAS information adequacy in their aggregated dimensions.

Figure 1: Conceptual Model of the Study

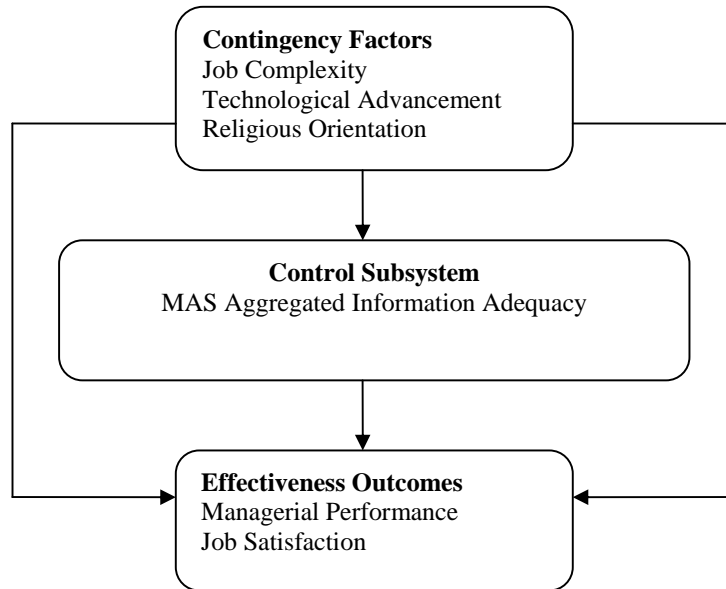


Figure 2: Theoretical perspective and the Independent Variables

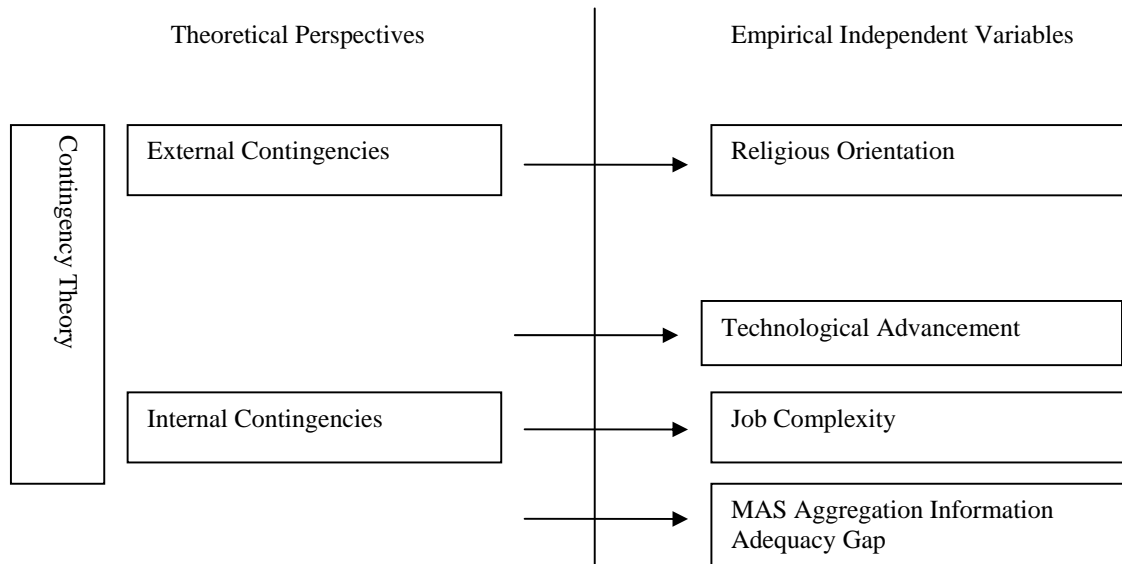
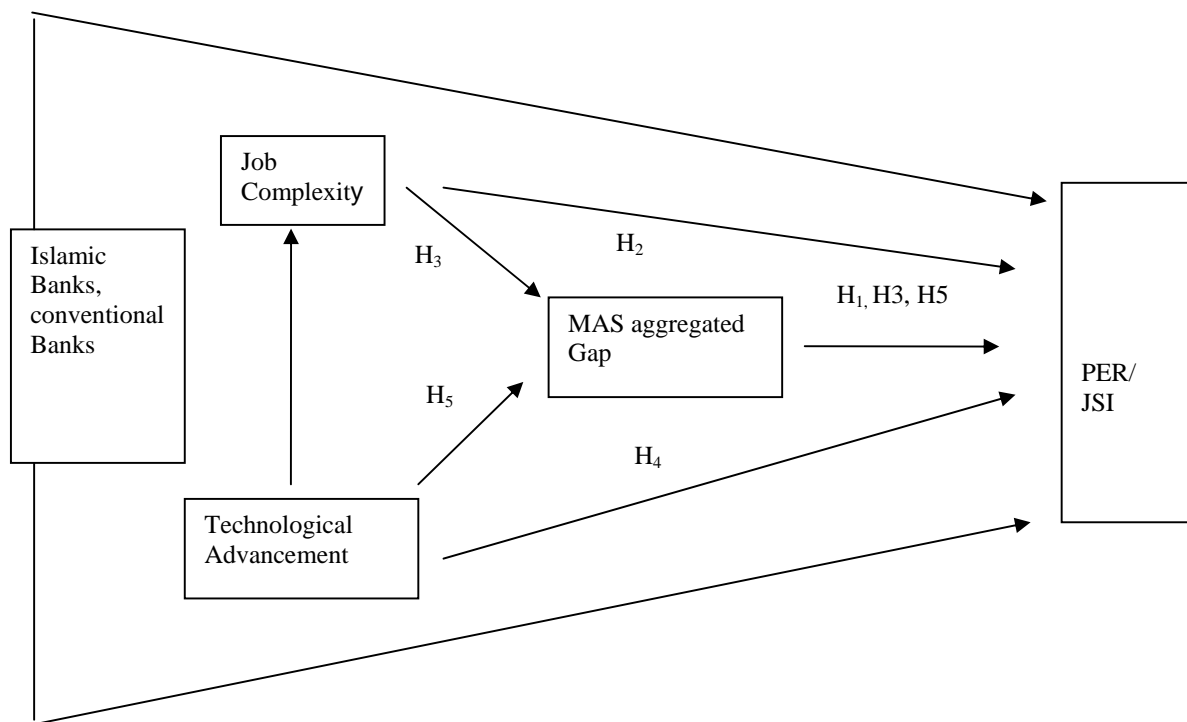


Figure 3 illustrates the empirical model of this study. The proposed empirical model shows all the hypotheses and the variables and relationships which are investigated by these hypotheses. H1 investigates the direct relationship between MAS aggregated information gap and managerial effectiveness. H2 investigates the direct relationship between job complexity and managerial effectiveness. H3 investigates the intervening effect of the MAS information adequacy gap on the relationship between job complexity and managerial effectiveness. H4 investigates the direct relationship between technological advancement and managerial effectiveness. Lastly, H5 investigates the intervening effect of the MAS information adequacy gap on the relationship between technological advancement and managerial effectiveness. All these relationships (investigated in all five hypotheses) are examined in the broader external contingency of Islamic and conventional banks.

Figure 3: Empirical Model of the Study - MAS aggregation information gap and contingency variables



### Research Method

The unit of analysis for this study consists of managers in Islamic and conventional banks in Bangladesh. In particular middle managers with supervisory responsibilities were chosen for analysis. The sample of managers was obtained from major banks in the capital city, Dhaka. Eleven large retail banks participated in the study. These banks were chosen on the grounds that they are large, have operations in Dhaka, are easy for the researchers to access, and most critically, were permitted by the banks' chief executive officers to distribute to and collect the questionnaire from their senior, middle and supervisory level managers.

Data was collected using a questionnaire designed to gather information on the variables being studied. A structured questionnaire was used to collect data. The questionnaire was based on previously tested instruments. The questions on the MAS gap were modified from a manufacturing context to a service sector context. The questions on technology were newly developed for this study based on prior work in the information systems literature.

In this study the questionnaires were personally administered. The researcher made visits to the chief executives of major banks. In total 250 questionnaires were distributed to middle and senior management level employees of 14 major banks in Bangladesh.

For the purpose of testing the variables to confirm their theoretical groupings or construct validity, principal components analysis was used. The dependent and independent variables were tested for construct validity. The final selection was made by applying a varimax rotation. For the purpose of reliability tests, Cronbach Alpha was calculated. Results of factor analysis, reliability and validity of the instruments are shown in Table 2. Finally, path analysis was employed to analyse the data.

## Data Analysis and Discussion

### *A Profile of Respondents*

A total of 146 questionnaires were collected out of 250 (which were distributed). So the response rate was 58.4%. The hierarchical composition of the sample was as follows: executive personnel =17 or 11.6%; middle management was 51 or 34.9%; supervisory employees were 43 or 29.5% and operational employees were 35 or 24%. Most of the respondents (64.4%) had supervisory responsibilities. The mean age of respondents was 39.39 (SD =8.36 and age ranged from 26 to 62 years). In terms of gender there were 130 males (89%) and 15 (10.3%) females. The average tenure for all respondents was 3 years and 11 months (SD 4 years and two months and the range is a few months to a maximum of 30 years). Details of respondents' profiles are provided in Table 1. The items, their factor loadings, eigenvalues and Cronbach Alpha are given in Table 2. Correlation matrix of independent and dependent variables are shown in Table 3.

**Table 1**  
Profile of the Respondents

<b>Respondents</b>	<b>Frequency</b>
Executive Personnel	17
Middle management/ senior managers	51
Supervisory employees/ junior managers	43
Operational employees	35
<b>Total respondents</b>	<b>146</b>
Male	130
Female	16
Mean age of respondents	39 years and 11 months (SD=8.36)

**Table 2**  
Reliability and Validity of the Instruments

Study variables		Measures	Eigen value	% of variance explained	Cronbach Alpha coefficients
<b>Contingency Factors</b>	JC	Job complexity (JC) has been measured from the mean scores of five sub-items created from a combination of three items (developed by Hackman & Oldham, 1975) each with six semantic differentials that loaded in a single dimension and acquired the average value of the five mean scores.	2.97	59.42	0.83
	TA	Technological advancement (TA) factor utilised the average value of the mean scores of three factors which were extracted from six semantic differentials of nineteen items that were incorporated into a single dimension.	1.85	61.75	0.68
	RA	Religious orientation (RA), a dichotomous variable was created from the Islamic and conventional banks to document differences between the two groups in terms of religious orientation.			
<b>MAS Adequacy gap</b>	AGP	Aggregation gap (AGP) has been measured by Islam, Tylor & Islam (2000) by combining the mean scores of the items comprising the usefulness and availability dimensions, which is divided by two. Usefulness of coordinated information is extracted in a single dimension from six items/sections of an organisation. Availability of coordinated information is extracted in a single dimension from nine items/sections of an organisation.	2.41	60.26	0.78
			2.52	62.96	0.80
<b>Managerial effectiveness</b>	PER	Managerial performance (PER) has been measured by the mean value of the three items that indicate performance levels.	2.39	79.60	0.87
	JSI	Intrinsic job satisfaction (JSI) has been measured by the mean value of a seven-item instrument developed by Warr, Cook & Wall (1979).	3.08	61.63	0.84
	JSE	Extrinsic job satisfaction (JSE) has been measured by the mean value of an eight-item instrument developed by Warr et al. (1979)	3.63	45.35	0.82

JCM= Job Complexity; TCL= Technological Advancement; AGP= Gap of Aggregated Information; PER= Managerial Performance; JSI = Intrinsic Job Satisfaction

**Table 3**  
Pearson Correlation Matrix for independent and dependent variables

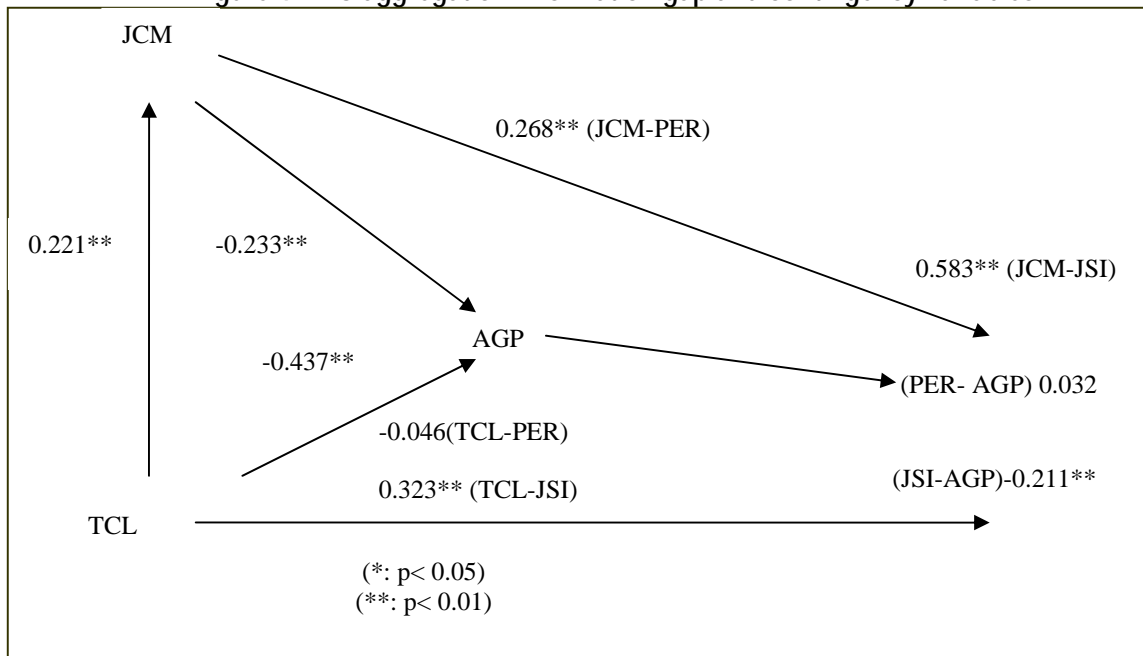
	PER	JSI	JSE	TCL	JCM	AGP
JSI	0.220** (0.008)					
JSE	0.149 (0.074)	0.839** (0.000)				
TCL	-0.046 (0.580)	0.323** (0.000)	0.285** (0.000)			
JCM	0.268** (0.001)	0.583** (0.000)	0.497** (0.000)	0.221* (0.007)		
AGP	0.083 (0.329)	-0.234* (0.005)	-0.145 (0.087)	-0.315** (0.000)	-0.213* (0.011)	
BANK	0.071 (0.397)	0.237** (0.004)	0.194* (0.019)	0.235** (0.004)	0.280** (0.001)	-0.229** (0.006)

JCM= Job Complexity; TCL= Technological Advancement; AGP= Gap of Aggregated Information; PER= Managerial Performance; JSI = Intrinsic Job Satisfaction

*Hypothesis Testing and Discussion of Results*

The observed correlations between the individual variables in the MAS aggregation gap model, based on the whole sample, show significant results. The path diagram and the correlations (not decomposed into direct and indirect components) are presented in Figure 4. On the basis of these significant correlations, path analysis is undertaken and end results are derived for various

**Figure 4 MAS aggregation information gap and contingency variables**



JCM= Job Complexity; TCL= Technological Advancement; AGP= Gap of Aggregated Information; PER= Managerial Performance; JSI = Intrinsic Job Satisfaction

comparative sub-samples. No significant results emerged for the managerial effectiveness variable of extrinsic job satisfaction. Therefore, this dimension of managerial effectiveness was not included in the discussion of results. Table 4 provides the direct effects and these are: firstly, the values of path (regression) coefficients of the various relationships affecting managerial performance; and secondly, intrinsic job satisfaction in the conventional and Islamic bank groups.

#### *MAS Information Adequacy (H1)*

H1 states that the adequacy gap between perceived usefulness and availability of MAS information in its aggregation dimension is significantly related to managerial effectiveness. Table 4 reveals that the direct effect of MAS aggregation gap on job performance is not significant in conventional or Islamic banks. The direct impact of the MAS aggregation gap on intrinsic job satisfaction in conventional or Islamic banks is also not significant. Therefore, the results in Table 4 lead to the rejection of H1. It seems from this finding that a bank manager's perception of the adequacy of MAS aggregation information is not an important direct influence on his or her job performance or job satisfaction. There was an expectation that bank managers in Islamic banks would have a greater need for aggregated information about their clients' business performance due to specific Islamic banking arrangements (such as *Mudharaba* and *Musharaka* methods). However the adequacy of aggregated information has been found to not have any direct impact on effectiveness of management in Islamic banks.

Aggregated information gap has no significant direct effect on managerial performance or intrinsic job satisfaction for both types of banks. H1 is completely rejected. The results suggest that, in both types of banks, the adequacy of aggregated information from the MAS is not an important direct influence on managers' effectiveness. As previously noted, this result may be due in part to the fact that subjects comprised mainly middle and lower level managers who may require less aggregated corporate information in their tasks.

#### *Job complexity (H2 & H3)*

In relation to H2, concerning the direct effect of job complexity on managerial effectiveness, Table 4 shows that job complexity is significantly positively related to managerial performance in both the conventional and Islamic banks. Job complexity is also significantly positively related to intrinsic job satisfaction in both types of banks. These results fully support H2.

As mentioned previously, job complexity is significantly and directly positively related to both managerial performance and intrinsic job satisfaction in both groups. This may be an outcome that is prominent in the banking industry in Bangladesh in that those with more repetitive or less significant tasks may be made to feel that their performance is less valued, regardless of the religious orientation of their bank. H2 is fully confirmed. The implication of these results is that the greater a bank manager's job complexity, the higher will be his or her self-rated managerial performance. Furthermore there will be greater intrinsic job satisfaction regardless of the banks' religious orientation. These results suggest that managers who have greater and more complex responsibilities in Bangladeshi banks (regardless of the effects of religious orientation) will rate themselves more highly on managerial performance and intrinsic job satisfaction.

**Table 4**  
Path Analysis: Direct Effects for the MAS Aggregation Gap Split by Islamic and Conventional Banks

		Dependent Variables	Independent Variables	Hypothesis Tested	Path Coefficient	t-value	Sig. level
Performance Model	Conventional Group	AGP	Tech Adv	H5	-0.348	-3.409	0.001
		Perform	Tech Adv	H4	-0.226	-2.029	0.046
			Job complex	H2	0.260	2.479	0.015
			AGP	H1	0.091	0.824	0.412
	Islamic Group	AGP	Tech Adv	H5	-0.311	-2.262	0.028
		Perform	Tech Adv	H4	0.323	2.376	0.022
			Job complex	H2	0.384	2.922	0.005
			AGP	H1	0.233	1.718	0.019
		Job Satisfaction Model	Conventional Group	AGP	Tech Adv	H5	-0.348
JSI	Tech Adv			H4	0.109	1.177	0.242
	Job complex			H2	0.579	6.663	0.000
	AGP			H1	-0.029	-0.316	0.753
Islamic Group	AGP		Tech Adv	H5	-0.311	-2.262	0.028
	JSI		Tech Adv	H4	0.181	1.289	0.204
			Job complex	H2	0.400	2.941	0.005
			AGP	H1	0.040	0.285	0.777

JCM= Job Complexity; TCL= Technological Advancement; AGP= Gap of Aggregated Information; PER= Managerial Performance; JSI = Intrinsic Job Satisfaction

**Table 5**  
Indirect Effects: Various Paths for Aggregated Gap and Managerial Performance for Islamic and Conventional Banks

	Path		Path Coefficient	
PER Model Conventional Banks	Path 1	TCL-JCM-PER (H2)	0.241×0.260	= 0.063
	Path 2	TCL-AGP-PER (H5)	-0.348×0.091	= -0.032
		Total indirect effect		= 0.031
	Path 3	JCM-AGP-PER (H3)	-0.055×0.091	= -0.005
		Total indirect effect		= -0.005
PER Model Islamic Banks	Path 4	TCL-AGP-PER (H5)	-0.311×-0.233	= 0.072
		Total indirect effect		=0.072
	Path 5	JCM-AGP-PER (H3)	-0.176×0.233	= -0.041
		Total indirect effect		= -0.041

JCM= Job Complexity; TCL= Technological Advancement; AGP= Gap of Aggregated Information; PER= Managerial Performance; JSI = Intrinsic Job Satisfaction

The indirect influences of the aggregated information gap on the relationship between job complexity and managerial performance are summarised in Table 5. For the conventional group, the path of job complexity MAS aggregated information gap and managerial performance gives (path 3, JCM-AGP-PER) an indirect effect of -.005, indicating a non-consequential intervening impact of MAS aggregated information gap. For the Islamic banks, the intervening effect of MAS aggregated information gap on the relationship between job complexity and managerial performance (path 5, JCM-AGP-PER) is stronger but not meaningful (-.041). Therefore, H3 is rejected in the case of managerial performance.



**Table 6**  
Indirect Effects: Various Paths for Aggregated Gap and Intrinsic Job Satisfaction for Islamic Banks

	Path		Path Coefficient	
JSI Model Conventional Banks	Path 6	TCL-AGP-JSI (H5)	-0.348×-0.029	= 0.010
		Total indirect effect		= 0.010
	Path 7	JCM-AGP-JSI (H3)	-0.055×-0.029	= 0.002
		Total indirect effect		= 0.002
JSI Model Islamic Banks	Path 8	TCL-AGP-JSI (H5)	-0.311×0.040	= -0.012
		Total indirect effect		=-0.012
	Path 9	JCM-AGP-JSI (H3)	-0.176×0.040	= -0.007
		Total indirect effect		= -0.007

JCM= Job Complexity; TCL= Technological Advancement; AGP= Gap of Aggregated Information; PER= Managerial Performance; JSI = Intrinsic Job Satisfaction

The indirect effects of the MAS aggregated information gap on the relationship between job complexity and intrinsic job satisfaction are provided in Table 6. In respect of both the conventional and Islamic groups, the path of JCM-AGP-JSI (path 7 and path 9) indicates weak indirect effects (.002 and -.007, respectively). Therefore, H3 is also rejected in the case of intrinsic job satisfaction.

Aggregated information gap produces no meaningful indirect effect on the relationship between job complexity and either managerial performance (see Table 5) or intrinsic job satisfaction (see Table 6) in the conventional or Islamic group. H3 is completely rejected. The results suggest that the MAS aggregation gap and job complexity are ineffective as control-contingency "fit" variables, regardless of the banks' religious orientation.

#### *Technological Advancement (H4 & H5)*

In relation to H4 concerning a significant relationship between technological advancement and managerial effectiveness, Table 4 shows that technological advancement is significantly negatively related to job performance for the conventional banks and significantly positively related to job performance for the Islamic banks. This unexpected finding of an inverse relationship for the conventional group is difficult to explain. Both Islamic and conventional banks have recently experienced rapid technological change in Bangladesh and managers are currently struggling with "teething" problems. It is speculated, however, that Islamic banks have been benefiting from rapid technological change more than conventional banks. This may be because Islamic bank managers have more involved working relationships with their clients under *Mudharaba* and *Musharaka* methods. Technological advances, such as financial planning and control services, customer needs planning services, customer data storage facilities and multi-stakeholder constraints management, would generate more immediate benefits in terms of managing clients. Therefore, the positive relationship between technological advancement and managerial performance is found for Islamic banks. For conventional banks such benefits may not outweigh the "teething" problems caused by rapid technological change, thus explaining the finding of a negative relationship between technological advancement and managerial performance.

Turning to the effect of technological advancement on intrinsic job satisfaction, Table 4 shows no significant relationship with intrinsic job satisfaction in the two groups. H4 is rejected

in regard to the relationship between technological advancement and intrinsic job satisfaction. These results suggest that the degree of technological advancement will affect the managerial performance of bank officers in different directions depending on whether or not banks are religiously oriented.

Let us now consider the indirect effect of MAS aggregation gap on the relationship between technological advancement and job performance for the two groups, as shown in Table 5. In relation to the conventional group, the TCL-AGP-PER (path 2) produces an indirect effect of  $-.032$ . The result is not meaningful according to Bartol's (1983) criterion. In relation to the Islamic group, TCL-AGP-PER (path 4) results in an indirect effect of  $-.072$ . Therefore, H5 is accepted in the Islamic group with regard to the indirect effect of MAS aggregation gap on the relationship between technological advancement and job performance. It is plausible that the MAS aggregation gap has an intervening effect in Islamic banks, but not in conventional banks, due to the different nature of contractual relationships with clients.

Next, consider the indirect effects of MAS aggregation gap on the relationship between technological advancement and intrinsic job satisfaction (H5), for the religious groups, as given in Table 6. In relation to the conventional group, the TCL-AGP-JSI path (path 6) gives an indirect effect of  $.010$ . Turning to the Islamic group, the path of TCL-AGP-JSI (path 8) gives an indirect effect of  $-.012$ . Therefore, the strength of MAS aggregation gap as an intervening influence between technological advancement and intrinsic job satisfaction is inconsequential for both the conventional and Islamic group. H5 is rejected in conventional and Islamic bank groups with regard to the indirect effects of MAS aggregation gap on the relationship between technological advancement and intrinsic job satisfaction. That is, irrespective of religious orientation in the workplace, adequacy of MAS aggregated information does not influence the relationship between technological advancement and intrinsic job satisfaction.

Results show that MAS aggregation gap does not produce meaningful indirect effects on the relationship between technological advancement and intrinsic job satisfaction (see Table 6) in both groups. It has a meaningful level of intervening effect on the relationship between technological advancement and job performance (see Table 5) in the Islamic bank groups. H5 is accepted in the Islamic bank group. The results indicate that the intervening effect of MAS aggregation gap is sensitive to the religious orientation of a bank in the relationship between technological advancement and managerial performance.

Table 7 has an added spurious effects column in order to reconcile the decomposition of the observed correlations. A summary is given below of the results contained in Table 7. These summarised results of hypotheses tests for the MAS aggregation gap model are presented for both conventional and Islamic banks. Table 7 summarises the full decomposition of the observed correlations for the MAS aggregation gap, for Islamic and conventional banks.

**Table 7**  
Decomposition of Observed Correlations for the MAS Aggregation Gap split by Islamic Banks

		Relations	Observed Correlations (a)	Direct Effects (b)	Indirect Effects (c)	Spurious Effects (d)= (a) – [(b) + (c)]
PER Model	Conventional Group	TCL/PER	-0.219*	-0.226*	0.03	-0.023
		TCL/JCM	0.241*	0.241*		
		JCM/AGM	-0.129	-0.055		-0.074
		TCL/AGP	-0.360**	-0.348**	-0.013	0.001
		AGP/PER	0.138	0.091		0.047
		JCM/PER	0.183	0.260*	-0.005	-0.072
	Islamic Group	TCL/PER	0.343*	0.323*	0.047	-0.027
		TCL/JCM	0.347*	0.347*		
		JCM/AGM	-0.261	-0.176		-0.085
		TCL/AGP	-0.359*	-0.311*	-0.061	0.013
		AGP/PER	0.017	0.233		-0.216
JCM/PER	0.413**	0.384**	-0.041	0.07		
JSI Model	Conventional Group	TCL/JSI	0.283*	0.109	0.149	0.025
		TCL/JCM	0.241*	0.241*		
		JCM/AGM	-0.129	-0.055		-0.074
		TCL/AGP	-0.360**	-0.348*	-0.013	0.001
		AGP/JSI	-0.143	-0.029		-0.114
		JCM/JSI	0.613**	0.579**	0.002	0.032
	Islamic Group	TCL/JSI	0.243	0.181	0.125	-0.063
		TCL/JCM	0.347*	0.347*		
		JCM/AGM	-0.261	-0.176		-0.085
		TCL/AGP	-0.359*	-0.311	-0.061	0.013
		AGP/JSI	-0.130	0.040		-0.17
JCM/JSI	0.412**	0.400**	-0.007	0.019		

JCM= Job Complexity; TCL= Technological Advancement; AGP= Gap of Aggregated Information; PER= Managerial Performance; JSI = Intrinsic Job Satisfaction

Results of hypotheses tests and discussion of them are given in the following summary points:

- MAS aggregated gap has no significant direct effect on managerial performance or intrinsic job satisfaction for both groups. H1 is fully rejected. The results suggest that, in both types of banks, the adequacy of aggregated information from the MAS is not an important direct influence on managers' effectiveness. As previously noted, this finding may be due in part to the fact that subjects comprised mainly middle and lower level managers who may require less aggregated corporate information in their tasks.
- In relation to H2, concerning the direct effect of job complexity on managerial effectiveness, it is fully confirmed. Table 4 shows that job complexity is significantly positively related to managerial performance and intrinsic job satisfaction in conventional and Islamic banks. The implication of these results are that; firstly, the greater a bank manager's job complexity, the higher will be his or her self-rated managerial performance; and secondly, intrinsic job satisfaction will emerge, regardless of the banks' religious orientation.

- MAS aggregated gap produces no meaningful indirect effect on the relationship between job complexity and either job performance (see Table 5) or intrinsic job satisfaction (see Table 6) in the conventional or Islamic group. H3 is fully rejected. The results suggest that the MAS aggregation gap and job complexity are ineffective as control-contingency "fit" variables, regardless of the religious orientation of the banks.
- Technological advancement has no significant direct effect on intrinsic job satisfaction for the conventional or the Islamic group. In these cases H4 is rejected. However, technological advancement was found to be directly and significantly negatively related to job performance in the conventional group and directly and significantly positively related to job performance in the Islamic group. This suggests that, contrary to expectation, those bank officers working with more advanced technology are rated highly for their work in Islamic banks. However, in the conventional banks the relationship is negative which means advanced technology leads to decline in performing one's duties. It is speculated that this latter finding may be due to recent rapid advances in technology in conventional banks, which managers in Bangladesh may find difficult to adapt to. In the short-term at least, this may mean deterioration in their performance.
- MAS aggregated gap has a meaningful level of intervening effect on the relationship between technological advancement and job performance (see Table 5) in the Islamic bank groups. H5 is accepted in the Islamic bank group. However, MAS aggregated gap does not produce meaningful indirect effects on the relationship between technological advancement and intrinsic job satisfaction (see Table 6) in both groups. The results indicate that the intervening effect of MAS aggregation gap is sensitive to the religious orientation of a bank in the relationship between technological advancement and managerial performance.

## Conclusion and Implications

This study has sought to contribute to management accounting research by further defining, modeling and measuring the relationships of variables that are associated with MAS in banks in a developing country. It adopts a job-oriented approach in employing contingent variables in management accounting.

The contingency framework developed in this study becomes too complex, in terms of possible alternative relationships among variables. To provide an empirically researchable focus, the conceptual framework has adopted the contingency variable of MAS adequacy gap in its aggregated dimension, the job-relevant contingency variables of job complexity and technological advancement and organisation-relevant contingency variables of a religious orientation. Finally three surrogates for managerial effectiveness were chosen: managerial performance, extrinsic and intrinsic job satisfaction.

This conceptual model of six independent variables and three dependent variables needed "trimming" in order to derive a parsimonious set of relationships that could represent an empirical schema able to be interpreted. For this reason, bi-variate relationships in possible causal path models were considered. Those variables that displayed a predominance of non-significant path relationships with other variables under consideration were eliminated. One of these variables was extrinsic job satisfaction; it did not have a significant influence in the model, so it was eliminated from the study.

Although the aggregated adequacy gap fully exists for both conventional and Islamic

banking groups, an important finding of this study is that that gap does not translate into a significant negative impact on managers' performance in the two bank groups. Results show that with regard to direct effects of MAS aggregation gap on managerial effectiveness, only for some religious groups did this gap translate into a significant negative/positive impact on managers' job performance.

Job complexity is directly significantly and positively related to managerial effectiveness, a finding that is fully supported in Islamic and conventional banks. This implies that job complexity is important for managerial performance and intrinsic job satisfaction. Managers with complex jobs will rate managerial performance and intrinsic job satisfaction highly. On the other hand managers with more repetitive or less significant tasks in banks in Bangladesh derive lower satisfaction and may feel that their performance is less valued.

As to the direct relationship of technological advancement with job performance and intrinsic job satisfaction in the two bank groups – technological advancement was found to have no significant direct relationship with intrinsic job satisfaction in either group. Turning to managerial performance, technological advancement emerged as being directly significantly and positively related to job performance in the Islamic group. This suggests that in the Islamic banks, managers perceive their performance as increasing when advances in technology occur. However, technological advancement has been found to be directly, significantly and negatively related to job performance in the conventional group. This finding is contrary to expectation and difficult to explain. It may be speculated that perhaps, conventional banks have recently experienced rapid technological change in Bangladesh and managers are currently struggling with this development. However, this can be a short-term phenomenon and the finding may suggest that the degree of technological advancement will affect the managerial performance of bank officers in different directions depending on the religious orientation of their banks.

The intervening effect of MAS aggregated information gap reveals that this has a significant mediating influence on the contingency variable of technological advancement in terms of its impact on managerial performance in Islamic banks. The practical implication for Islamic banks is that increases in technological advancement should be coupled with improvements in the adequacy of aggregated information from the MAS. It appears that technology reduces the more mechanical and repetitive tasks of bank managers in Islamic banks, in particular, and possibly increases these bank managers' need for aggregated information that can be directly applied in their higher level problem-solving tasks.

In summary, the results of the study provide support for the hypotheses that MAS adequacy gap in its aggregated form produced different effectiveness outcomes amongst different banks with or without religious orientation. Results differed among bank groups with or without religious orientation concerning the impact of aggregated information gap on managerial effectiveness. Significant results were also found for the direct effects of technology and job complexity on managerial effectiveness and these findings varied across religious groups.

The finding of significant, direct and positive relationship between job complexity and managerial effectiveness reinforces earlier studies' conclusions that job complexity is an important variable that affects managerial effectiveness. This supports the suggestion by Taylor (1995) that managerial effectiveness is an outcome of an appropriate matching between the internal organisational characteristic (such as job complexity) and the external characteristic such as technology. These results also reinforce Mia's (1989) finding of a positive relationship between job complexity and self-rated performance. It is also in line with Lawler's (1973) finding that managerial effectiveness is a function of both motivation and ability, and ability is a

function of matching individual aptitudes with job characteristics. This study adds to Taylor's (1998) finding that job complexity has a significant effect on certain aspects of managerial effectiveness. The findings regarding religious orientation in the modelling of managerial performance is a new contribution to the extant literature.

### Limitations and Future Research

The sample of managers was taken from large banks in Bangladesh. This suggests that the results of the study may have limited external validity beyond the industry and country setting of this study. In particular, the use of a self-reported performance measure may have produced higher means due to leniency error, and lower standard deviations due to restricted range error. Furthermore, managers' measures of MAS information availability are based on their own beliefs, which may not correlate with objective measures of actual information available through the organisation's MAS.

The administration of the survey instrument was not uniformly controlled by the researcher in all cases. In every instance, the specific respondents were not identified but rather were left to the banks' chief executive officer to internally select the respondent. Apart from this, the role of personal factors such as locus of control, personality or tolerance for ambiguity, was not addressed in this study. Such factors are likely to have an impact on the way a respondent perceives and uses information from the organisation's MAS.

This study involved a single paradigm modeling. Future studies could take on multi-paradigm modeling. It did not embrace other major theories underpinning the organisational research literature, including agency theory and institutional theory and testing of other relationships between the variables in this study. Further evidence is required from other settings in order to consider any generalisations of the influence of religious orientation on the relationship between organisational control devices, such as the design of MAS and performance. More research could use qualitative methods to relate the variables in this study to the interplay between religious and technological contexts of managers' use of MAS information in their workplace. Furthermore, future research could use the variables studied here and link them to organisational strategies.

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