Examining Factors Influencing the Use of Multi-dimensional Performance Measures in the Banking Sector of a Developing Country: The Case of Bangladesh

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy

by

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October 2014

Statement of Candidate

I hereby declare that the work in this thesis has not been submitted for a higher degree to any other institution or university. The sources of information used and the extent to which other people's works have been used in the study have been duly acknowledged. Similarly, the ethics committee approval has been obtained (Ethics number: **5201100221[D]**).

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October 2014

Abstract

Multi-dimensional performance measures (MPM) take into account qualitative, non-financial performance measures that have been practised worldwide including in developing countries in recent decades. Traditional accounting-based measures, when used alone, have been criticised as delineating incomplete, inadequate, past-oriented pictures of performance, whereas MPM that constitute financial and non-financial performance measures are perceived as leading indicators of organisational performance in many dimensions such as employees, customers, internal business processes, suppliers, communities and the environment. However, there is very little research that has examined the relationships between the use of MPM, the factors that influence their use and the effects of MPM on organisational performance in the banking industry. Similarly, there is very little systematic understanding of the use of MPM in the context of developing countries. The current thesis fills this gap in the extant performance measurement (PM) literature by examining the factors that influence the use of MPM and the effect of MPM on organisational performance.

This PhD study is in publication format comprising three academic papers. The first paper focuses on a review of the MPM literature in the context of developing countries. For the purpose of this review, the existing literature was classified into four topic areas, namely: (a) the use of MPM; (b) contextual factors and their role in MPM and organisational performance; (c) comparative studies on MPM; and (d) others. The paper also identifies internal and external factors that influence the use of MPM in developing countries and provides areas for future research. A number of research gaps identified in the first paper are empirically examined in the second and third papers. The second paper which examines the role of institutional factors on MPM use is informed by the new institutional sociology theory. The paper also examines the mediating effects of top management participation in the relationship between central bank influence and MPM use and the moderating effects of market competition in understanding the relationship between top management participation and the use of MPM. The third paper examines the mediating effects of MPM use in the relationship between change in investment in intangible assets and organisational performance using contingency theory. Additionally, the moderating effects of external factors (e.g., market competition) and internal factors (e.g., banks' size) in understanding the relationship between the change in investment in intangible assets and organisational performance relationship have also been tested in the paper.

To validate the models in the second and third papers, the thesis used both quantitative and qualitative approaches: a cross-sectional survey as a quantitative method, semi-structured interviews as a qualitative method and component-based structural equation modelling – partial least squares – as a

data analysis technique. Based on data collected from all commercial banks in Bangladesh, the findings of the second paper show that central bank influences, market competition, success of key competitors and banks' size have a significant positive association with the use of MPM. In addition, the study revealed that the use of MPM is influenced by the participation of top management. The paper also reveals the partial mediating effects of top management participation in the relationship between central bank influence and MPM use. Top management participation in the use of MPM is moderated by market competition.

The third paper found that the change in investment in intangible assets has a direct and mediating role in the use of MPM, and in improving organisational performance. The findings of the study further show that change in investment in intangible assets and its relationship with organisational performance is moderated by market competition and banks' size.

In terms of its theoretical contribution, the thesis extends PM research by conceptualising the factors that influence MPM use and their impact on MPM, and the impact of MPM on organisational performance in the context of the banks of a developing country (e.g., Bangladesh). Furthermore, the thesis provides new insights towards understanding the moderating effects of market competition in the relationship between top management participation and MPM use. This line of understanding has attracted limited attention in earlier studies in the PM literature. Likewise, the findings of this thesis on the mediating effects of MPM in the relationship between change in investment in intangible assets and organisational performance contributes to the PM literature. Lastly, findings of the moderating effects of market competition and size of banks on the relationship between change in investment in intangible assets and organisational performance indicate the importance of these two factors for understanding the change in investment in intangible assets and organisational performance relationship. For managers and practitioners in Bangladesh, the thesis provides evidence that various factors have influenced the use of MPM which necessitate them taking into account these factors in their use of MPM.

Acknowledgements

First of all, I am grateful to my creator Allah who kept me fit for my accomplishment of the PhD ride, blessed me with the sheer volume of incessant bounties with regards to my physical and mental soundness, and answered my prayers myriad times. Then, I am deeply indebted to my two sagacious supervisors – Associate Professor Dr Maria Dyball and Honorary Associate Professor (Fellow) Dr Sujatha Perera – for providing endless care and collaboration. From the core of my heart, I express my complete gratitude to both of them for their generosity and endurance in addressing my theoretical necessities. Their time, direction and motivational knack have very much advanced my self-confidence to overcome all the challenges that I have experienced in my PhD project. The process of my gratitude to my supervisors would surely be incomplete unless I mention the name of my previous co-supervisor, Dr Nazmi Jarrar. My wholehearted thanks go to Nazmi whose critical and constructive comments during the first one and half years of my PhD journey were very influential in the design of the theoretical model of my PhD project. I also express my appreciation to the faculty members of the Accounting and Corporate Governance department, research team members of the Faculty of Business and Economics (in particular, HDR managers Mrs Agnieska, Mr Eddy and HDR assistants Mrs Kaleen and Mrs Jee). Beyond doubt, their inspiration and constant support will always be remembered.

I am grateful to the Australian Government, Macquarie University's Research Office and the Faculty of Business and Economics, Macquarie University for their full assistance for all my financial needs in the form of stipends and other financial assistance including assistance for my field visit and my summer conference presentations at the Performance Management Association (PMA) conference, University of Cambridge, UK and at the Interdisciplinary Perspectives of Accounting (IPA) conference, University of Cardiff, UK. Without their support, it would not have been possible to start my PhD journey, collect my data from the field level, share the key research findings with the global academic community and widen my research stance. I am also indebted to Professor James Guthrie, Professor Graeme Harrison and Professor Chris Patel at Macquarie University for their constructive comments in developing my research questionnaire which have immensely helped me in ensuring the methodological thoroughness in my thesis. I would like to thank Professor Harrison and Professor Guthrie for their amazing support in strengthening my questionnaire development

in the phase that involved pre-testing of the questionnaires before formal data collection commenced. I also thank Valerie Williams for her dazzling support by performing exceptional work in proofreading this dissertation.

By all means, countless indebtedness must be credited towards all my target respondents in Bangladesh whose support and cooperation made it possible to collect a massive amount of primary data in different time periods despite their extremely busy work schedules. My sincere and profound gratitude go to all the respondents for this reason. In the same process, special thanks go to my ex-university teacher Professor Moin Uddin Khan (Vice-Chancellor, ASA University Bangladesh), Dr Riazul Reza Chowdhury (Professor, University of Dhaka), Dr Mohoboot Ali (Professor, University of Dhaka), Md Basaruzzaman Khan (Director, Bangladesh Power Development Board [BPDB]), Md Nurul Hoque (Deputy Director, Bangladesh Bank), Mr Nurul Amin (Deputy General Manager, Bangladesh Krishi Bank [BKB]), and all my university friends, senior mates working in commercial banks in Bangladesh, whose cooperation and support were simply overwhelming and unforgettable in my data collection phase. Their support in approaching and introducing my many target respondents will never be forgotten at any stage of my life whenever I look back in nostalgia to my PhD mission. Thanks also go to the convenor of Accounting Alumni, University of Dhaka for providing the “Alumni Directory” that facilitated my direct contact with many potential respondents.

Thank you to my family and especially my parents, my younger brother and my grandmother, Rashida Akter. You people have been an untiring source of love and encouragement during my research. All other family members from my extended grandmother’s family are also worthy of thanks as I always found them to be there at times of my wellness and woe. Thanks also go to my social friends, Dr Shahriar, Dr Riyadh, Dr Abdel Halabi, Dr Rafiuddin, Dr Chowdhury Golam Hossan, Mr Rokon, Mrs Sawda, Mr Abdullah, Mr Shariar Haroon, Mr Imrose, Mr Jashim, Mrs Shatu, Mrs Shahin and my in-laws, Mr Kajol, Mr Dipok and Mrs Shimu, for supporting and inspiring me throughout the PhD journey.

No lyrics would be able to entirely convey my endless gratitude and love to my wife cum life accountant, Pompi. Without her endless amount of backing, this process could not have been accomplished. My love has been further earned by my six-year-old son, Hilmi, who has

always been a source of my inspiration. In the entire PhD process, capitalising on his loving and childish questions, coupled with passing my spare time with him, have offered me an indispensable ingredient in refreshing and recharging myself, in particular, when tiredness ruthlessly seized me in such a long-term production process as the dissertation recipe. Hilmi was the constant source of inspiration and joy and love for me and for my entire PhD project.

Dedication

This achievement is dedicated with love to my son Hilmi, my Mother and my Grandma.

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List of Abbreviations

ASEAN	Association of South East Asian Nations
AVE	average variance extracted
BACH	Bangladesh Automated Clearing House
BB	Bangladesh Bank
BIBM	Bangladesh Institute of Bank Management
BSC	balanced scorecard
CAMEL	Composite rating for banks comprising: capital (C), asset quality (A), management (M), earning capacity (E) and liquidity (L)
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CR	composite reliability
CRM	customer relationships management
CSR	corporate social responsibility
EFA	exploratory factor analysis
EFT	electronic funds transfer
EPS	earnings per share
ERP	enterprise resource planning
EU	environmental uncertainty
EV	eigenvalue
EVA	economic value-added
FDI	foreign direct investment
GCC	Gulf Cooperation Council
GDP	gross domestic product
GFC	global financial crisis
GNP	gross national product
GOB	Government of Bangladesh
GoF	goodness-of-fit
HRM	human resources management
IA	investment in intangible assets
ICT	information and communications technology
IFC	International Financial Corporation
IMF	International Monetary Fund
ISO	International Organization for Standardization
IT	information technology
KMO	Kaiser-Meyer-Olkin's (test)

KPI	key performance indicator
LDCs	least developed countries
MA	management accounting
MAS	management accounting system
MCS	management control system
MFI	micro-finance institution
MNC	multinational corporation
MOF	Ministry of Finance (Bangladesh)
MPM	multi-dimensional performance measures
NBR	National Board of Revenue (Bangladesh)
NGO	non-governmental organisation
NIC	newly industrialised country
NIS	new institutional sociology (theory)
NPL	non-performing loans
OIE	old institutional economics
OLS	ordinary least squares (regression)
OP	organisational performance
PCA	principal components analysis
PCBs	private commercial banks
PM	performance measurement
PMS	performance measurement system
R&D	research and development
ROA	return on assets
ROI	return on investment
RQ	research question
SBSC	sustainability balanced scorecard
SCBs	state-owned commercial banks
SCOR	supply chain operation reference (model)
SEM	structural equation modelling
SMEs	small and medium enterprises
SSTs	self-service technologies
TMP	top management participation
TQM	total quality management
UK	United Kingdom
USA	United States of America

UN	United Nations
VAIC	value-added intellectual coefficient (model)
WAS	weighted average score
WTO	World Trade Organization

Chapter 1 Introduction

1.1 Background of the study

This thesis examines the factors that influence the use of multi-dimensional performance measures (MPM) and the effect of MPM on organisational performance in banks in a developing country. The use of MPM in firms' performance measurement systems (PMS) has emerged as a key research focus in recent decades (Gosselin, 2011; Kaplan & Norton, 1996). Performance measurement underpinned by financial indicators has been traditionally viewed as an element of planning and budgetery control that assists firms in providing performance data, enabling feedback and prompting work behaviour (Johnson & Kaplan, 1987; Otley, 1999; Pedersen & Sudzina, 2012). It is argued that changes in the contemporary business environment represent a source of pressure for business organisations (Franco-Santos & Bourne, 2005; Gosselin, 2005). The growing level of global competition; the influence of information technology (IT); acute external pressures from customers, communities and regulators; and new manufacturing practices such as total quality management (TQM) and just-in-time systems are demanding comprehensive performance information on firms' processes, products, customers and, above all, on community and environmental impact (Ittner et al., 2003a; Gosselin, 2005; Franco-Santos & Bourne, 2005; Pedersen & Sudzina, 2012). A financial-based traditional PMS alone is insufficient to provide information on all these areas.

Relying solely on financial-based performance information has also been problematic for other reasons. Firstly, it is a backward-looking measurement approach that encourages short-term orientation of firms' performance (Pedersen & Sudzina, 2012; Kaplan & Norton, 1992). Secondly, financial performance indicators are no longer leading indicators of performance in today's technology-driven, customer-focused, changing business environment since they merely emphasise outcome measures (e.g., profitability, cash flows) rather than drivers (e.g., customer satisfaction, quality, on-time delivery, process improvement, employees' performance) that actually assist in improving outcome measures (Kolehmainen, 2010; Franco-Santos et al., 2007; Neely, 2005; Kaplan & Norton, 1996).

The growing understanding of the flaws of financial-based performance measures resulting from changes to firms' business environments has therefore led to the implementation and use of a holistic and multi-dimenstional approach of performance measurement combining both

financial and non-financial dimensions of organisational performance (Sawalqa, 2011). The use of MPM is seen to offer many benefits to decision makers. To illustrate, MPM provide not only essential information for the management functions (Olsen et al., 2007) but also assist in management action, continuous improvement and employees' motivation (Kaplan & Norton, 1996; Olsen et al., 2007). In an MPM approach, performance measurement plays a significant role in the formulation and implementation of firms' strategic plans together with assessing the accomplishment of their objectives (Ittner & Larcker, 1998; Henri, 2004). Likewise, such techniques allow managers to balance growth and control, and short-term and long-term performance (Simons, 2000). MPM are also essential since the linkage of MPM use with various external and internal factors enhances organisational performance (Gosselin, 2005; Hoque & James, 2000).

The significance of MPM in the services sector, including the banking industry, has been recognised in recent years (Moufty, 2009). The banking sector plays a key role in the global economy and this sector is the most important business intermediary in any economy (Cetorelli & Gambera, 2001). Similarly, the banking industry is of special importance in many countries because its contribution in gross national product (GNP) has been increasing over the years (Al-Enizi et al., 2006; Ahmed & Yusuf, 2005). For example, Ahmed and Yusuf (2005) noted that the banking industry in Bangladesh accounted for 10% of the services activities in the gross domestic product (GDP) in 1993 but this increased to 48% by 2004. Likewise, Al-Enizi et al. (2006) reported that in the Gulf Cooperation Council (GCC), the banking industry represented about 14% of the services activities in GDP in 1996 but increased to 25% by 2006 (see also GCC Secretariat General, 2006). Owing to its key role in the economy, it has been urged that the banking sector should receive special protection and great emphasis has been placed on the supervision of this sector across the globe (Barth et al., 2006).

Historically, the banking sector's performance measurement (PM) has been dominated by financial indicators and the sector has made limited progress towards adopting contemporary performance measurement system compared to other industries. As explained by Fuster (2007; p. 37), simple cost structures and the limited need for information in planning and control were two main reasons for such limited progress in the industry. However, in recent years, the banking environment has changed as a result of many factors such as deregulation, developments and advances in information technologies, increased awareness of stakeholders

and the more recent occurrence of the global financial crisis (GFC) (Munir et al., 2011; Lapavitsas & Santos, 2008). As a consequence, banks have increasingly experienced intense pressure from their stakeholders to improve performance (Wu, 2012; Fuster, 2007). This necessitates the development of new PMS for the banking industry (Wu, 2012). In order to respond to continuously changing customer demands, preferences and stakeholders' requirements, banks are now required to change their traditional way of measuring performance (Wu, 2012; Hannula et al., 2002).

Notwithstanding the fact that the banking industry has played a key role in both developed and developing countries for more than a quarter of a century (Demirguc-Kunt & Huizinga, 2001), researchers and policy makers have focused more on PMS in industrial sectors such as manufacturing and agriculture with little attention on the banking sector (Moufty, 2009). Also, multi-dimentional performance measurement practices have been much more extensively investigated in manufacturing than in the banking sector (Moufty, 2009). Systematic knowledge of MPM in the banking industry is also lacking in developing countries. This thesis therefore focuses on these issues.

In the context of developing countries, the banking sector serves as an important source of financing for private sector firms owing to the underdevelopment of financial markets (Sufian & Habibullah, 2010). As in developed countries, banks in developing countries also experience intense competitive pressure with the increased number of micro-credit organisations and non-governmental organisations (NGOs) providing similar banking services (loans and deposit services in particular) and the emergence of many private banks (with both local and foreign ownership) (Morium, 2002; Guerreiro et al., 2006). Morium (2002) noted that the pressure on managers in the banking sector in developing countries to develop strategies to compete in these dynamic environments necessitates multi-dimensional perspectives of performance information in order to make both strategic and tactical decisions.

The rest of this chapter is structured as follows. The remaining part of section 1 (from subsections 1.1.1 to 1.1.4) describes the definition, design and features of MPM, and discusses the theoretical perspectives on identifying factors that influence MPM use, MPM in the banking sector and the definition of developing countries. In section 1.2, the aims and objectives of the thesis are discussed. Section 1.3 provides details of the motivation for the

thesis, with a discussion of the reasons for choosing Bangladesh and its banking sector in section 1.4. This is then followed by a discussion of the significance of the thesis in section 1.5. In section 1.6, the overviews of the three papers are presented. Section 1.7, the final section, discusses the structure of the thesis.

1.1.1 Definition, design and features of MPM

As there was no agreed definition of performance measurement in the literature, this study has adopted the following operational definition of *performance measurement* used by Bourne et al. (2003): "performance measurement … refers to the use of a single or multi-dimensional set of performance measures. The set of performance measures is multi-dimensional if it includes both financial and non-financial measures, both internal and external measures of performance, and if it includes both measures which quantify what has been achieved as well as measures which are used to predict the future" (p. 3). The definition of *performance measurement system* (PMS) also lacks consensus as this concept involves many perspectives (Franco-Santos et al., 2007). To define PMS, the study thus followed Neely et al. (1995) who defined PMS *at the operational level* as a "set of performance metrics used to quantify both the efficiency and effectiveness of actions" (p. 1229).

The PM literature has suggested that *measurement diversity* is one of the features of PMS (Lipe & Salterio, 2002; Ittner et al., 2003a; Bisbe & Malagueno, 2012; Aranda & Arellano, 2010). *Measurement diversity* consists of a mix of diverse financial and non-financial indicators that combine many value-driver activities of businesses (Aranda & Arellano, 2010). The diversity approach in PMS emphasises the inclusion of a variety of performance indicators categorised into financial and non-financial measures to develop holistic, comprehensive performance measures used in different business units and in the organisation as a whole (Aranda & Arellano, 2010). These measures are commonly referred to as multi-dimensional performance measures (MPM).[1] Increasing diversity in performance measurement is not merely a question of including more measures but rather of including more perspectives from which an enterprise is evaluated (Aranda & Arellano, 2010; p. 273) as well as evaluation of what a company plans to achieve (Fitzgerald et al., 1994). Therefore, the choice of diversity in PMS should be driven by strategy (Bisbe & Malagueno, 2012).

[1] Also known in the literature as multiple performance measures (Hoque et al., 2001), integrated performance measures (Lee & Yang, 2011), and financial and non-financial performance measures (Chenhall & Langfield-Smith, 2007).

1.1.2 Theoretical perspectives on identifying factors that influence MPM use

In the literature, the factors that are likely to influence MPM use have been principally informed by the two popular theoretical perspectives, namely, institutional theory and contingency theory (Modell, 2009; Chenhall, 2003). Management accounting (MA) literature informed by institutional theory has suggested that it is necessary to consider wider socio-economic aspects of organisational life when examining MA practices (Granlund & Lukka, 1998; Hoque & Hopper, 1994; Covaleski & Dirsmith, 1996). Earlier MA research suggested that the organisational belief system and practices are rooted in the institutional environment. A selection of MA practices including MPM use thus could essentially be the result of institutional beliefs, norms and practices (Covaleski & Dirsmith, 1996; Granlund & Lukka, 1998; Hussain & Hoque, 2002) and not merely be motivated by technical criteria or economic efficiency (Ma & Tayles, 2009).

Using the new institutional sociology (NIS) stream of institutional theory (DiMaggio & Powell, 1983; Scott, 2008), previous MA research has identified institutional factors that explained MA practices and changes in MA practices, including PMS (Hussain & Hoque, 2002; Munir et al., 2011). The NIS theory has contributed significantly to the understanding of the relationship between organisational structures, rules, practices and the wider environment of an organisation (Hussain & Hoque, 2002; Granlund & Lukka, 1998). According to the NIS theory, specific organisational forms or practices are diffused across firms operating in similar environments or organisational fields on the grounds of legitimacy (DiMaggio & Powell, 1983). Many services organisations such as banks, hospitals and schools operate in highly institutional environments (Scott, 2008). Operating in such environments, banks, for example, may implement, use and improve their PMS not only as a result of their response to the external environment, but also in response to the influence of regulatory bodies such as the central bank (DiMaggio et al., 1991; Munir et al., 2011).

Recent NIS research trends, however, have been towards understanding the role of actors and explaining the internal dynamics of organisational change (Sharma et al., 2010). Actors may be individuals such as top management or managers, or organisations such as consulting firms (Maguire et al., 2004). They are powerful and active actors who control resources to create new institutions or to transform existing ones, and their commitment and support are essential to change traditional performance measurement practices.

Another popular theory in MA literature is the contingency theory, which takes into account the effect of different contextual factors on the extent of MPM use. Previous contingency studies have claimed that the MA system, including MPM use as a whole, is a contextually defined phenomenon that takes into account internal and external factors in order to help managers achieve business goals (Gosselin, 2011, 2005; Chenhall, 2003; Otley, 1980). More specifically, contingency theory suggests that there is no generally established MA system; the appropriateness, effectiveness and use of MPM are driven by the circumstances or contexts in which an organisation operates (Chenhall, 2003; Otley, 1980, 1999; Malina & Selto, 2001; Lee & Yang, 2011). Many factors such as environmental uncertainty (Hoque, 2005); business strategy (Baines & Langfield-Smith, 2003; Gosselin, 2011, 2005); organisational structure (Gosselin, 2011, 2005; Lee & Yang, 2011); and business size (Hoque & James, 2000) have been examined under contingency-led PM research within the MA literature.

Recent PM research under the contingency theory perspective has addressed investment in intangible assets as an important factor in implementing MPM tools such as the balanced scorecard (BSC) (e.g., Henricks et al., 2012). In today's competitive business environment, many firms make significant investments not only in advanced manufacturing technology, such as computer-integrated manufacturing and just-in-time systems, or in implementing a TQM program (Baines & Langfield-Smith, 2003), but also in intangible assets. These intangible assets include brand building, human resource development and information systems, as well as internal and external relationships through networks and alliances in order to increase quality, productivity and flexibility, and to reduce cost (Marr et al., 2004; Lev & Zambon, 2003).

Other studies have suggested that firms across the globe have changed their investment in many intangible assets. To illustrate, Zéghal and Maaloul's (2011) recent research examining firms from more than 40 countries found that annual research and development (R&D) investment growth rate has increased from 4% to more than 9% between years of 2001-2007. Sharif et al.'s (2013) research found that the growth rate on R&D expenditure as a percentage of gross national product (GNP) was 0.02% for firms in Bangladesh and 0.46% for Malaysian firms (an increase from 0.13% to 0.59%) between the years of 1994-2008. In Spain, Martin-Oliver and Salas-Fumus's (2008) study reported that during the period from 1989 to 2003, the

change of investments in information technology (IT) increased on average by 4.8%. Despite this increase in investment in intangible assets, the PM literature does not provide a sufficient understanding of the issues associated with the measurement of intangible assets, the use of a measurement system approach such as MPM (Zigan & Zeglat, 2010; Kaplan & Norton, 2004) and the association between change in investment in intangible assets and the use of MPM. In this regard, Bose and Thomas (2007) indicated that the absence of appropriate PM techniques will lead to under-investment in intangible assets because decision makers would not understand the impact of investment in intangible assets on firms' value-addition process in measurable terms. As a matter of fact, a performance evaluation style that relies solely on financial measures is not adequate for measuring the impact of investing in intangible assets (Kaplan & Norton, 2004) since short-term accounting-based financial performance indicators are not able to assess and evaluate all the expected benefits associated with investment in intangible assets (Khallaf, 2012).

Studies have suggested various benefits that firms would receive if they measure intangible assets using a multi-dimensional performance measurement system (Hunter et al., 2005; Zigan & Zeglat, 2010). To illustrate, firms that measure intangible assets are capable of managing their intangible assets more efficiently (Hunter et al., 2005). Marr et al. (2004) suggested that measuring intangible assets helps organisations not only to formulate and execute their strategy, but also to communicate to external stakeholders and to build long-term sustainable competitive advantages. Zigan and Zeglat (2010) argued that consideration of intangible assets in PMS would allow managers and stakeholders to better evaluate the performance of the entire organisation (p. 605). Others have reported that intangible assets have a positive effect on firms' performance (Kamath, 2008). However, there must be alignment of PMS with firms' investments in intangible resources, and the organisational PMS must be sufficiently comprehensive to measure benefits of investment in intangible assets (Walsh et al., 2008).

1.1.3 MPM in the banking sector: a brief review

Banking institutions in recent years have experienced competitive pressures and economic shocks globally as a result of the financial 'tsunami' that took place in early 2007 (Wu, 2012; Chen et al., 2008). As a result of the global financial crisis, stock markets across the globe severely plummeted and numerous firms, in particular, banks collapsed: through government bail-outs and other assistance, the sector was later rescued (Shah, 2009). Banks, as a result,

have had to give greater importance not only to enhancing operational performance but also to developing an effective alignment of their strategies with their corporate objectives through performance indicators (Wu et al., 2009; Wu, 2012).

Within PM research, there are few studies that have specifically investigated the banking sector. Specifically, Hussain and Hoque's (2002) study on four Japanese firms is considered to be the first to have examined factors that influence non-financial PM in the banking sector. Their findings indicated that a number of institutional forces influenced banks to implement and use PMS. Based on multiple case studies in Finland, Sweden and Japan, Hussain's (2003) later research studied the impact of economic conditions on performance measures in banks and reported that when economic uncertainty increases, the case banks placed greater importance on using financial-based performance measures. The empirical findings of Ittner et al.'s (2003b) study in the US reported that performance measurement tools (the BSC) associated with bonus plans were often modified or utilised by managers in line with their own personal benefit. Another case study by Hussain (2005) in four Swedish banks reported that more importance was placed on using financial performance indicators than on non-financial indicators. In recent times, there have been other studies on management control and performance measurement systems in the specific context of the banking industry. Soin and Scheytt (2008), for example, offered a literature review of MA practices (including PM practices) in the financial industry. They concluded that MA and control systems in the financial services industry have not been developed much. Recently, Munir et al. (2011) offered a framework for PM change in the banking industry and suggested various macro-level factors (economic, technological, socio-cultural and political) that could place pressure through various forms (mimetic, normative and coercive) to change the PM practices in banks. Very recently, Gooneratne and Hoque (2013) provided a detailed review and the recent standing of management control systems of banks.

Few other PM studies in the developed countries' banking sector have addressed the behavioural issues of PM practices. Specifically, de Waal and Coevert's (2007) case study on the Netherlands' financial industry reported that the behavioural factors of performance measurement are important for effective implementation of the PM system (i.e., the BSC tool). Similarly, Kominis and Emmanuel (2007) reported that, in the UK financial industry, the value of extrinsic rewards is significantly associated with other attributes of performance measures

and firms' reward systems, specifically the precision of the performance measures and the transparency with which the performance measures and rewards are connected (Kominis & Emmanuel, 2007, p. 49). Aranda and Arellano's (2010) study on European savings banks found that implementation of the BSC brought about a change in managers' beliefs by giving more importance to lower measures in the BSC model and by increasing the level of awareness on strategic priorities.

Some PM studies in the banking sector of developing countries have revealed other issues. For example, the four cases studied by Al-Enizi et al. (2006) in Gulf Cooperation Council countries found that the studied banks used non-financial performance measures as a result of customer demands and due to the perception that financial performance measures had limitations (Al-Enizi et al., 2006). Others have explored issues such as the role of national culture in implementing the BSC model in the Indonesian central bank (Rhodes et al., 2008); the way the new BSC model has been effectively institutionalised and converted into new values, habits and routines inside a Brazilian bank (Guerreiro et al., 2006); and the way the BSC has been introduced, modified and redefined in Thailand's financial industry (Wongkaew, 2007). Very recently, Munir et al.'s (2013) case study on a state-owned bank in Pakistan showed that factors such as uncertain economic conditions, competitive forces and pressures to improve performance and enhance accountability served as a motivator for the change of its PMS. Their study further reported that financial losses of the case bank, major changes in the regulatory environment, the appointment of a new board of directors and president, a higher level of uncollectable loans in the industry, and, above all, financial sector reforms, acted as the key catalysts in the change in PMS. However, to date, the use of MPM as a result of various institutional and internal factors has remained unexplored in the context of banks in developing countries. As mentioned earlier, this current thesis focuses on this unexplored theme.

The growing importance of investment in intangible assets in the banking industry lies in the inherent nature of its activities, that is, for processing, managing and using banks' information strategically (Beccalli, 2007). With the aims of reducing operating costs, ensuring better customer service and, above all, improving efficiency, the industry has long been using self-service technologies (SSTs) and remodelling its service delivery systems by depending on SSTs (Ou et al., 2009; Hung et al., 2012; Berger et al., 2010; Wilson et al., 2010). Typical examples where the industry habitually invests a significant amount of resources include

information systems, networking systems, and technology-led banking products and services such as mobile banking, telephone banking, online banking, e-finance, etc. (Ou et al., 2009; Hung et al., 2012; White, 1998). Recent research studies in the context of banks have evidenced that globally there has been a change in investment in many intangible assets. For example, Martin-Oliver and Salas-Fumus (2008) reported that banks' investments in IT in Spain have increased on average more than 4.8% coupled with changes in investment in advertising (on average from 3.54% to 4.72%) for the period of 1989-2003. Beccalli's study (2007) on five European countries evidenced that changes in investment in IT systems have increased over 12% for the five-year period from 1995 to 2000. Beccalli (2007) argued that IT investment (a component of intangible assets) in the banking industry is regarded as an 'opportunity' to pursue an increasingly recognised strategic objective (i.e., the improvement of service quality through a joint focus on customers and commercial activities). Changes of investment in other intangible assets such as relational capital enable banks' decision makers to exploit new collaborations such as building a joint client base and stronger capital backing across a large number of syndicated loans, asset-based securities and other financial assets (Matthews & Thompson, 2008; Holland, 2010; Wilson et al., 2010).

In addition to investment in IT and relational capital, customer relationships management (CRM) and investment for developing human capital are also important for the sector (Peppard, 2000; Al-Ghazawi, 2012). Given that the banking industry experiences increasing challenges to retain existing customers and to acquire new customers as a result of its competitive environment (Berger et al., 2010; Wilson et al., 2010), there has been a growing consensus in the industry to allocate financial resources to develop, enhance and maintain their existing customer bases and to develop banks' human resources (Al-Ghazawi, 2012; Berger et al., 2007; Duncan & Elliott, 2004). The rising investment of the banking industry in human capital (another component of intangible assets) in many areas such as education and training of their workforce, salaries and other benefits is necessary since human capital plays a fundamental role in creating value for service firms such as banks (Al-Ghazawi, 2012; Ou et al., 2009).

Given that change in investment in intangible assets (such as IT, CRM programs and human capital development) entails a substantial component of costs and exerts a strong influence on banking operations (Al-Ghazawi, 2012; Beccalli, 2007), examining the impact of change in

investment in intangible assets on bank performance is an important issue. Indeed, investments in intangible assets are made on the grounds that they have the potential to improve organisational efficiency, reduce operating cost, lessen employee turnover and ensure better customer service (Beccalli, 2007; Al-Ghazawi, 2012). Understanding the impact of investing in intangible assets on banks' performance is therefore an significant research topic not only because there has been a growing change in investment in intangible assets in recent years, but also because it is logical to need to know what benefits banks receive from this change in investment. However, the fundamental question is how to measure the benefits that are expected to be received as a result of the change in investment in intangible assets. Boudreau and Ramstad (1999) pointed out that an appropriate PM framework is needed for validating the theoretical logic and argument that investment in human resources, customer services and other intangibles leads to improved organisational performance.

Given that the banking industry spends a significant amount of resource allocation with regards to intangible assets, it is reasonable to comment that an appropriate PMS (e.g., the use of multi-dimensional performance measures) is necessary to assess and evaluate intangible assets' performance (Kaplan & Norton, 2004) and to understand whether change in investment in intangible assets adds value (benefits) for banks. In the context of the banking sector, surprisingly, there has been very limited understanding about the impact of change in investment in intangible assets on organisational performance (but see Beccalli [2007] and Martin-Oliver and Salas-Fumus [2008] who provided empirical evidence on changes in investment in IT and organisational performance). Similarly, there have been no prior empirical studies that investigate whether change in investment in intangible assets is an influencing factor in the use of MPM. Furthermore, little has yet been advanced in the context of banks to understand the possible mediating effects of MPM in the relationship between change in investment in intangible assets and organisational performance. On the basis of the above-mentioned discussion and argument, the banking sector thus offers an ideal context for examining change in intangible asset investment and its association with MPM and banks' performance (see Chapter 4 for further discussion).

1.1.4 Definition of developing countries

In defining developing countries, international organisations such as the International Monetary Fund (IMF) and World Bank (WB) have categorised developing countries on the basis of

economic criteria, for example, the use of per capita income thresholds (O'Arthur & Sheffrin, 2003; IMF, 1998). However, management accounting researchers (e.g., Hopper et al., 2009) argue that defining developing countries in terms of economic criteria is problematic since poverty is not unique to developing countries. Rather than relying on economic indicators (e.g., per capita income) as is generally found in the WB, or the IMF income threshold, Hopper et al. (2009) argue that it is necessary in defining developing countries to consider other socio-economic variables, for example, child welfare, quality of life, citizen empowerment and governance (p. 471). This current study adopts the definition of developing countries provided by Bożyk (2006) who describes developing countries as countries whose economies enjoy rapid progress in terms of socio-economic classifications, but are not yet treated as developed countries.

1.2 Aims and objectives of the thesis

This thesis addresses two research questions:

1) ***What are the influences of institutional factors on the use of multi-dimensional performance measures (MPM) in banks in developing countries?***
2) ***As an internal factor, what is the influence of change in investment in intangible assets on MPM use, and the impact of MPM use on the performance of banks in developing countries?***

To answer these questions, the study has the following specific objectives:

I. To identify the factors that influences the use of MPM by reviewing the relevant literature on developing countries.
II. To provide empirical evidence of institutional factors that influence MPM use in banks.
III. To provide empirical evidence of the effect of change in banks' investment in intangible assets on MPM use and on organisational performance.

In order to achieve the above-mentioned research objectives, this study has chosen the banking sector in Bangladesh.

1.3 Motivation for the thesis

As noted earlier, this thesis examines factors that influence the use of MPM in the banking industry in a developing country and examines the impact of MPM on organisational performance. This section highlights the research gaps and identifies the motivation for this thesis.

Firstly, there is the need to clearly understand what factors influence the use of MPM. Understanding the factors that influence MPM will lead to a greater understanding of MPM use and the accompanying pressures for change in traditional PMS.

Secondly, while there are studies which have explained and identified the institutional forces which impact on the use of PM (e.g., Hussain & Hoque, 2002; Munir et al., 2011), very little research has been undertaken to examine the role played by institutional and competitive forces on the use of MPM (James, 2009). The current thesis's literature review chapter (see Chapter 2) has also evidenced that, to date, there has been little progress towards understanding this relationship in the context of developing countries. Tsamenyi et al. (2006) stated that more studies were required to understand how MA practices are shaped by the relationship between institutional and competitive (market) forces (p. 429). The case examined here of a developing country allows an examination of both institutional and competitive forces as explained in Section 1.4. The necessity for this line of understanding has intensified as recent accounting studies (e.g., James, 2009) have suggested that organisations can demonstrate legitimacy not just as an isomorphic response to an institutional field, but as a strategic response to the competitive environment for the purpose of efficiency (see Chapter 3 for further discussion).

Thirdly, the role of powerful actors within organisations in responding to institutional pressures in MPM has also been given little attention in previous research. In this regard, earlier studies (Ma & Tayles, 2009) have argued that much of the previous MA research overlooked the key role of internal actors (generally the CEO, CFO and other managers). There is still only limited PM research investigating the influence of 'internal actors' on MPM within organisations. As discussed in the literature review in Chapter 2, research towards understanding the role of internal actors, and specifically top management participation, in the use of MPM within organisations has been limited in the specific context of banks in developing countries.

Accordingly, this thesis has been motivated to consider this issue in the case of MPM (see Chapter 3 for further discussion).

Fourthly, from the contingency perspective of accounting studies, little attention has been given thus far to understand change in investment in intangible assets and its links to firms' use of MPM. Although intangible assets generate more than 60% of firms' value (Kaplan & Norton, 2004), the importance of the measurement of intangible resources has been neglected in previous PM research (Roslender & Fincham, 2001). Similarly, organisational performance, to a large extent, depends on how intangible assets (such as customers, employees' competence and relational assets) are evaluated and measured, (Kamukama et al., 2011; Wang et al., 2008). As found in the literature review (see section 2.5 of Chapter 2), to date, this line of understanding has been little advanced in the context of developing countries. Hence, the current thesis is motivated to fill this gap by examining the impact of change in firms' investment in intangible assets on MPM, and the mediating role of MPM in the relationship between the change in investment in intangible assets and organisational performance (see Chapter 4 for further discussion).

Fifthly, the relationship between MPM use and organisational performance is still unclear. Previous studies (e.g., Hoque & James, 2000; Ittner et al., 2003a; Henri, 2004; Ittner & Larcker, 2001; Davis & Albright, 2004) have indicated that little was known regarding the effect of MPM on organisational performance. Accordingly, further research on the performance effect of the different perspectives of performance measurement could make a contribution to the MA literature (Ittner & Larcker, 2001, p. 376). Accordingly, this thesis has been motivated to consider this issue in the specific context of the banking sector in a developing country (see Chapter 4 for further discussion).

Sixthly, the current state of MPM knowledge in developing countries is not well established as no review has been conducted to date (except for Hopper et al. [2009] and Tillema et al. [2010])[2] in the context of developing countries.[3] While the development and progress of PM knowledge are established in the context of developed countries as evidenced in previous literature review studies (e.g., Neely, 2005; Neely et al., 2005; Taticchi et al., 2010; Yasin &

[2] Tillema et al.'s (2010) study was conducted only on the public sectors' PMS in the developing countries setting.
[3] For details, see Chapter 2.

Gomes, 2010), such knowledge is limited in the context of developing countries. The attempt made in this study could provide researchers, managers and policy makers with useful insights on the use of MPM in developing countries. A deeper understanding of and insight into MPM could also be helpful in better gauging the PM practices of other developing countries, the trend towards adopting contemporary PM tools and techniques, and what motivates organisations in developing countries to choose MPM imported from developed countries (see Chapter 2 for further discussion).

Finally, with regard to PM issues, Yasin and Gomes (2010) suggested that research that is more empirical was needed in different services industries including banks, hospitals, hotels and tourism with a view to clarifying relationships among different theoretical constructs of PM which could provide practical managerial implications (p. 221). As found in the literature review (see section 2.5 of Chapter 2), in the context of banks in developing countries, there has been little progress towards understanding issues in relation to performance measures such as the current state of the use of MPM, factors influencing MPM use or understanding the possible impact of MPM use on organisational performance, etc. Overall, the banking sector has long been under-researched in PM studies, in particular the banking sector in developing countries, where it plays a dominant role in social and economic development. Understanding the multi-dimensional perspectives of performance and the factors affecting MPM use is helpful for the effective and efficient flow of the management information of banks in these countries where banks are often faced with growing external demand and need to make the right decisions on their efficient use of limited resources.

1.4 Reasons for choosing Bangladesh and its banking sector

As mentioned earlier, this thesis has considered Bangladesh and its banks as the context in which to achieve the research objectives. The reasons for choosing Bangladesh and its banks are numerous. As mentioned in section 1.1, the banking sector in developing countries plays a key role in the economy: the banking sector in Bangladesh shows similar trends to those observed in other developing countries. In Bangladesh, the banking sector controls most of the financial flows and possesses around 95% of the financial system's total assets (Baher, 2009). Given the close relationship between the financial soundness of the banking sector and the growth of other sectors, understanding the banks' MPM and the factors that influence banks' MPM and banks' performance is therefore crucial.

In the Bangladesh context, the shift from a planned economy to a market economy, which began initially in 1974 and which has accelerated since the late 1980s, has resulted in many fundamental changes. These include the restructuring and privatising of state-owned enterprises, the emergence of the private sector, introduction of financial incentives for exports, and initiatives undertaken for foreign direct investment (FDI) (Palit, 2006). As in other developing countries (Chang et al., 2007), the number of foreign multinational corporations (MNCs) operating in Bangladesh has sharply increased in many sectors in the last two decades (Bangladesh Economic Review, 2007). Recognising that the private sector could be the key catalyst of the country's growth, the Government of Bangladesh (GOB) has encouraged and opened up more private investment, and has formulated more liberal FDI policies and measures over recent years (Rahman, 2008). Such liberalised measures include the issue of work permits for foreign nationals, shortening approval times for new investments, offering tax holiday facilities for investment in underdeveloped regions or regions prioritised by the government, granting exemptions from import duties for export processing industries and, above all, no restrictions on the repatriation of profits and income (Rahman, 2012). Initiatives undertaken through these liberalised measures are believed to have made Bangladesh the most liberal FDI regime in South Asia (Rahman, 2008; Bangladesh Economic Review, 2007).

Changes in the business environment of Bangladesh owing to liberalised government policy coupled with the rapid advancement of IT have created opportunities for future growth. Such changes, however, have made the business environment extremely competitive for both local and foreign firms (Rahman & Anwar, 2006; Mahmud et al., 2008). This competitive environment has made firms in Bangladesh reshape their management control systems in order to improve operational efficiency and quality, provide better customer service and attract new customers (Hossain, 2008). Nevetheless, this trend of reshaping management control systems is not specific only to the context of Bangladesh. Rather, it is consistent with some other developing countries where it has been evidenced that management accounting practices including performance measurement systems have been changed as a result of economic reforms, liberalisation and extreme competition in the economy (de Waal, 2007; Waweru et al., 2004; Anderson & Lanen, 1999; Firth, 1996). Specifically, Waweru et al.'s (2004) study on South African firms evidenced that increasing competition as a result of deregulation, economic reforms and the advent of technology was a key factor that had changed traditional

MA practices including performance measurement systems. Similar results have also been reported by other studies in developing countries. For example, de Waal (2007) explained that the move to a market-based economy induced firms in Tanzania to modernise their MA practices and adopt contemporary management control and information systems in order to be more performance-oriented and customer-centric. Anderson and Lanen (1999), in the context of India, stated that changes in MA practices including PM practices and strategy formulation were as a result of economic reform in India that took place after the 1990s (see also Firth [1996] who reviewed the case of China).

The banking industry in Bangladesh has become vibrant and dynamic[4] experiencing rapid growth (Rahman, 2008). Prior to 1980, the sector was highly protected but, since the reforms, the sector has become much more open with many initiatives undertaken to attract foreign investment (Siddiqui, 2011). For instance, the central bank of Bangladesh has licensed many local and foreign banks in the last three decades (Bahar, 2009): these new banks not only brought a massive injection of foreign and private capital but also came with aggressive marketing strategies which sparked intense competition in the banking industry. Banks in Bangladesh have become inclined to aggressively market and compete for the same customers in recent years and each tries to out-compete the others in terms of service with slogans such as 'the customer is king' (Fatima, 2010). Fatima (2010) mentioned that, in order to implement a customer-focused marketing strategy, sufficient customer information should be available within banks' information systems to be able to provide information to managers. Thus, the banking sector is an interesting focus for exploring factors for the adoption of modern MA practices.

In Bangladesh, numerous studies have been carried out to understand MA practices in various sectors (e.g., Rahman & Scapen, 1986; Hoque & Hopper, 1994, 1997; Uddin & Hopper, 2003; Hoque & Alam, 2004; Uddin, 2009; Uddin & Hopper, 2001; Sharkar et al., 2006; Islam et al., 2011). A few other studies have also been conducted in Bangladesh specifically on PM issues such as the suitability of BSC-based MPM techniques in the banking sector (Morium, 2002); exploring BSC practices in an MNC (Ishtiaque et al., 2007); testing the theoretical hypothesis of the BSC model (Khan et al., 2010b); exploring the role of competition and business strategy

[4] It is argued that the government-owned banks in Bangladesh are still lagging behind in this dynamic process since these banks are often influenced by government, the leaders of the ruling parties and the lack of full control by the central bank in monitoring owing to dual regulations (see Chapter 3 for details).

on the use of the BSC in manufacturing firms (Khan et al., 2010a); and, recently, the extent of the use of the BSC in Bangladeshi-listed companies (Khan et al., 2011). While a handful of research attempts have been undertaken in various sectors in Bangladesh to understand MA practices in general (e.g., Hoque & Hopper, 1994; Uddin & Hopper, 2003) and PM practices in particular (e.g., Morium, 2002; Ishtiaque et al., 2007), most of these earlier studies were conducted in non-banking sectors (except for Morium, 2002; Purohit & Mazumder, 2006; Islam et al., 2011). Clearly, there has been no attempt to understand factors that influence the use of MPM in the context of the banking industry, arguably the most important services sector of the country. Among the bank-specific Bangladeshi studies, Morium (2002) has suggested that commercial banks in Bangladesh by necessity have the pre-requisites[5] for implementing a BSC-based MPM tool. A recent study by Khan et al. (2011)[6] has reported that banks in Bangladesh use MPM.

The supervision and monitoring of the performance of commercial banks in Bangladesh from economic, social and environmental perspectives by external stakeholders (in particular, the country's central bank) have pushed the banking sector to generate and disseminate various performance-related information in recent years. Azim et al. (2009), in their study of listed firms in Bangladesh, suggested that the banking industry provided more information on customer, community and environmental activities in its annual reports than any other sector. This finding was further validated by a very recent study by Hossain et al. (2012). Khan and Khan (2010), in their longitudinal study of listed firms, found that over time the banking sector disseminated more customer and human resources-related information than any other industry. Commercial banks in Bangladesh are now reshaping their control system/PMS in response to these external and internal factors (Morium, 2002; Purohit & Mazumder, 2003). Consequently, the emerging question is: what are the factors that could shape the PM practices (specifically, MPM) of commercial banks in Bangladesh?

Likewise, the commercial banks of Bangladesh experience increased customer demands and regulatory influence, together with industry-wide rapid development of technology-driven

[5] Morium (2002) identified that the banking sector's massive investment in technological innovation, in hiring the most talented and skilled employees, and in its customer base would assist it to broaden the existing PMS.
[6] Khan et al.'s (2011) study (n=60) contained only five banking firms and clearly did not examine the factors influencing MPM practices.

banking services (Morium, 2002; Hossain, 2008; Islam et al., 2011). Therefore, the adoption of an appropriate PMS (specifically, the use of MPM) in banks has the potential to provide relevant and accurate information on banks' products, processes and customers, which are likely to assist bank managers in reducing non-performing loans, and ensuring transparency and accountability (Islam et al., 2011; Morium, 2002; Purohit & Mazumder, 2003, 2006). Banks' performance information through the use of MPM would help the bank managers in Bangladesh to understand not only how the banks execute their external responsibility, but also how to assess the banks' performance for internal decision making (Morium, 2002; Purohit & Mazumder, 2006). Nevertheless, as reported earlier, this line of understanding is limited in the context of banks in Bangladesh. Arguably, the banking sector in Bangladesh is an interesting research site for exploring the factors that influence the adoption of contemporary management accounting practices (MAP) (and, specifically, the use of MPM).

This study has taken a holistic approach consolidating the internal and external factors (from both the institutional and contingency theory perspectives) in order to examine their impact on MPM use and the impact of MPM use on organisational performance. As mentioned before, earlier studies in Bangladesh have not addressed this issue, thus the current thesis is an attempt to fill this gap. It is assumed that, by undertaking a comprehensive study on multi-dimensional performance measurement systems in developing countries in general and in the country of Bangladesh in particular, an incremental contribution could be made to that limited literature.

1.5 Significance of the thesis

The banking business around the globe, including in developing countries, has transformed noticeably over the past few decades as a result of deregulation, internationalisation, financial crisis and reregulation (Larson et al., 2011). Parallel to this global transformation, as discussed earlier, the banking industry in Bangladesh has changed considerably in recent decades (Islam et al., 2011). The industry plays a key role of providing finance for many business sectors and continues to make a positive contribution towards the economy of Bangladesh (Sufian & Habibullah, 2010). In recent decades, on top of mobilising savings and granting credit, in accordance with initiatives taken by the Bangladesh Bank (BB) (the country's central bank), the industry has become increasingly involved in broadening financial inclusion to meet social and environmental goals (BB, 2012; Government of Bangladesh, 2012). Specifically, as part of contributing to the social development of the country, the commercial banks of Bangladesh are

now involved in granting loans to women entrepreneurs either by opening small and medium enterprise (SME) centres or by partnering with micro-finance institutions (MFIs); granting agricultural loans to landless farmers; granting special loans for establishing the agro-processing industry; meeting social goals (e.g., initiating long-term scholarship programs for meritorious but poor students; granting loans to establish solar plants) (BB, 2012, 2013a, 2013b).

In association with the central bank's initiatives, the commercial banks in Bangladesh are also continuing their efforts to meet developmental, social and environmental goals through participation in many initiatives (e.g., agri-loans for women, loans for developing women entrepreneurs, granting loans to educated but unemployed youths, undertaking work for community and social activities through banks' social responsibility programs, and working for a pollution-free environment) while, at the same time, keeping their economic (financial) performance stable (BB, 2012, 2013a). To measure the success of these initiatives, the commercial banks in Bangladesh need to use an appropriate PMS (e.g., the use of MPM). In recent decades, the central bank of Bangladesh has also issued several regulations that have resulted in increasing requirements for commercial banks to report performance in many areas such as customers, communities, and environmental and risk assessment issues in addition to financial performance (BB, 2012, 2013a, 2013b). For the decision makers of banks in Bangladesh, information obtained through the use of MPM could be useful for performance and in the accomplishment of these goals.

The above-mentioned phenomenon of banking industry in Bangladesh can be linked with the notions of institutional environment explained in institutional theory, specifically, with the concept of NIS (DiMaggio & Powell, 1983) mentioned in section 1.1.2 of the current chapter. Operating in an institutional environment, it is understandable that banks in Bangladesh are not able to disregard such external requirements, and social norms and expectations. Nevertheless, understanding the institutional factors that influence MPM use by using the institutional lens has, thus far, been little explored in the specific context of banks in Bangladesh (detailed discussion in Chapter 3). The current thesis is relevant since it examines the institutional factors of MPM use, the findings of which have implications both for the academic community and for decision makers of banks.

Moreover, the emergence in recent years of the widespread application of IT within the country, in general, as a result of the government's recent policy of 'Digital Bangladesh' (Government of Bangladesh, 2012), and the change in investment in IT (e.g., Bangladesh Automated Clearing House [BACH]; mobile phone-based financial services; e-commerce; online banking; etc.) in the specific context of the banking industry, in particular, have changed the industry's technological environment (BB, 2013a; Shah, 2009). The industry is also typified by the sheer volume of investment in many other intangibles such as strategic alliances through which banks are able to balance technology components (e.g., sharing ATM machines so they serve customers from more than one bank), credit portfolios (e.g., arranging syndicated loans where a large project is jointly financed by more than one bank) and, above all, the concentration on improving human capital through training and development (BB, 2013b; Afroj, 2012; Majumder, 2012; Kabir et al., 2012). As service entities, the ability of the banks in Bangladesh to mobilise, exploit and change their spending on many intangible assets has arguably become more influential than investing in tangible assets *(*Majumder, 2012; Kabir et al., 2012). Given that decision makers of banks in Bangladesh would be interested in measuring the benefits of investing in intangible assets, the use of appropriate performance measures for banks would be essential (Morium, 2002).

Nevertheless, understanding the impact of change in investment in intangible assets on multi-dimensional performance measures and organisational performance has not yet been advanced in either the management accounting literature (discussed in section 1.3) or in the context of banking in Bangladesh. Based on the argument from the contingency perspective of management accounting (Chenhall, 2003), it can be stated that a factor such as change in investment in intangible assets is a contextual factor and its possible relationship with MPM use and organisational performance for banks in Bangladesh could be dependent on the contextual environment of banks in Bangladesh. Therefore, this thesis takes the opportunity to empirically examine this issue in the Bangladesh banking context, the findings of which have implications both for academics and for practitioners.

Furthermore, corporate governance and the types of ownership in Bangladesh are different from those in developed countries: for example, dominance of family ownership in the corporate sector including the banking industry and political interference are often found in banks in Bangladesh (see Chapter 3 for detailed discussion) (Reaz & Arun, 2006; Khatun,

2012). Therefore, commercial banks in Bangladesh may experience challenges in adopting MPM. Based on the above-mentioned distinctive characteristics of the Bangladeshi banking industry, ownership types and governance, it can be stated that the business environment in Bangladesh is different from the socio-cultural perspective in comparison to that of other countries. This indicates that commercial banks in Bangladesh are an interesting site in which to explore answers to the research questions of the current thesis developed earlier (see section 1.2 of the current chapter) which call for a separate study in this context. Hopper et al. (2009) stated that when exploring management accounting practices in developing countries, each study should be informed through its own social and environmental context so as to gain context-specific insights. Luther and Longden (2001) noted that, despite the influence of widely sold textbooks and other quick knowledge-sharing processes, management accounting practice is not universally uniform and should be understood in the light of the political, social and contextual environment of a nation. Therefore, a fresh research initiative is necessary to examine the impact of various factors on MPM use in the specific context of banks in Bangladesh. In the light of the above-mentioned developments in the banking industry of Bangladesh, the current study expects that there might be some context-specific reasons and factors that could stimulate (or could prevent) the use of MPM by commercial banks; if so, such findings would also offer additional insights for the PM literature.

By looking into the factors that influence MPM use and the possible alignment between the use of MPM and these factors (internal and external) in a new setting and by seeking to gain an understanding of the MPM impact on organisational performance, the findings of the current thesis make a contribution to the MA literature, in general, and to commercial banks in Bangladesh, in particular. Furthermore, as found in the literature review, there has been little research on MPM and factors influencing MPM in the context of banks in developing countries (see Chapter 2 for details). Consequently, by conducting empirical research in the context of banks from a developing country's perspective (e.g., banks in Bangladesh), the current thesis makes a contribution to the literature with specific reference to the banking industry in developing countries (for details, see Chapters 3, 4 and 5).

1.6 Overview of the three papers

This thesis focuses on institutional and internal factors that influence the use of MPM using a set of established theories, namely the new institutional sociology theory and contingency

theory. This PhD study adopts a publication format and comprises three academic papers. Paper 1 reviews the MPM literature in the context of developing countries. Paper 2 examines institutional factors that influence MPM, using NIS theory. Paper 3 examines the impact of investment in intangible assets on MPM use and organisational performance, using contingency theory. Each paper is designed based on the specific objectives identified in section 1.2. More specifically, this study has addressed the research questions shown in Table 1.1 below.

Table 1.1: Titles of papers with research questions

Paper	Specific topics	Broad research questions
1	Multi-dimensional performance measurement systems in developing countries: a literature review	What is the current status of research on the use of multi-dimensional performance measures (MPM) in developing countries? What are the areas for future research?
2	Influence on the use of multi-dimensional performance measures of banks: an institutional perspective	What are the institutional factors that influence the use of MPM of banks in Bangladesh?
3	Intangible assets, multi-dimensional performance measures and organisational performance: Direct and mediating relationships	Does change in investment in intangible assets influence the use of MPM and the organisational performance of banks in Bangladesh?

1.6.1 Paper 1: 'Multi-dimensional performance measurement systems in developing countries: a literature review'

This paper achieves the first objective of the thesis. It identifies factors that influence the use of MPM in developing countries by reviewing the multi-dimensional performance measures (MPM) literature in developing countries. Within the reviewed papers, topics were classified into four categories, namely: (a) extent and use of MPM; (b) contextual factors and their role in MPM and organisational performance; (c) comparative studies on MPM; and (d) others. Furthermore, based on the review of literature, the paper identifies factors that influence the use of MPM in developing countries and areas for future research.

The paper is based on secondary data, that is, the analysis of academic papers (102 research papers). The review found that developing countries have made progress in the use of MPM, and the use of MPM tools (e.g., the BSC) has also gained prominence in developing countries. The study also highlighted internal and external factors that influence the use of MPM. The review revealed that in addition to manufacturing sectors, MPM studies in developing countries have

also been carried out in other sectors such as public sectors. The findings also report that some firms in developing countries have developed their own performance indicators. Moreover, some research gaps and future directions of MPM research in the specific context of developing countries are highlighted at the end of the paper.

The paper contributes to the overall aims of this thesis by recognising the internal and external factors that influence the use of MPM in developing countries. This has enabled the researcher to identify the effects of these factors on the use of MPM in the specific context of developing countries.

Some of the future directions identified in Paper 1 have been empirically examined in Papers 2 and 3 located in Chapters 3 and 4, respectively. Specifically, the current thesis empirically examines the first and second research directions of Paper 1 (presented in Chapter 2) in Papers 2 and 3 (presented in Chapters 3 and 4) collecting data from the specific context of banks from a developing country (i.e., Bangladesh). As mentioned earlier in section 1.3 (and also in Chapter 2), the understanding of the influence of institutional factors in the context of developing countries is limited, particularly, in the specific context of banks in developing countries (for more discussion, see Chapter 3). Similarly, as mentioned earlier, while the change in investment in intangible assets across the globe has been evidenced, there has been little progress, to date, in the literature towards understanding its effect on the use of MPM and organisational performance and the role of MPM in the relationship between MPM and organisational performance (see Chapter 4): this understanding is even more limited in the context of developing countries as found in the review conducted in Paper 1 (see Chapter 2). Therefore, the review conducted in Paper 1 has outlined the necessary grounds and motivations for conducting further research in the remaining two papers (presented in Chapters 3 and 4) and for selecting firms in a developing country (Bangladesh) as an empirical case for Papers 2 and 3.

1.6.2 Paper 2: 'Influence on the use of multi-dimensional performance measures of banks: an institutional perspective'

The paper achieves the second objective of the thesis; namely, it provides empirical evidence of institutional factors that influence MPM use in the commercial banks of Bangladesh. To achieve this, the paper identifies institutional factors that influence MPM use, develops a

theoretical model and empirically examines the model in the context of the commercial banks of Bangladesh using survey data. The survey results are further supplemented by post-questionnaire interview data. Accordingly, the overall discussion of findings is carried out with the combination of survey findings and interview data.

The theoretical model developed in the paper identifies competitive forces, coercive influences (such as the central bank, and socio-economic and political institutions), normative influences (e.g., professional associations); and mimetic influences (namely, the success of key competitors). The model also categorised the roles of top management participation, dominant shareholders' influence, banks' size in the use of MPM. Further insights of the influence of these factors are elaborated by interview data and other published information relevant to the banking sector.

The results indicated that the influence of the central bank, market competition and success from peer banks are the institutional factors associated with the use of MPM in the commercial banks of Bangladesh. The results also suggested that top management participation has influence on the use of MPM. There was no evidence to support a relationship between socio-economic and political institutions, and professional and trade associations and the use of MPM. However, banks' size was associated with MPM use.

In addition, the paper investigates the mediating effects of top management participation in the relationship between central bank influence and MPM use. Furthermore, the moderating effects of market competition in understanding the relationship between TMP and MPM use have also been tested in the paper (see subsection 3.5.5.1 of Chapter 3). The results of the additional analysis reported the partial mediating effect of top management participation in understanding the relationship between central bank influence and use of MPM. The additional analysis also evidenced that the participation of Bangladeshi banks' top management in the use of MPM is moderated by the level of market competition in the environment. Specifically, when competition is intense in the industry, top management is more participative and supportive of the use of MPM and when competition is less intense, top management is less participative and supportive.

The paper contributes to the overall aim of the thesis by providing empirical evidence on the role of the competitive and institutional factors that influence MPM use in banks. By taking into account different factors, the paper provides a picture of the roles of institutional factors in the use of MPM. It also provides further insights on the role of a mediator (e.g., top management participation) in predicting the relationship between central bank influence and the use of MPM, and the effect of a moderator (e.g., market competition) in predicting the top management participation and MPM relationship.

An earlier version of the paper was presented at the Performance Management Association (PMA) conference, University of Cambridge, UK, 11-13 July 2012 and at the Interdisciplinary Perspectives of Accounting (IPA) conference, University of Cardiff, UK, July 2012.

1.6.3 Paper 3: 'Intangible assets, multi-dimensional performance measures and organisational performance: a direct and mediating relationship'

The paper achieves the third objective of the thesis by identifying the role of change in investment in intangible assets on MPM use and organisational performance. For that, a theoretical model has been developed and empirically tested in the context of the commercial banks of Bangladesh. Collecting primary data using a survey questionnaire, the model tests the following relationships: (a) the relationship between change in investment in intangible assets and MPM; (b) the relationship between MPM use and organisational performance; and (c) the mediating role of MPM in the relationship between change in investment in intangible assets and organisational performance. The survey results were further supplemented by post-questionnaire interview data. Accordingly, the discussion of findings is organised with a blend of survey findings and interview data. This paper identifies an internal factor (i.e., change in investment in intangible assets) that should be aligned with MPM and that could affect organisational performance. It also provides evidence that the use of MPM is positively associated with organisational performance. In addition, this paper examines the moderating effects of market competition and banks' size in understanding the relationship between change in investment in intangible assets and organisational performance (see subsection 4.5.4 of Chapter 4). The results of the additional analysis revealed that market competition and size of banks moderate the relationship between change in investment in intangible assets and organisational performance.

The paper also contributes to the overall thesis aims by identifying an internal factor that influences MPM use and organisational performance. Specifically, the paper contributes to the overall objective of the thesis in that it examines the impact of change in investment in intangible assets on MPM use and the use of MPM in improving organisational performance. Lastly, it also provides further insights on the role of a mediator (e.g., MPM use) in explaining the relationship between change in investment in intangible assets and organisational performance, as well as the role of moderators (e.g., market competition and banks' size) in understanding the change of investment in intangible assets and organisational performance relationship.

An earlier version of this paper was presented at the Performance Management Association (PMA) conference, University of Cambridge, UK, 11-13 July 2012.

1.7 Structure of the thesis

The remainder of the thesis is organised as follows. Chapters 2, 3 and 4 contain the three above-mentioned self-contained papers. Each paper is presented in journal format that includes the relevant literature, theoretical framework, research design, findings, tables, figures and references. Chapter 5 comprises the concluding chapter of the thesis summarising the findings of the three papers, drawing an overall conclusion, describing the contribution of the thesis, and identifying limitations and the scope for future research.

Chapter 2
Multi-dimensional performance measurement practices in developing countries: a review of the literature

Abstract: The aim of this study was twofold: (a) to review the existing literature on multi-dimensional performance measurement in developing countries; and (b) to identify the factors that influence the use of multi-dimensional performance measures (MPM) and MPM tools such as the balanced scorecard (BSC) in developing countries. To achieve this, 102 papers published in accounting, performance measurement and management journals between the years 1987 and 2012 were analysed. The principal findings of this review are: (a) firms in developing countries use MPM, but the rate of MPM use differs between countries; (b) the balanced scorecard (BSC) is used as an MPM tool among firms in developing countries; (c) the use of MPM in developing countries is driven by many internal and external factors; (d) the main focus of MPM research in developing countries has been on the manufacturing sector; (e) the implementation and use of MPM in developing countries take into account the local cultural, institutional and operating environment; and (f) some firms in developing countries were found to have developed their own multi-dimensional performance indicators. Based on the review undertaken for this study, various factors that appear to influence the use of MPM in developing countries were identified and classified, first as internal and external factors, and then as enablers and causes. The study also highlighted future research directions.

Keywords: Performance measurement, multi-dimensional performance measures, developing countries, multiple industries.

2.1 Introduction

Over the last two decades, there has been a worldwide shift towards changing firms' traditional performance measurement systems (PMS), and the use of multi-dimensional performance measures (MPM) has gained increased acceptance (Garengo & Bititci, 2007; Chenhall, 2005). The multi-dimensional approach to measuring business performance has received such acceptance as the technique, in particular, motivates employees and managers, and encourages them to achieve overall organisational objectives with a sense of belonging and accomplishment (Yasin & Gomes, 2010; Greiling, 2006). Similarly, in addition to financial information, MPM provide performance information on other key dimensions of firms' value chains such as customers, employees, quality, the business process and suppliers (Neely et al., 2005; Langfield-Smith et al., 2011). The practice of using MPM has thus become an important agenda item for practitioners and a key research topic in the field of management accounting (MA), performance management and similar academic disciplines. As a consequence, the volume of MPM literature has considerably increased over the last two decades or so (Kennerly & Neely, 2003; Neely et al., 2001; Neely, 2005; Yadav et al., 2013).

The aim of the current study was twofold: (a) to review and analyse the existing literature on multi-dimensional performance measures in developing countries; and (b) to identify the factors that influence their use. Such an attempt is appropriate since, in the past, attempts at similar reviews have been undertaken in relation to developed countries (e.g., reviews by Neely [2005] of performance measurement literature, Srimai et al. [2011b] in the USA and Yasin and Gomes [2010] in the services sector generally). Other rationales and motivations that led to the current study are highlighted below.

Firstly, Hopper et al.'s (2009) study appeared to be the first of its kind to offer a useful review of MA practices in developing countries. Tillema et al.'s (2010) recent review on PM practices offered a framework for understanding the demand and supply of PM information for developing countries' public sectors. The current study has extended the scope of recent reviews on MPM research (i.e., Hopper et al., 2009; Tillema et al., 2010) by covering multiple industries in developing countries. There are, however, certain differences between the current study and the above-mentioned two reviews. Hopper et al. (2009) reviewed broader aspects of MA practices, and their review contained very limited information on the state of MPM use in

developing countries. Tillema et al. (2010) addressed PM in the public sector only. Mimba et al. (2007, p. 192) have noted the lack of knowledge on the use of PM in developing countries including the types of performance indicators used, the extent of use, as well as the manner and the motives for which PM information is used, and whether any changes are taking place in this area.

Secondly, it is now essential that firms in developing countries use quality and real-time MA information as well as taking a comprehensive approach to performance measurement (Waweru et al., 2005). In the past, state-controlled economies commonly prevailed in many developing countries such as China and South Africa (Anderson & Lanen, 1999; Luther & Longden, 2001; Waweru et al., 2005). In such controlled economies, MA practices were likely to be dissimilar from those in the free market economies in developed countries (Waweru et al., 2005, p. 232). During the last three decades, however, many developing countries have liberalised their economies through deregulation, which has resulted in high competition, increased customer and stakeholder demands, and, above all, joint venture initiatives with firms in developed countries (Waweru et al., 2005; Anderson & Lanen, 1999). However, the current understanding is very limited regarding whether any changes have taken place on the use of MPM as a result of the opening of developing countries' economies and the introduction of competitive forces. In the context of developing countries, it is therefore necessary to investigate whether there have been any changes in the use of MPM resulting from the opening of their economies and the introduction of competitive forces.

This study contributes to the literature on MPM, especially in the developing country context, in a number of ways. A comprehensive review of MPM research contributes to the literature on developing countries by outlining the opportunities for future MPM research in developing countries. By gaining knowledge about the state of MPM in the context of developing countries, scholars will be likely to have a clear picture of how and what aspects of the use of MPM have been adopted (and not adopted) by firms in developing countries. The current study has highlighted a number of under-researched issues on MPM practice in developing countries and this is likely to motivate future research in those areas. These issues include: the reliance on appropriate PM techniques (e.g., MPM and/or other multi-dimentional performance measurement tools such as the BSC) in developing countries; how firms from developing countries accommodate imported PM techniques within their own values and social systems;

what the challenges are in using MPM techniques; and whether any modification of MPM techniques is required to suit the local needs of developing countries. In addition to reviewing the relevant literature for the above-mentioned purposes, the study also identified the factors that influence the use of MPM in developing countries.

The next section provides a description of the method utilised in this research. The third section analyses the review findings. The fourth section presents a list of factors that influence the use of MPM in developing countries. The final section offers a summary of the findings and provides suggestions for future MPM research in developing countries.

2.2 Review method

2.2.1 Definition of terms

In this review, the term 'multi-dimensional performance measures' refers to different performance indicators that are used to measure different dimensions of organisational performance, and includes both financial and non-financial, and innovative MPM tools such as the BSC. 'Performance measurement' refers to the act of using performance indicators (Bourne et al., 2003, p. 3). For this review, to be classified as a 'developing countries' study', the research context needs to have been applied to the setting in developing countries. 'Developing countries' include both the emerging and newly industrialised countries (United Nations [UN], 2010). Wallace (1990) referred to the term 'emerging countries' as 'an amorphous and heterogeneous group of countries mostly found in Africa, Asia, Latin America, the Middle East and Oceania' and which had a colonial past (p. 3). 'Newly industrialised countries' (NICs) are countries whose economies enjoy rapid progress in terms of socio-economic classifications, but are not yet treated as developed countries (Bożyk, 2006).

2.2.2 Scope, techniques and length of time

The scope of the review included the use of MPM and innovative MPM tools such as the BSC, and the use of MPM tools as a management system. Additionally, the prior research that has encompassed the link between the contextual factors, and the MPM and the organisational performance relationship; the challenges of using MPM; and comparative studies on MPM between developing countries, and between developing versus developed countries, were also within the scope of the review.

For the purpose of this review, a number of databases and search engines, such as Emerald, Google Scholar, Inderscience and ScienceDirect among others, were used. This procedure helped the researcher to identify articles which focused on issues related to the multi-dimensional approach to performance measurement in developing countries. The keywords used in the search included 'multi-dimensional performance measures (MPM)', MPM tools such as 'BSC or others', 'performance measurement' and 'developing countries'. This technique of searching the literature produced over 300 articles. Since the study's intent was to review the literature, the applicability of the articles was evaluated in terms of whether they addressed MPM and tools or techniques relevant to MPM in developing countries irrespective of the sector to which the organisations belonged. It is acknowledged that there are other terminologies such as hybrid performance measurement systems, which may overlap with the terminology MPM used in the current review.

As a consequence, 102 papers published between January 1987 and December 2012 were identified and finally selected in accordance with the above-mentioned scope of the study. The choice of the year 1987 was driven by the fact that 1987 marked the beginning of an increased interest in MPM and this theme of research (Johnson & Kaplan, 1987). The year 2012 was chosen because this was the latest year that could be addressed within the study. The review included articles on MPM in developing countries published both in the top-tier ranked journals and in journals which are considered to be peer reviewed (see Appendix 2.1 for a detailed list of the journal articles reviewed for this study). The published papers that the study reviewed were from both accounting and non-accounting journals. Appendix 2.1 provides a list of papers published in the focused area of this study in each journal listed. It also highlights the number of papers published in leading accounting-based journals and non-accounting journals.

In the current review, papers were classified according to their topics. The classifications of papers in accordance with topics appear in Table 2.1 (for information relating to the classifications of papers based on settings, the theories used and their research methods see Appendices 2.2, 2.3 and 2.4).

Table 2.1: Topics in reviewed papers

Topics	Frequency	Relevant studies
The use of MPM	**52**	Burgess et al. (2007); Wadongo et al. (2010); Anh et al. (2011); Scapens & Yan (1993); de Waal (2007); Al-Enizi et al. (2006); Waweru & Spraakman (2012); Juhmani (2007); Yongvanich & Guthrie (2009); Joshi (2001); Anand et al. (2005); Khan et al. (2011); Ismail (2007); Khan et al. (2010a); Khan et al. (2010b); Khan & Halabi (2009); Huang et al. (2007); Jusoh et al. (2008b); Ong et al. (2010); Waweru et al. (2005); Curado & Manica (2010); Sawalqa et al. (2011); Jasiukevicius & Christauskas (2011); Tsamenyi et al. (2010); Luther & Longden (2001); Sˇevic (2005); Bogicevic & Domanovic (2009); Kloviene & Gimzauskiene (2009); Srimai et al. (2011a); Al-Materneh (2011); Mohamed & Hussain (2005); Rabbani et al. (2011); Rabbani et al. (2007); Joseph (2008); Norhayati & Siti-Nabiha (2009); Lonial et al. (2008); Pienaar & Penzhorn (2000); Solano et al. (2003); Scavone (2006); Rabbani et al., 2010; Peters et al. (2007); Hansen et al. (2008); Edward et al. (2011); Rhodes et al. (2008); Chaklader & Roy (2010);Valmohammadi & Servati (2011); Umashanker & Dutta (2007); Bhagwat & Sharma (2007); Thakkar et al. (2009); Yu et al. (2009); Posayanant & Chareonngam (2010); Jardali et al. (2011)
Contextual factors, the use of MPM and organisational performance	**28**	Anderson & Lanen (1999); Hoque & Alam (2004); Kapugi & Smith (2007); Fleming et al. (2009); O'Connor et al. (2006); Tsamenyi et al. (2011); Tsang (2007); Jusoh et al. (2008a); Jusoh et al. (2006); Jusoh & Parnell (2008); Amir et al. (2010); Amir (2011); Smith et al. (2008); Ong & Teh (2008); Kattan et al. (2007); Mmieh et al. (2011); Waweru et al. (2004); Tayles et al. (2007); Eker & Pala (2008); Demirbag et al. (2006); Avci et al. (2011); Gimzauskiene & Kloviene (2011); Guerreiro et al. (2006); Kamhawi (2011); Tsamenyi et al. (2008); Lau & Sholihin (2005); Akbar et al. (2012); Kagaari (2011)
Comparative studies on MPM	**6**	Chen et al. (2006a); Jazayeri et al. (2011); Taylor et al. (2001); Julnes & Mixcóatl (2006); Sulaiman et al. (2004); Hoque (2001)
Others[7]	**16**	Duh et al. (2008); Mimba et al. (2007); Tillema et al. (2010); Hopper et al. (2009); Wickramasinghe et al. (2007); Othman et al. (2006); Bevanda et al. (2011); Sinković et al. (2011); Sharma & Lawrence (2005); Pusavat et al. (2009); Johnston & Pongatichat (2008); Li & Tang (2009); O'Donnell & Turner (2005); Satta (2006); Marwa & Zairi (2009); Siti Nabiha & Scapens (2005)
Total	**102**	

[7] This included the challenges of implementing and using MPM, MPM change and any literature review-based PM research in developing countries.

Within the reviewed papers, topics were classified into four categories (see Table 2.1), namely: (a) the use of MPM; (b) contextual factors and their role in MPM and organisational performance; (c) comparative studies on MPM; and (d) others (this category included the challenges of implementing and using MPM, MPM changes, any literature review-based MPM research in developing countries, and the development of their own MPM by firms in developing countries). Category (b) addressing 'contextual factors and their role with MPM and organisational performance' comprised those studies which have explicitly identified factors that drive firms in developing countries to use MPM. The grouping of category (c) was motivated by seeking to understand any MPM research attempted in developing countries beyond their own national boundaries. Similarly, comparative MPM studies between developing countries and developed countries (if any) were likely to provide clear pictures of why implementation and use of any MPM or MPM tools were being facilitated or hindered in any developing country's setting, but might have been successfully implemented in developed countries. Category (d) entailing 'others' included other studies of MPM that did not fall under the first three categories.

Consistent with Shields' (1997) approach, this review excluded book reviews, conference papers, working papers, unpublished theses, brief editorials and commentaries, and also has only considered papers published in English. Furthermore, given that the scope of the study was to review articles published on MPM in academic journals, articles published in professional journals, newspapers or books were also excluded. This approach is consistent with similar studies in the literature in addition to Shields (1997) (e.g., Hopper et al., 2009).

2.3 Review findings

This section outlines the main findings of the review. As shown in Table 2.1, the review found that the most commonly examined topic was the use of multi-dimensional performance measures (MPM), with a total of 52 papers; followed by contextual factors, their role in MPM and organisational performance (28); others (16); and comparative studies on MPM (6). MPM research in developing countries focused principally on the manufacturing sector (28); followed by the services sector (20); the public sector (19); and then multiple industries (16) (see Appendix 2.2). The greater focus of developing countries' studies on the manufacturing sector is similar to many reviews (e.g., Shields [1997)] in the USA and Chenhall and Smith [2011] in Australia). Having the majority of papers with an emphasis on the manufacturing

setting in developing countries was expected given that the performance measurement (PM) technique has historically been associated with the manufacturing setting (Shields, 1997). In terms of the theories used, as shown in Appendix 2.3, contingency theory has been the most-applied theory in MPM studies in developing countries (10 studies), followed by institutional theory (5), grounded theory (3), and stakeholders' framework (2). However, a large number of studies did not explicitly mention the theoretical perspective (71 studies). [8] In relation to the research method used in the papers analysed in this study, as shown in Appendix 2.4, quite a number of MPM research studies in developing countries have applied case studies using both interviews, and interview and document analysis (a total of 20 papers out of 102). It was also revealed that while the survey method seemed to be the most popular method for MPM studies in developing countries (45 papers), the mixed-methods approach also seemed to gain some popularity (14 papers).

The following subsections discuss multi-dimensional performance measures (MPM) research in developing countries classified under four categories based on the topic area covered in each study, namely: (a) the use of MPM; (b) contextual factors and their role in MPM and organisational performance; (c) comparative studies on MPM; and (d) others. The review, in particular, focused on the findings of the studies and, where relevant, on unexpected findings: in addition, topics that have not been sufficiently examined or not examined at all were also highlighted.

2.3.1 The use of MPM

As shown in Table 2.1, almost half of the papers reviewed for this study (i.e., 52 papers) were on the topic of the use of MPM. Of the 52 papers, seven papers explained the use of MPM in developing countries; 29 papers described the use of the BSC as a multi-dimensional performance measurement tool; and 16 papers examined the use of MPM tools for performance management and for alternative applications. These three sub-groups of papers are discussed in turn in the following subsections.

[8] As argued by Wacker (1998, p. 361), theory is essential for several reasons: firstly, it offers researchers an analytical framework; secondly, any academic area is developed through theory. In addition, it is relevant for understanding practical problems (Wacker, 1998).

(i) Use of MPM in developing countries

As mentioned earlier, of the 52 papers that fell into the category of 'The use of MPM', seven papers directly examined the use of MPM in a number of developing countries. For example, Burgess et al. (2007) reported that 81% of listed firms from manufacturing industries in Malaysia used MPM indicators (n=149). This rate was 51.6% (n=124) for hotel and tourism firms in Kenya (Wadongo et al., 2010). Comparing their findings in 2003 and 2009 regarding the use of MPM in multiple industries in Vietnam, Anh et al. (2011) reported that there has been an increase in the use of MPM from 65.2% to 71.8% (n=181). Anh et al. (2011) further reported that MPM use was lower in the public sector than in listed firms formed through joint ventures with significant foreign interests. Scapens and Yan (1993) also found that performance evaluation of responsibility centres in China is based on a mix of financial and non-financial indicators.

Only a few studies have examined the application of MPM in universities (e.g., de Waal, 2007) and in banks (e.g., Al-Enizi et al., 2006). While de Waal's (2007) study, using the single case of a tertiary college, investigated the usefulness of a new performance measurement (PM) tool for organisations in developing countries, Al-Enizi et al. (2006), in studying banks in Gulf Cooperation Council (GCC) countries, found that banks used non-financial performance measures due to the limitations of financial performance measures. Very recently, Waweru and Spraakman's (2012) study on micro-finance institutions (MFIs) found that the studied MFIs used both financial and non-financial performance measures.

(ii) Use of MPM tools – the balanced scorecard (BSC) and others

The review revealed that the use of the BSC as a performance measurement tool in developing countries is evidenced in many studies (29 papers). For example, the use rate of the BSC tool was 65% (n=83) for firms from multiple industries in Bahrain (Juhmani, 2007); around 40% (n=123) for firms from multiple industries in Thailand (Yongvanich & Guthrie, 2009); 10% (n=60) for firms from multiple industries in Bangladesh (Khan et al., 2011); 60.1% (n=33) for firms from multiple industries in Egypt (Ismail, 2007); 21.2% (n=52) in South African manufacturing and service sectors (Waweru et al., 2005); 38.1% (n=181) for multiple industries in Vietnam (Anh et al., 2011); and 10% (n=30) on the Madeira Islands for multiple industries (Curado & Manica, 2010). A number of studies also focused on the use of the BSC in the manufacturing sector. For example, this rate was reported at 40% (n=60) in Indian

manufacturing firms (Joshi, 2001). A later study by Anand et al. (2005) in the same context reported 45.28% (n=24) of firms were using the BSC although this study entails a smaller sample size than the former study (i.e., Joshi, 2001). Further studies have found that 35.1% (n=168) of manufacturing firms in Jordan (Sawalqa et al., 2011) and 50% (n=30) of manufacturing firms in Lithuania (Jasiukevicius & Christauskas, 2011) were using the BSC as an MPM tool.[9]

Despite the above-mentioned use of the BSC tool in various developing countries, some studies also reported limited use of the BSC. For example, Bogicevic and Domanovic (2009) reported that managers in Serbia rely mainly on financial measures and ratio analysis, and are not interested in using the BSC tool. Their findings were that Serbian managers thought that measuring enterprise performance using the BSC was nothing new, rather it was a game of rhetoric, and they were satisfied with using financial performance indicators only, which resulted in limited use of the BSC tool (Bogicevic & Domanovic, 2009; Sˇevic, 2005).

With regard to empirically testing the causal link of the BSC tool using data from developing countries, four recent studies have provided evidence. Specifically, Huang et al.'s (2007) study was considered the first to have contributed to the literature by testing the causality of BSC perspectives in the Chinese tourism industry, followed by Jusoh et al.'s (2008a) study of Malaysian manufacturing firms. Later, similar efforts were also found in two other studies, namely, by Khan et al. (2010b) in Bangladesh and by Ong et al. (2010) in Malaysia.

It is important to mention that all of the above-mentioned BSC-based studies involved the full adoption of all four perspectives of Kaplan and Norton's (1992) BSC model, with one exception (i.e., Tsamenyi et al., 2010). Using a modified version of the BSC model by adding the community perspective as a fifth perspective, Tsamenyi et al. (2010) analysed the performance of two large privatised companies in Ghana. Their study reported that subsequent to privatisation, the two case companies were able to improve their performance in all performance dimensions.

[9] The use of BSC in many developing countries is consistent with other studies in the literature. For example, the BSC use rate was 17.8% (n=200) in Canada (Gosselin, 2005); 31% (n=17) in Finland (Malmi, 2001); 32% (n=53) in Denmark (Nielsen & Sorensen, 2004); 26% (n=201) among firms in the three German-speaking countries, Germany, Austria and Switzerland (Speckbacher et al., 2003); 60% (n=1,000) in the USA (Silk, 1998); 40% (n=1,000) in the USA (Thompson & Mathys, 2008); and 88% (n=140) in Australia (Chenhall & Langfield-Smith, 1998a).

(iii) Use of MPM tool for performance management and for alternative applications

As mentioned earlier, the review found that a total of 16 papers have examined the MPM tool as a performance management tool and for alternative applications, (10 of these papers described the BSC model used as a performance management tool and 6 described alternative applications of the BSC tool). More than simply emphasising financial and non-financial measures, the BSC is intended to translate mission and strategy into tangible objects and a comprehensive set of performance measures (Kaplan & Norton, 1996, 2001). The review found that research on the BSC as a performance management tool initiative in developing countries also commenced a decade earlier (see Pienaar & Penzhorn [2000] in South Africa where it was used for an academic information service). Later, Sonalo et al. (2003) in Venezuela examined the use of BSC within a quality integration approach and provided evidence that by using the BSC model, the systemic quality integration approach can be developed to ensure organisational quality assurance.

Since then, the pace of this line of research has continued as more researchers have contributed to this area. For example, Scavone (2006) showed an environmental-BSC methodology for sustainability-related performance in Argentina. Other researchers have evidenced that the BSC as a performance management tool has been used in other developing countries such as Pakistan (Rabbani et al., 2010), in Afghanistan's health sector performance management (Peters et al., 2007; Hansen et al., 2008; Edward et al., 2011) and in the Indonesian central bank (Rhodes et al., 2008). In addition, Chaklader and Roy (2010) extended the conventional BSC model by adding social and environmental dimensions and applied this to an automobile company in India to assess performance of sustainable operations of the case company. Their study explained that the BSC model can also be used as a sustainability BSC (SBSC) model. Recently, Valmohammadi and Sarvati (2011) reported the use of the BSC for the preparation of a strategy map together with strategic performance indicators for a case company in Iran.

The review also found that the BSC model has been applied by research studies in developing countries in a number of alternative ways (six papers). These papers showed various applications of the BSC model: how the BSC model could be applied to higher education programs/institutions in India (Umashankar & Dutta, 2007); developing the BSC for supply chain management performance in the small and medium enterprises (SMEs) of India (Bhagwat & Sharma, 2007); developing the supply chain performance measurement

framework using the BSC and the supply chain operation reference (SCOR) model in the same sector of India (Thakkar et al., 2009); applying the e-BSC for higher education in Malaysia for measuring academic staff performance (Yu et al., 2009); developing key performance indicators (KPIs) in the Thai public sector using the BSC and value chain model (Posayanant & Chareonngam, 2010); and integration of the BSC indicators with the Delphi multi-criteria decision-making methodology for a national hospital service's performance measures in Lebanon (Jardali et al., 2011).

The studies reviewed in subsection 2.3.1(i) reveal that a number of firms in developing countries do in fact use MPM, but that understanding is limited to a few aspects. For example, the purposes of MPM use have not been addressed in reviewed studies (an exception is Waweru and Spraakman [2012]). The purpose could be evaluating employees or managerial performance, or using MPM information for either strategic or tactical decisions (Ittner et al., 2003).

The above discussion in subsection 2.3.1(ii) revealed that the BSC model is used by a number of firms in developing countries. There is also evidence that the BSC model is at times modified by firms in developing countries by adding new perspectives (e.g., Tsamenyi et al., 2010). However, these studies have provided limited information on some aspects. To illustrate, the BSC studies in developing countries have provided inadequate information on the generation[10] of the BSC model (an exception was Yongvanich and Guthrie's [2009] study in Thailand). As explained in the literature, the improvement of the BSC tool by its architects has been done over time (Kaplan et al., 2010; Kaplan & Norton, 2004). More studies on the BSC in developing countries will be necessary to understand whether (or not) firms in developing countries use an improved version of the BSC model and which generation of the BSC model is being used. Further, little is known about other MPM models used in developing countries. An exception was the study by Curado and Manica (2010) who reported that the Tableaux de Bord model was more popular than the BSC among the largest firms on the Madeira Islands. More studies on the BSC in developing countries would help to understand why BSC-based MPM techniques have gained acceptance.

[10] See Malmi (2001), Speckbacher et al. (2003) and Valmohammadi and Sarvati (2011) for useful discussion in this regard.

While the BSC has been effectively implemented in the public sector in developed countries (Smith & Kim, 2005; Dyball et al., 2011), the current review has revealed that the rate of its use in that sector is not yet known. This was despite the fact that more than 17% of the total reviewed papers were on the MPM theme in the public sector of developing countries (see Appendix 2.2 for details).

With regard to the use of MPM tools for performance management and for alternative applications, many broader aspects were covered (as discussed in subsection 2.3.1(iii)). Examples included the integration of the BSC with the Delphi multi-criteria decision-making methodology for measuring hospital performance (Jardali et al., 2011); the use of e-BSC for assessing academic staff performance in a higher education institution (Yu et al., 2009); and the combination of the BSC and value chain approaches in the public sector (Posayanant & Chareonngam, 2010).

However, these studies have also provided insufficient information in some respects. For example, it was not clear how these studies defined the MPM technique (specifically, the BSC model) when it was used as a performance management tool, and whether there was any operational definition of MPM as a management tool, although the PM literature did have clear directions on these points (Chenhall, 2005). The MPM technique can be considered as a performance management tool when it has the following attributes: it combines multiple performance indicators with leading and lagging indicators; indicators are derived from the firm's overall strategy; it links all business units' activities, and managerial staff and employees' performance to the achievement of the firm's goal and objectives; it is produced in a fully documented form; and organisational rewards are linked with performance (both financial and non-financial) (Chenhall, 2005). The lack of information in the reviewed studies in developing countries made it impossible to conclude whether firms in developing countries were abreast of all the criteria of the BSC when it was used as a performance management tool.

2.3.2 Contextual factors, their role in MPM and organisational performance

As shown in Table 2.1, 28 papers examined the influence of contextual factors on the use of MPM. Researchers in developing countries have shown increased interest in studying the role of contextual factors in the use of MPM, as has been widely suggested in the literature (e.g.,

Chenhall, 2005; Anderson & Lanen, 1999). For example, factors affecting the use of MPM or MPM tools have attracted attention with liberalising forces (deregulation), reform policies and privatisation found to be associated with the use of MPM (Waweru et al., 2004; Hoque & Alam, 2004; Anderson & Lanen, 1999; O'Connor et al., 2006). Other factors include market competition (Fleming et al., 2009; Khan et al., 2010a); the size of the firm (Khan et al., 2011; Burgess et al., 2007); structural change and uncertainty (Luther & Longden, 2001); the external environment (Gimzauskiene & Kloviene, 2011); environment uncertainty (Fleming et al., 2009); legislative requirements (Akbar et al., 2012); government influence (Norhayati & Siti-Nabiha, 2009); national culture (Tsang, 2007); social and cultural factors such as values, loyalty and obedience (Tsamenyi et al., 2008); and the type of ownership (Burgess et al., 2007).

Other studies have also identified many internal factors as being influential in the use of MPM in developing countries. These factors include business strategy (Tsamenyi et al., 2011; Jusoh et al., 2006, 2008b; Fleming et al., 2009; Jusoh & Parnell, 2008; Khan et al., 2010a; Amir et al., 2010; Avci et al., 2011); technological innovation (Smith et al., 2008; Ong & Teh, 2008); the role of information technology (IT) (Kamhawi, 2011); corporate culture (Hoque & Alam, 2004; Rabbani et al., 2011; Rabbani et al., 2007); technical knowledge and management commitment (Akbar et al., 2012); availability of necessary resources and human resources (Al-Materneh, 2011); and the implementation of total quality management (TQM).[11]

Moreover, one study (Guerreiro et al., 2006), has identified institutional forces that influenced the multi-dimensional approach to performance measurement. By way of illustration, under the old institutional economics (OIE) approach, Guerreiro et al. (2006) in their case study of a bank in Brazil indicated that three factors motivated the change of MA practices (including multi-dimensional performance indicators). These factors were competitive pressures, the decline in the rate of inflation in the economy and the case bank's substantial losses during past years (p. 217).

[11] Developing countries' research on the relationship between TQM and the use of an MPM tool (e.g., the BSC) was advanced by Demirbag et al. (2006) whose article was considered the first in the developing countries' PM literature to examine the linear link between TQM adoption and BSC use (see also Eker & Pala, 2008; Kapuge & Smith, 2007). The influence of TQM adoption on the use of MPM in developing countries is in line with the findings reported in developed countries (Vinuesa & Hoque, 2011).

In terms of investigating the MPM and organisational performance relationship through the mediating and moderating role of contingent variables, four studies have provided evidence. Specifically, a study by Amir (2011) reported that the use of MPM in Malaysia had a significant mediating role on the relationships between the differentiation strategies, environmental competitiveness and organisational performance for service firms. Two studies investigated the moderating role of contingent factors on PM practices. Specifically, Kagaari (2011) investigated the moderating effect of organisational culture on MPM practices which affected the achievement of non-financial performance (quality services, service delivery and cost reduction) in public universities in Uganda. (See also Tsamenyi et al.'s [2011] study in China which investigated the moderating role of business strategy in management control system and performance.)

The above-mentioned contextual factors-related MPM studies in developing countries have advanced the understanding of the many contextual factors that are likely to have an influence on the use of MPM. Among others, research by Anderson and Lanen (1999) in India enhanced the understanding that contextual factors, namely, economic reforms, international orientation of firms and organisational strategy, have tended to change MA practices including PM practices. Another key research study was conducted by Lau and Sholihin (2005) in Indonesia: this study is considered to be the first contribution in the literature to address the behavioural aspect of financial and non-financial performance evaluation on job satisfaction. Their study suggested that the intervening effects of two factors (i.e., the level of subordinates' trust in supervisors and fairness in the PM evaluation process) were influential in the relationship between performance measures and job satisfaction.

Within the above-mentioned contextual factors related to MPM studies in developing countries, some studies have revealed unexpected results (e.g., Fleming et al., 2009; Amir et al., 2010; Jusoh et al., 2008). Specifically, in their study on listed Chinese manufacturing firms (n=104), Fleming et al. (2009) reported a negative relationship between environmental uncertainty and the adoption of a growth strategy. Their study further confirmed that Chinese firms with a greater emphasis on a growth strategy tend to make greater use of MPM. In other words, Chinese firms place less emphasis on a growth strategy in the face of increased environmental uncertainty; however, they emphasise greater use of MPM use when adopting a growth strategy. Given that uncertainty in the environment makes it difficult for decision

makers to forecast the future, studies in MA literature have found a positive relationship between uncertainty and the firms' emphasis on a growth strategy (see Miller, 1988; Miller & Friesen, 1983) coupled with the adoption of a contemporary PMS. Such unexpected results in the context of developing countries suggest that it is necessary to explicitly consider the unique environmental characteristics of developing countries' cultural differences when investigating the theme of any MA practices including PM practices, an argument in line with Hopper et al. (2009).

Another unexpected result in the context of developing countries has been reported by Amir et al. (2010). Specifically, in their study of multiple professional and mass service firms in Malaysia, Amir et al. (2010) confirmed a positive relationship between a differentiation strategy and the practices of contemporary PMSs, but their study could not confirm a negative relationship between firms following a low-cost strategy and the practices of contemporary PMSs. The use of contemporary performance measures for firms following a low-cost strategy is not consistent with the MA literature (Langfield-Smith, 2007; Chenhall & Langfield-Smith, 1998b; Langfield-Smith, 1997) when following Porter's typology of competitive strategy (Porter, 1985). Also, this finding is not consistent with the findings from developing countries as found in the current review. Specifically, Tsamenyi et al. (2011) reported that Chinese firms pursuing a low-cost strategy tend to use more financial-based performance measures rather than using non-financial-based performance measures. Probably, contemporary PMSs are equally relevant for both professional and mass service firms operating in some developing countries irrespective of the types of strategy that they adopt. Nevertheless, the review results further emphasised the necessity of considering the unique institutional and environmental characteristics of each developing country when investigating PM practices.

Lastly, Jusoh et al.'s (2008) study (n=119) in the context of Malaysian manufacturing firms reported no evidence of a relationship between the practice of MPM (e.g., all perspectives of the BSC model) and firms following a defender strategy. Specifically, Jusoh et al. (2008) found no significant relationship between a defender strategy and the use of financial as well as internal business process measures. The assumption that firms following a defender strategy will have a lower-level use of non-financial measures (specifically, customer-related measures, and innovation and learning measures) has also not been confirmed in their study. Furthermore, their study could not confirm that firms following a prospector strategy have put greater

reliance on the use of multiple performance measures (both financial and non-financial measures). Such results are not only inconsistent with the empirical findings from other developing countries as evidenced in the current review (e.g., Khan et al., 2010a) but also are inconsistent with previous PM studies in the literature (see Hoque et al., 2001; Abernethy & Guthrie, 1994). In their study, Khan et al. (2010a) reported that manufacturing firms in Bangladesh following a prospector strategy have relied on more multiple performance measures to rate business performance than the firms following a defender strategy. Likewise, firms following a defender strategy rely more on financial-related measures than non-financial measures (customers, business process, learning and innovation-related). All these unexpected results suggest that there is room for further research in developing countries taking into account institutional, cultural and environmental characteristics in each developing country and how these institutional, cultural and environmental differences affect managers' implementation of business strategy and the use of contemporary control systems (e.g., MPM) to accommodate external environmental forces.

Notwithstanding the above progress, little is known about the relationship between other contextual factors such as change in investment in intangible assets, decentralisation and the use of MPM. The current review found that only one study has provided some insights on the role of investment in intangible assets on firms' MPM use despite the increasing importance of intangible assets and investment in intangible assets in developing countries (Indjikian & Siegl, 2005; Dutz et al., 2012). Specifically, Tayles et al. (2007) in their exploratory research in the context of large Malaysian companies revealed that the level of emphasis on investing in intangible assets is associated with firms' performance and with many MA practices including performance measurement. However, to date, there is little progress towards understanding the impact of change in investment in intangible assets on the use of MPM and organisational performance. An understanding of the practices of MPM with the changes of investment in intangible assets in developing countries is essential since recent decades have witnessed significant change in investment in many intangible assets in many developing countries such as India, China, Brazil and others (Indjikian & Siegl, 2005; Dahlman, 2007; Sasidharan, 2011; Dutz et al., 2012). More needs to be known about whether changes in investment in intangible assets have an influence on the use of MPM and whether MPM have an intervening effect on the relationship between changes in investment in intangible assets and organisational performance (see subsection 2.5.1 of the current chapter for further discussion).

There is also a scarcity of research in developing countries that has addressed organisational structures (centralisation versus decentralisation) and the MPM relationship. In the context of the developing countries' literature, Hoque and Alam (2004) in their field study on two privatised jute manufacturing companies in Bangladesh showed that the privatisation program resulted in a wide range of changes in the management control system in the two case companies in terms of participative management style, decentralised organisational structure and use of MPM. Note that their study did not explicitly evidence the relationship between organisational structure and MPM use. Rather, their study showed that the case firms' use of MPM increased after privatisation, accountability and decision-making authority had become more decentralised. There has been little progress, to date, in exploring the impact of organisational structure (decentralisation versus the centralised form of organisational structure) on MPM use: this is worthy of investigation in future research in the context of developing countries. This is because decision makers in developing countries are now concentrating on changing organisational structures, as a result of pressures from international aid agencies, in order to establish and ensure better accountability (Mimba et al., 2007).

2.3.3 Comparative studies on MPM

As shown in Table 2.1, six papers undertook comparative analysis of MPM (or MPM tools) between developing countries, or developing *versus* developed countries. For example, Chen et al.'s (2006a) study on the use of an MPM tool (such as the BSC framework) by a hospital authority both in Japan and China provided evidence that the use of the BSC not only stimulated the development of performance measures in hospitals but also helped them to compare and evaluate hospital performance between two countries. Sulaiman et al.'s (2004) literature review on four Asian countries suggested that there was a lack of use of contemporary MA tools such as the BSC model. Their research, however, explained that the importance of using non-financial indicators (e.g., customer satisfaction) was growing owing to increasing competition in the four countries. Hoque's (2001) study of five South Asian countries (i.e., Bangladesh, India, Nepal, Pakistan and Sri Lanka) showed that government agencies in these countries had widened the scope of performance measures by concentrating on many measures, for instance, growth, efficiency, value for money, competition and customer satisfaction (p. 1419).

Likewise, another comparative case study between manufacturing firms in Sri Lanka and the UK by Jazayeri et al. (2011) revealed that the implementation of the BSC model was unsuccessful in a Sri Lankan manufacturing firm as it was externally imposed (by the Chartered Institute of Management Accountants [CIMA] Sri Lanka) and resulted in internal disagreement. However, in a UK firm, the culture of an 'internal change program' within the firm led to the successful use of the BSC model. The comparative study by Taylor et al. (2001) between manufacturing firms in Australia and Mauritius revealed that significant differences existed between these countries in terms of the Chief Executive Officer (CEO)'s emphasis on financial *versus* non-financial measures (Australian CEOs rely frequently on financial measures but, in Mauritius, chief executives rely on non-financial measures) with production technology and information asymmetry having an impact on these differences. Lastly, the study by Julnes and Mixcóatl (2006) in Mexican and US public sector MPM tool implementation revealed that a US state government organisation in Utah and a Mexican state government organisation in Campeche noticeably followed two separate routes to the application of the MPM technique. In Utah, where the attempts at MPM tool adoption (i.e., the BSC) were initiated by legislators together with the governor taking a key leadership role, after consultation with government agencies, the BSC was implemented in a participative manner. However, in Campeche, attempts at BSC implementation emanated primarily from external necessities, followed by encouragement from the governor; the project was implemented in a top-down manner (i.e., active support and involvement by top-level management).

Although the above-mentioned comparative studies have delineated a picture of MPM practices beyond the national borders of developing countries, more comparative studies could enrich the existing MPM literature on developing countries. Additional comparative research on the use of the MPM tool (e.g., the BSC or others) in different developing countries may not only provide necessary inputs for the development of relevant national policies in the public sector but also enable academics to gain a better understanding of how the fragmented institutional environment across developing countries has resulted in disparity in MPM practices. Given that firms in developing countries operate under different organisational, cultural and institutional environments (Chen et al., 2006a; Jazayeri et al., 2011; Julnes & Mixcóatl, 2006; Hoque, 2001), sufficient care should however be taken in considering the specific cultural and institutional settings that prevail within developing countries.

2.3.4 Others

A total of 16 papers were categorised in the 'others' category. These included literature reviews/general reviews (four papers); the challenges/roadblocks of implementing and using MPM in developing countries (10 papers); and the development of their own MPM by firms in developing countries (two papers). There were also studies that identified problems associated with implementing a Western-based MPM tool (the BSC model) in developing countries (Wickramasinghe et al., 2007; Othman et al., 2006; Bevanda et al., 2011; Pusavat et al., 2009; Sharma & Lawrence, 2005; O'Donnell & Turner, 2005). Specifically, Wickramasinghe et al. (2007) claimed that in Sri Lanka the diffusion of the MPM tool (e.g., a BSC project) by the country's Chartered Institute of Management Accountants (CIMA) in order to globalise Western management accounting systems was initially accepted within the case firm, but afterwards failed to be used continuously within the firm for a few reasons. These included professional rivalries which resulted in internal controversies, and the owners' preference for focusing only on the financial perspective rather than the entire BSC model (p. 237).

Similarly, Othman et al. (2006) reported that a BSC project was resisted in a Malaysian telecommunication company owing to a corporate culture and leadership style that conflicted with the human relations norms essential for successful implementation of the BSC (see also Bevanda et al. [2011] and Sinković et al.'s [2011] study in Croatia). Sharma and Lawrence's (2005) study revealed that a public entity, when responding to the demands of donor agencies such as the World Bank with its promise of lending money, implemented the BSC model in Fiji. However, the imposed restructuring of the public sector which was essentially motivated by donors failed to meet local needs. (See also Li and Tang's [2009] study in China for a similar observation.) Phusavat et al.'s (2009) study in Thailand described four key roadblocks to implementing performance measurement in organisations, namely, empowerment of staff, budgeting, external knowledge and linkage with software usage (p. 646).

Li and Tang's (2009) study in China identified that political restrictions and the absence of key databases are key impediments to change from the traditional technique of performance measurement. O'Donnell and Turner's (2005) study on Vanuatu's public sector reported that the implementation of a new public management model (i.e., a performance agreement system in which all public officials would be evaluated on the achievement of pre-defined goals and targets) had not received much acceptance owing to distrust, absence of incentives and an

employee perception that it was externally imposed by donor agencies. Mimba et al.'s (2007) study on the public sectors in several developing countries identified that a higher level of corruption, low institutional capacity, weak control system and a higher level of informality acted as barriers to supplying PM information within those sectors.

The current review has revealed that some developing countries have developed their own performance indicators. For example, Satta's (2006) study showed that the Tanzanian small firm financing scheme had developed comprehensive performance assessment criteria under various categories such as portfolio quality, financial structure, profitability, efficiency and productivity, each of which had its own performance indicators. Informed by a literature review study, Marwa and Zairi (2009) developed a diverse performance-oriented measurement model for a firm in Kenya emphasising many issues such as stakeholders' requirements, governance, leadership, and learning and innovation (p. 37).

The above-mentioned studies under the 'others' category have portrayed many issues such as the demand for implementing MPM tools, the challenges of implementing MPM and the development of firms' own MPM techniques in developing countries. Lessons learnt from these studies include the implementation of a target-oriented performance evaluation agreement with a commitment to performance improvement (O'Donnell & Turner, 2005) and developing a stakeholder analytical framework in the design and use of a performance measurement system (Li & Tang, 2009). But firms using a Western MPM model (e.g., the BSC) can experience difficulties if the local, cultural and social setting in which organisations operate is ignored (Wickramasinghe et al., 2007; Sharma & Lawrence, 2005; O'Donnell & Turner, 2005). Indeed, calls have been made to adjust the BSC model (together with an adjustment of the strategy map) to the specific culture of developing countries owing to the influence of the national and organisational culture (Bevanda et al., 2011; Sinković et al., 2011).

Having an understanding of the cultural and social setting in order to investigate MPM practices in developing countries is essential since some studies have provided insights that certain factors are not relevant in particular developing countries owing to cultural and environmental differences. For example, Sinković et al.'s (2011) case study of a public utility firm in Croatia indicated that issues such as delegation of authority, and employees'

empowerment and responsibility which have long been considered as pre-requisites for implementing and practising the BSC model (Kaplan, 2000; Niven, 2008) did not play any role in BSC adoption as these directly oppose the organisational and national culture of Croatia (see also Bevanda et al., 2011). In another case study in Croatia, Bevanda et al. (2011) in the same setting reported that adjustment of the BSC model (e.g., IT-related measurement perspectives with the BSC model) in developing countries is important to fit the specific organisational requirements and working environment in, for example, the Croatian public sector.

Nevertheless, there has been little advance towards gaining an understanding of whether change in the traditional PMS (and the use of MPM) in firms in developing countries impacts on organisational performance. Given that this understanding is limited in the context of developing countries, the question is whether firms in developing countries benefit from using MPM that meet local needs as well as accommodating country-specific institutional and legislative requirements. Such an effort has the potential to enhance the understanding of outcomes (if any) that decision makers can expect as a result of MPM use in firms of developing countries. The importance of understanding the impact of MPM use on organisational performance/organisational effectiveness has also been advocated in a recent study in the context of developing countries (e.g., see Munir et al., 2013).

2.4 Factors influencing MPM use in developing countries

This section addresses the second aim of the study, that is, to recognise the factors that influence the use of MPM. To achieve this, relevant factors were outlined that are likely to influence the use of MPM in developing countries. Understanding the factors that influence MPM use is important for a number of reasons. Firstly, identifying these factors would also assist managers in developing countries to have a clear picture of what contingencies they might face in using MPM in their local settings. This might help them to understand more fully the factors that are at work, that is, in the situation to which MPM might be applied before MPM can be successfully used. Secondly, recognising these factors would assist academics to become familiar with the forces that could stimulate firms in developing countries to change from a conventional PMS. Thirdly, given that the factors identified in the current study that influence MPM use in developing countries have been derived from many sectors, academics may also be motivated to adjust the list of factors so it can be used in specific sectors (e.g., banks, hospitals or the manufacturing industry) in developing countries.

In the literature, a number of studies have identified the forces that led to a change from the traditional approach to performance measurement to the MPM approach. For example, Waggoner et al. (1999) summarised the many forces that drive the demand for performance measurement change as being customers, information technology (IT), the marketplace, legislation (public policy), new industries, the nature of the work (e.g., outsourcing) and future uncertainty (cited in Kennerly & Neely, 2002, p. 1226). The research by Kennerly and Neely (2002, p. 1227) offered a framework that suggested the drivers of, and barriers to, performance measurement system change.

However, factors considered in these frameworks could have little relevance for firms in developing countries given the differences in the cultural, historical, political and economic systems of developing countries that need to be taken into account. Similarly, earlier studies did not explicitly identify the list of influential factors for the use of MPM in the context of developing countries. This current study's review of the MPM literature in developing countries has suggested that the factors which affect the use of MPM are numerous. Based on the review of MPM studies in the specific context of developing countries (highlighted in previous subsections 2.3.2 to 2.3.4), the current study thus outlines the list of factors that are perceived to influence the use of MPM in the specific context of developing countries. The influential factors for MPM use have been categorised into two categories, namely: (a) *internal factors* and (b) *external factors*.

Internal factors are the factors/drivers that arise within organisations which are essentially under the control of the organisation (Haldma & Laats, 2002). *External factors* are drivers external to organisations which are not within the control of the organisation's decision makers although they affect the implementation and use of any management control system such as the use of MPM (Waweru & Uliana, 2008; Pedersen & Sudzina, 2012). Both internal factors and external factors could be further classified into two categories, namely: '*causes*' and '*enablers*'. *Causes* are factors that cause firms in developing countries to adopt MPM. Certain internal factors (e.g., business strategy) and external factors (e.g., market competition) could cause firms to use MPM. *Enablers* are factors that enable, facilitate or help organisations in developing countries to use MPM. While the degree of decentralisation, investment in intangible assets and business strategy could cause firms to use MPM, support and involvement from top-level management, and adequacy of resources, database and IT infrastructure could facilitate and enable MPM use within firms in developing countries.

Consistent with findings by other researchers (e.g., Haldma & Laats, 2002; Assiri et al., 2006; Franco-Santos & Bourne, 2005), this study admits that the list of factors shown in Table 2.2 should not be considered as comprehensive, since it is unlikely that only one study will identify and include all the factors and their impact on MPM from all perspectives. The study shows that there have been several influential factors on MPM use in developing countries which are discussed in turn in the following subsections.

2.4.1 Internal factors: Causes

'Internal factors' that 'cause' firms in developing countries to adopt MPM include the degree of investment in intangible assets; the degree of decentralisation and of coalition between powerful constituents; the business strategy adopted; the size of the business; the presence of foreign ownership; and the presence of dominant family ownership.

As found in the current review (see subsection 2.3.2), in the literature on developing countries, research has shown that organisational structure, for instance, a decentralised organisational structure, plays a key role in the change of the management control system including the use of MPM (Hoque & Alam, 2004). Specifically, the use of MPM is driven by a decentralised organisational structure, as has been found in this review (e.g., Hoque & Alam, 2004). In the specific context of developing countries, a key factor in the provision of financial support by donor agencies is reform, decentralisation and delegation of responsibilities to the lower levels of management (Mimba et al., 2007). Similarly, reforms, size and expansion of the operations of firms in developing countries allow them to delegate operational decision making to middle and operational levels of management (Narayana, 2005). Consequently, the degree of decentralised organisational structure in developing countries is a key internal factor in the use of MPM by firms in these countries.

Similarly, as found in the current review, considering investment in intangible assets as an internal factor for the use of MPM is a recent trend in the context of developing countries (e.g., Tayles et al., 2007). Firms in developing countries invest in intangible assets on a larger scale as revealed in many studies (Dutz et al., 2012; Hulten & Hao, 2011; Raihan, 2007). For example, the key finding of a study by Dutz et al. (2012) in Brazil was that there was significant change in intangible asset investment in the Brazilian business sector (around 4% of gross domestic product [GDP] during the period from 2000 to 2008): this rate was not much

below that of other developed countries such as Italy and Spain (at around 5-6%). Hulten and Hao (2011) reported this rate to be about 8% of GDP in China. Raihan's (2007) study identified massive changes and improvements within the banking industry of Bangladesh in many areas including investing in projects to upgrade manual business processes into automated systems, massive investment for efficient manpower creation and investment for enhancing employee skills and competence. Given that investment in such assets is growing significantly within firms in developing countries (Dutz et al., 2012; Hulten & Hao, 2011; Raihan, 2007), as evidenced in the current review, investment in intangible assets is an influential factor in the use of MPM for firms in developing countries (see Tayles et al., 2007). Investment in intangible assets therefore is a key internal factor in the use of MPM in developing countries.

Furthermore, as found in the current review, bargaining between agents through the use of power within firms in developing countries determines what performance indicators can be used (Jazayeri et al., 2011; Wickramsinghe et al., 2007). Specifically, the use of MPM techniques in an organisation can be subject to the interests of those who are the dominant party within the organisation. The current review (see subsection 2.3.4) found that the bargaining power among internal and external constituents in developing countries could lead to the unsuccessful use of MPM tools owing to professional rivalry between, for example, engineering managers and accounting personnel, or loss of interest by an owner-manager (e.g., Wickramsinghe et al., 2007). Jazayeri et al. (2011) argued that the success or failure of any MPM implementation initiative and the use of MPM tools (e.g., the BSC) depends on an understanding of political power, of negotiating with and managing powerful constituents, the ability to collaborate with others rather than using enforcement and, above all, establishing a democratic culture in organisational contexts. Arguably, the degree of coalition among powerful constituents is an important internal factor for MPM use in the context of developing countries.

In line with contingency theory's proposition that the size of firms may affect the way in which they implement and use MPM (Verbeeten & Boons, 2009), the current review evidenced the influence of the size of firms in the use of MPM in the context of developing countries (Chen et al., 2006b; Burgess et al., 2007; Khan et al., 2011). Specifically, Burgess et al. (2007) in Malaysia and Khan et al. (2011) in Bangladesh have evidenced a significant relationship

between firms' size and MPM. In the context of developing countries, Chen et al. (2006b) expressed the view that the use of MPM (or MPM tools) is more appropriate for larger companies essentially because larger firms possess more resources, knowledge and expertise to implement sophisticated management tools such as the BSC. Firm size thus is an important internal factor that causes firms in developing countries to use MPM.

Family ownership is more common in developing countries (Hopper et al., 2009). Many researchers have suggested that this induces informal and arbitrary management controls, restricts information to family members and has management working for the best interests of a few family owners with rules and regulations often dictated by family or friendship links disregarding the rights of minority shareholders (Hopper et al., 2009; Black et al., 2000; Uddin, 2009; Dyball & Valcarcel, 1999). As found in the current review, the role of 'family' in management control and, specifically, in the adoption of MPM was also found in some studies in developing country settings such as in Indonesia (Efferin & Hopper, 2007) and in Sri Lanka (Jazayeri et al., 2011). Family ownership thus is an influential internal factor for the use of MPM in developing countries.

Likewise, previous research in developing countries has reported that MA practices in developing countries have changed significantly as a result of foreign operations either by way of joint venture agreements or foreign ownership (e.g., Firth, 1996). Although this line of research is limited in respect to MPM use in developing countries as found in the current review (e.g., Burgess et al. [2007] in Malaysia), it is likely that MPM (or the BSC model) could be diffused and used in developing countries as a result of foreign ownership by means of joint ventures or through foreign directors. Burgess et al. (2007) showed that Malaysian companies which formed joint venture partnerships with foreign firms implemented more contemporary PM practices compared to similar Malaysian companies which had no joint venture agreement with foreign firms. The presence of foreign ownership thus has an influential role in causing firms in developing countries to use MPM.[12]

[12] Many researchers (e.g., O'Neill et al., 2005) have mentioned that developing countries in the 21st century have the high potential to become leading economies in the world as a result of many factors, one of which is foreign ownership through foreign direct investment (FDI) in these countries.

As found in the current review, the use of MPM in the context of developing countries is also stimulated as a result of technological innovation and the use of IT (Bevanda et al., 2011; Smith et al., 2008). These studies have shown that the use of technological innovation such as computer-aided manufacturing, computer-aided design, and computer-aided inspection and testing influences the use of contemporary MA techniques including MPM tools such as the BSC. Other studies in developing countries have evidenced that the use of IT plays an influential role in MPM use (Kamhawi, 2011; Ong & Teh, 2008). Technological innovation and the use of IT thus are key internal factors for the use of MPM in developing countries.

2.4.2 Internal factors: Enablers

This study has recognised 'internal factors' that enable the use of MPM in the context of developing countries. These factors include the degree of simplicity of the performance indicators used; net benefits from MPM use; and sufficient resources, training, adequate database, IT infrastructure and technical knowledge.

As has been argued in the reviewed studies, multi-dimensional performance measures used in the process of performance evaluation in the context of developing countries should be simple, understandable and easy to communicate (Mimba et al., 2007; Chen et al., 2006a). It is essential that the nature of the performance indicators used in firms in developing countries generates high quality performance information in order to intensify the communication between many parties such as employees, managers, supervisors and other stakeholders (Hoque, 2001). Communicating performance indicators in developing countries by way of either simple ratios or proportions enables users to better understand and compare information on performance indicators (Chen et al., 2006a). Multi-dimensional performance indicators need to be simple for firms in developing countries since these firms tend to have low institutional capacity (Mimba et al., 2007). As a result, the degree of simplicity is considered to be an influencing internal factor that enables firms in developing countries to use MPM. By 'simplicity', this study means that it is easy to understand MPM information, with no ambiguity in interpreting the results to the users.

Similarly, a lack of resources could be a key impediment to MPM use in developing countries. As found in the reviewed studies (see discussion section 2.3.4), many initiatives for the use of MPM tools in developing countries have been 'nipped in the bud' owing to resource

constraints: these constraints are not only in terms of funding but also in other areas such as the lack of adequate knowledge, technology, an adequate database, adequate training, etc. (for further detail, see Phusavat et al., 2009; Li & Tang, 2009; Khan et al., 2011; Akbar et al., 2012). As a result, sufficient resources and training, technical knowledge about contemporary MPM tools and having an adequate database are enabling factors for the use of MPM in developing countries.

As found in the current review, researchers have suggested that the use of MPM in developing countries is stimulated as a result of the inability of traditional PM techniques to provide sufficient information (Guerreiro et al. 2006; Al-Enizi et al., 2006). Nevertheless, the net benefits of using MPM must be tangible to decision makers in order for these measures to be continuously used. Studies in developing countries have highlighted that firms were adopting appropriate PM system such as MPM that offered them benefits in terms of having reliable and sufficient information relating to customers, products and processes for appropriate decision making. As such, decision makers of firms in developing countries have decided to allocate funds for implementing and using MPM (Li & Tang, 2009; Guerreiro et al., 2006; Al-Enizi et al., 2006).

The current study has also identified three additional enabling factors. These are: the level of top management support and involvement; presence of institutional entrepreneurs; and corporate culture. In the specific context of developing countries, there was little understanding in the literature that the level of top management support and involvement could be a powerful agent and contributing factor in the implementation and use of MPM as has been argued in recent new institutional sociology research (Akbar et al., 2012). Understanding the role of internal change agents in MPM use is essential since real transformation to change any organisational practices (e.g., use of MPM tools) is possible only when internal management actively takes part in the PM change process (Munir et al., 2013). As stated earlier (see subsection 2.3.4), reviewed studies in developing countries (e.g., Julnes & Mixcóatl, 2006) describe that without the support and backing of these change agents, no change is actually possible within organisations since these change agents oversee organisational resources and have the capacity to respond and behave strategically. As a result, the active roles of internal changes agents are influential enabling factors for the use of MPM in developing countries.

In the context of developing countries, as argued earlier, external parties often force firms to supply performance-related information (Tillema et al., 2010). These pressures could be exerted either directly by the regulator in a business environment or by international donor agencies. However, as suggested by Mimba et al. (2007), in the context of developing countries, there would be weak incentives for management to produce and supply information using an MPM technique unless demand for performance measures was supplemented by their own objectives. In this case, if internal management support remains minimal for producing performance information, then information produced on a PM system would either be decoupled or loosely coupled; that is, it would be far from the firm's actual practice. As a result, as found in the current review, support and involvement from internal management (generally top-level management) are essential for the implementation and use of an MPM tool (Julnes & Mixcóatl, 2006; Norhayati & Siti-Nabiha, 2009). Support and involvement from top-level management and the role of the institutional entrepreneur (Julnes and Mixcóatl, 2006; Norhayati & Siti-Nabiha, 2009; Wanderley et al., 2012) are therefore influential enabling factors in the use of MPM in developing countries.

As found in the current review, corporate culture is a significant challenge when practising MPM techniques within firms in developing countries (Sinković et al., 2011; Hoque & Alam, 2004). The reviewed studies on developing countries have suggested that corporate culture which motivates innovation, participation, flexibility and risk-taking activities is conducive for the use of MPM (Anderson & Lanen, 1999; Phusavat et al., 2009; Hoque and Alam, 2004). Otherwise, initiatives involving taking actions that are necessary for the change of the PMS within the organisation will be ineffective (Bevanda et al., 2011; Sinković et al., 2011). In the context of developing countries, Hoque and Alam (2004) in their case study on two jute mills in Bangladesh showed that the change in corporate culture in the corporation (i.e., greater managerial autonomy, ensuring cooperation and team orientation, removing labour-management conflicts through labour participation in management decisions and setting up a new incentive program based on religious values) tended to enable firms to change MA practices including the introduction of new performance measures (use of financial and non-financial performance measures) and incentive systems. Other studies in developing countries have shown that a participative corporate culture is conducive to the adoption of MPM techniques (Rabbani et al., 2011; Rabbani et al., 2007). Therefore, corporate culture is an influential enabling factor in the use of MPM in developing countries.

2.4.3 External factors: Causes

The causes under 'external factors' include factors such as environmental uncertainty, market competition, regulatory influence, influence from international funding agencies, deregulation and reforms, and peer pressures. Studies in developing countries have argued that environmental uncertainty is a key factor which affects the choice of performance measures in developing countries (Gimzauskiene & Kloviene, 2011; Kloviene & Gimzauskiene, 2009; Fleming et al., 2009). As found in the current review, researchers in developing countries have explained that changes in the external business environment of developing countries arise principally from environmental turbulence, political instability, changes in government regulations, market demand, legal reforms, market ambiguity, etc. This creates changes in the internal features of the organisations, for example, changes in MA practices and, specifically, the use of MPM (Fleming et al., 2009; Kattan et al., 2007).[13] The content and features of the performance measurement system (PMS) of firms in developing countries depend on uncertainty in the external environment and how firms in developing countries respond to this uncertainty (Gimzauskiene & Kloviene, 2011).

'Environmental uncertainty' (EU) is an important factor for modernising the management control system in developing countries because such conditions force firms in developing countries to scan the external environment that affects their strategic and tactical decisions (Kattan et al., 2007; Kloviene & Gimzauskiene, 2009; Fleming et al., 2009). However, as explained by some researchers (e.g., Kattan et al., 2007), there are some differences in the nature of environmental uncertainty between developed and developing countries. To illustrate, whereas environmental uncertainty in developed countries entails market-related uncertainty, uncertainty in developing countries arises as a result of political change, changes in the fundamental political arrangement in the country, political instability, strikes, etc. (Kattan et al., 2007).

Further to this argument, other researchers in developing countries have argued that the vagueness of labour law and insufficient national laws in some developing countries such as

[13] It has also been argued in the performance measurement literature that the existing approach to the performance measurement of firms is of little use unless it accommodates itself to the firms' changing business environment, changing customer demands, uncertainty in the environment and stakeholder expectations (Gordon & Miller, 1976; Waggoner et al., 1999; Pedersen & Sudzina, 2012).

China have resulted in greater government intervention which increases the uncertainty for managers (Fleming et al., 2009). Studies in developing countries in this regard have provided evidence that firms use both financial and non-financial performance indicators when they feel that the volatility and uncertainty in the environment are intense (Fleming et al., 2009; Kattan et al., 2007). Other studies have also evidenced that the use of MPM in developing countries is driven by uncertainty in the external environment (see Gimzauskiene & Kloviene, 2011; Kloviene & Gimzauskiene, 2009). Accordingly, 'environmental uncertainty' is considered as a key external factor that causes firms in developing countries to use MPM.

In the context of developing countries, researchers have explained that a liberalised economic system when combined with a privatisation program have resulted in a more competitive environment for firms (Anderson et al., 1999; Waweru et al., 2005; Khan et al., 2010a). At the same time, as a result of the deregulation policy adopted by governments in developing countries, local firms have experienced a competitive situation in retaining market share which has resulted in the necessity of using MPM (Fleming et al., 2009; Anderson et al., 1999; Waweru et al., 2005). To survive in the intense competitive environment, firms in developing countries require accurate information on many dimensions such as customers, suppliers and products (Waweru et al., 2005). The current review (see subsection 2.3.2) found that firms in developing countries use MPM to accommodate this competitive environment (Eker & Pala, 2008; Fleming et al., 2009; Khan et al., 2010a). Therefore, the use of MPM in developing countries is influenced by external factors such as market competition.

The current review (see subsections 2.3.2 and 2.3.4) found that research studies in developing countries have emphasised the need to investigate MA practice by considering external factors such as regulatory influence and social pressures because organisational beliefs, norms and internal practices (e.g., the use of MPM) are largely driven by such external factors (Akber et al., 2012; Guerreiro et al., 2006; Norhayati & Siti-Nabiha, 2009; Tillema et al., 2010). Similarly, as found in the current review, the use of MPM in developing countries is driven by other external factors such as privatisation, deregulation and reforms, and the influence of international funding agencies (see also Hoque & Alam, 2004; Khan et al., 2010a; Tillema et al., 2010). As a result, these external factors influence the use of MPM in developing countries. From the above discussion, it is clear that there are many internal and external factors that impact on MPM use in firms in developing countries. These factors are depicted in Table 2.2.

Table 2.2: Factors influencing MPM use in developing countries

Internal factors		Relevant studies
Causes	Degree of decentralisation	Hoque & Alam (2004).
	Degree of investment in intangible assets	Tayles et al. (2007).
	Technological innovation and use of IT	Smith et al. (2008); Ong & Teh (2008); Kamhawi (2011).
	Degree of coalition between powerful constituents	Jazayeri et al. (2011); Wickramsinghe et al. (2007).
	Business strategy	Anderson et al. (1999); Fleming et al. (2009);
	Firm size	Burgess et al. (2007); Khan et al. (2011).
	Presence of foreign ownership	Burgess et al. (2007).
	Dominant family ownership	Efferin & Hopper (2007); Jazayeri et al. (2011).
Enablers	Degree of simplicity of indicators used	Mimba et al. (2007); Chen et al. (2006a).
	Sufficient resources, training, adequate database, IT infrastructure and technical knowledge	Phusavat et al. (2009); Li & Tang (2009); Khan et al. (2011); Akbar et al. (2012).
	Extent of support and involvement from top-level management and the presence of institutional entrepreneurs	Julnes & Mixcóatl (2006); Akbar et al. (2012).
	Corporate culture	Hoque & Alam (2004); Phusavat et al. (2009).
	Benefits from MPM use	Guerreiro et al. (2006); Al-Enizi et al. (2006).

MPM use in developing countries

External factors		Relevant studies
Causes	Market competition	Fleming et al. (2009); Khan et al. (2010a).
	Uncertainty in the environment	Fleming et al. (2009); Kattan et al. (2007); Gimzauskiene & Kloviene (2011); Kloviene & Gimzauskiene (2009).
	Regulatory influence	Tillema et al. (2010); Akbar et al. (2012).
	Influence from international funding agencies	Tillema et al. (2010); Mimba et al. (2007).
	Deregulation and reforms, privatisation	Anderson et al. (1999); Waweru et al. (2005); Hoque & Alam (2004); Tsamenyi et al. (2010).
	Peer pressures	Norhayati & Siti-Nabiha (2009).

2.5 Conclusions, future research directions and limitations

The aim of this study was twofold: a) to review the existing literature on multi-dimensional performance measurement in developing countries; and (b) to identify the factors that influence the use of multi-dimensional performance measures (MPM) and MPM tools such as the balanced scorecard (BSC) in developing countries. This study reviewed 102 research papers on MPM use in developing countries published from 1987 to 2012. The main findings of this review were as follows: (a) firms in developing countries use MPM, but the rate of MPM use differs between countries; (b) the balanced scorecard (BSC) is used as an MPM tool among firms in developing countries; (c) the use of MPM in developing countries is driven by many internal and external factors; (d) the main focus of MPM research in developing countries has been on the manufacturing sector; (e) the implementation and use of MPM (or MPM tools) require firms in developing countries to take into account the local cultural, institutional and operating environment; and (f) some developing countries have developed their own multi-dimensional performance indicators for measuring firm performance.

The current review has reported that external factors, namely, deregulation and reform initiatives, regulatory influence, uncertainty in the environment and a competitive environment, have influenced the use of MPM by firms in developing countries. The internal factors such as use of information technology (IT), corporate culture, involvement of top management and the adoption of quality control techniques such as total quality management (TQM) have also facilitated the use of MPM by firms in developing countries. Nevertheless, the findings of studies in developing countries should be interpreted with care as it has been found in the current review that there are some unexpected findings within this context (see subsection 2.3.2). This calls for consideration of each developing country's cultural and institutional environment before exploring an understanding of any MA practices, for example, the use of MPM.

In conclusion, in response to the call by Mimba et al. (2007) for performance measurement in developing countries, it can be said that performance measurement practices in developing countries have been changing (the MPM system and the BSC are being used as found in this review) with many internal and external factors influencing the change process. However, much more needs to be known in the developing country context about the MPM approach as highlighted in the next subsection.

2.5.1 Future research directions

This subsection provides a number of future avenues for MPM research in the specific context of developing countries. These research avenues have been formulated based on the review findings discussed in earlier sections (from subsections 2.3.1 to 2.3.4) and the analysis of the review results.

Firstly, as found in the current review, in the specific context of the public sector in developing countries, the reviewed studies have progressed the understanding that external demand originates from multiple external stakeholders, which include the central government (Akbar, 2012) and international funding bodies (Tillema et al., 2010; Mimba et al., 2007). Tillema et al. (2010) reported that reforms in the public sector in developing countries are propelled through the prescriptions of funding agencies that have influenced the demand for performance measurement information.

Parallel to the influence of external stakeholders on the public sector, in the context of the banking sector in developing countries, demand for using MPM techniques could be driven as a result of the influence of external stakeholders such as the central bank or international funding agencies. As found in the current review, thus far, there has been little progress towards gaining an understanding of the role of institutional influence in the use of MPM in the specific context of banks in developing countries. Understanding the institutional influence of external stakeholders in the banking context is important since banks in developing countries operate in institutional environments that require them to conform to rules, regulations and guidelines executed by external stakeholders such as the central bank (Arnold, 2009). Similarly, banks in developing countries experienced substantial pressure from external stakeholders to improve their performance and to implement contemporary management control tools for various reasons, including: to strengthen their capital base; to decrease their non-performing loans; to implement risk-adjusted capital requirements (for commercial banks); and, above all, to foster banks' customer-retention efforts (Munir et al., 2013; Erturk & Solari, 2007; Arnold, 2009). Altogether, these phenomena necessitate the use of MPM for performance information in banks in developing countries.

On a related issue, given that the banking industry in developing countries experiences intense competition (Fakhri et al., 2009; Guerreiro et al., 2006), it is also interesting to know whether banks in developing countries experience both competitive influence and institutional influence

that stimulate them to change their control system (i.e., the use of MPM). Past studies have suggested that responding to both competitive and institutional influences is more applicable in industries such as banks and hospitals than in other fields, for instance, manufacturing firms, as the banking industry operates in environments that necessitate both economic efficiency and institutional legitimacy (Scott & Meyer, 1991; Scott, 2008). In a similar vein, as found in the current review, influence from external stakeholders alone did not lead to change in PM practices in developing countries: participation and involvement of top-level management was essential to adopt new PM practices (see studies by Norhayati & Siti-Nabiha, 2009; Julnes & Mixcóatl, 2006). As a result, internal factors such as participation and support from internal management are essential for adoption of the use of an MPM tool in banks in developing countries. An in-depth examination of the interplay between internal and external factors for the use of MPM in the banking industry would be a future path for researchers.

Secondly, as noted in the current review, only limited research has been undertaken to understand the impact of investment in intangible assets on the use of MPM in the context of developing countries. Specifically, in the context of developing countries, only one study (i.e., Tayles et al., 2007, in the Malaysian context) has revealed that the level of emphasis on investment in intangible assets is associated with MA practices including performance measurement and firms' performance. While initial insights from that research is useful to advance the understanding of the importance of intangible assets in organisational performance and MA practices, in the context of the current technology-driven, knowledge-focused business environment of developing countries, it is not sufficient: further research is needed. Future research is required to further explore the relationships between the use of management controls such as MPM, change in investment in intangible assets and firms' performance.

The importance of understanding the above-mentioned relationships in the context of developing countries can also be argued in the light of the growth in investment in intangible assets revealed in many studies. Specifically, studies in developing countries suggest a phenomenal growth in terms of investment in various intangible assets as a result of changes in the external environment. For example, Indjikian and Siegl (2005) reported that many firms in developing countries such as India, China, Egypt, Tunisia and Chile have made massive investment in IT in the last two decades through the establishment of effective telecommunication infrastructure, development of the software industry, e-governance and,

above all, building science parks (see also Udo & Edoho, 2000; Lal, 2002; Yao, 2003). A study by the Government of the Russian Federation (2011) reported that in Russia, between 2002 and 2010, investment in software and information and communications technology (ICT) services has changed from $345 million to $3.3 billion, of which significant amounts of spending were on engineering education for developing programmers, use of ICT services in government sectors and the establishment of a high technology park (see also Russoft Association [2011]; and Masten and Kandoole's [2000] research in the Malawi context). The research by Dutz et al. (2012) in Brazil evidenced that there has been a positive change in investment in intangible assets in the Brazilian business sector (around 4% of gross domestic product [GDP] during the period from 2000 to 2008). Other studies in developing countries have also provided evidence of the change in investment in other intangible assets. For example, the Indian economy has increased investment in R&D from an average of about 0.8% of GDP up to 2003; 1.1% of GDP in 2005; and over 1.5% in 2010 (World Bank, 2007; Sasidharan, 2011; also see Dahlman's [2007] study to review the change in investment in R&D in the context of China).

From the above-mentioned discussion, given that firms' investment in intangible assets has changed in developing countries, an emerging question is whether changes in investment in intangible assets lead firms in developing countries to change their management control system (e.g., the use of MPM). Changes in firms' investment in diverse intangible assets (e.g., IT, R&D, human resource development, etc.) could improve organisational performance: however, it is necessary for firms to use multi-dimentional performance measurement tools to assess such improvement (Kaplan & Norton, 2004; Hendricks et al., 2012, 2004). Given that many firms in developing countries now use MPM (or an MPM tool such as the BSC), as found in the current review, it is interesting to explore whether firms in developing countries have adopted MPM as a result of changes in investment in intangible assets, and if there is any relationship between change in investment in intangible assets and organisational performance. Future research in developing countries is therefore encouraged to investigate the direct relationship between change in investment in intangible assets and MPM use, and to explore whether there is any intervening role of MPM for firms in developing countries with regard to the relationship between changes in investment in intangible assets and organisational performance.

Thirdly, as found in the current review, management control system (specifically, the multi-dimensional performance measurement techniques) could be customised for use in developing countries (e.g., Tsamenyi et al., 2010). It seems worthwhile to investigate whether MPM and/or multi-dimensional performance measurement tools (e.g., the BSC) have or have not been modified as a result of increasing sustainability awareness. This trend could be particularly feasible since there has been increased consensus among developing countries to measure not only firms' financial performance but also sustainability indicators, for example, indicators such as employees, customers, the community or the environment either as a result of international influences (Belal & Owen, 2007), or owing to pressure from international financial institutions such as the World Bank or from local regulators such as their country's central bank. Although recent knowledge in this line of research is consistent with the proposition that developing countries have modified or added new perspectives to the BSC framework (Tsamenyi et al., 2010), more needs to be known about why and how firms do this.

Moreover, the current review has shown that many developing countries' MPM initiatives were unsuccessful (e.g., Jazayeri et al., 2011; Othman et al., 2006; Phusavat et al., 2009). Although the current review has focused on MPM in developing countries at large, it is very likely that these countries are heterogeneous with respect to the extent of poverty, corporate culture, and their political and economic systems (Hopper et al., 2009; Tillema et al., 2010). These heterogeneous characteristics could either facilitate the use of MPM or act as barriers to using MPM at the country-specific level. As stated earlier, the rate of MPM use and/or of MPM techniques (e.g., the BSC) was not the same among different developing countries. It is likely that heterogeneous characteristics could have a major influence on the rate of MPM use in developing countries. Questions have thus emerged about whether and how firms in developing countries advanced or have been challenged with respect to the use of MPM taking into consideration of the social, political and historical differences. A large-scale cross-country research study using a quantitative approach is welcome to investigate these questions.

Furthermore, as found in the current review, the rate of BSC use in the public sector in developing countries is still unknown. The public sector of developing countries is therefore a candidate for future large-scale, survey-based research. Also, as found in the current review, very few studies have been conducted in the micro-credit organisations (an exception is Waweru and Spraakman [2012]) using the mixed-method approach. The benefits of using the

mixed-method approach is that it provides greater understanding of the themes under investigation as this approach provides rich sources of data (Modell, 2005). Understanding multi-dimentional performance measurement techniques for micro-credit firms is essential because recent years have witnessed a substantial drive to evaluate their performance by stakeholders seeking to understand their financial sustainability, community outreach and, above all, the impact of micro-credit initiatives in developing countries (Zeller et al., 2003; Kipesha, 2013).

2.5.2 Contributions and limitations

The current study contributes to PM literature with a specific reference to developing countries. To the best of the researcher's knowledge, the current study is the first to review MPM research in the specific context of firms in developing countries. Therefore, the current study has advanced the knowledge of the state of MPM use; the factors influencing MPM use; and any impediments to MPM use or the use of MPM tools such as the BSC and fills these knowledge gaps in the PM literature.

This review, however, was not free of limitations. It was based on a literature review that, despite being organised and rigorous, might have missed some relevant MPM work that: (a) has been published in areas other than accounting, operations and information systems; (b) has been published in a non-English language journals; or (c) was documented in book reviews, conference proceedings, working papers, works published in professional publications or unpublished theses. The scope of the current study was to review published papers in academic journals only. Notwithstanding the above limitations, overall, the literature review of the current study addresses many factors that influence the use of MPM, and the findings of this review will offer directional avenues for further academic research in the same developing countries' context. This review has suggested that much research still needs to be undertaken in the many untouched areas of academic research on the MPM theme in the specific context of developing countries.

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Appendix 2.1: Reviewed papers classified by journals

Journal titles	Frequency (f)
Accounting journals	
Accounting Organisations and Society (AOS)	2
Accounting Forum (AF)	1
Accounting, Auditing and Accountability Journal (AAAJ)	4
Management Accounting Research (MAR)	3
Journal of Management Accounting Research (JMAR)	1
Critical Perspectives on Accounting (CPA)	1
Research in Accounting in Emerging Economies (RAEE)	2
Journal of Accounting in Emerging Economies (JAEE)	1
Journal of Accounting and Organisational Change (JAOC)	7
Asia-Pacific Management Accounting Journal (APMAJ)	2
Asian Review of Accounting (ARA)	2
Managerial Auditing Journal (MAJ)	3
South African Journal of Accounting Research (SAJAR)	1
Qualitative Research in Accounting & Management (QRAM)	2
Pacific Accounting Review (PAR)	3
International Journal of Accounting (IJA)	1
British Accounting Review (BAR)	1
Advances in Accounting, incorporating Advances in International Accounting	1
Advanced in Public Interest Accounting	1
Journal of Accounting Auditing and Performance Evaluation (JAAP)	2
Journal of International Accounting, Auditing and Taxation (JIAAT)	1
Asian Journal of Business and Accounting (AJBA)	1
Total reviewed articles in accounting journals	**43**
Non-accounting journals	
Benchmarking: an International Journal (BIJ)	2
International Journal of Productivity and Performance Management (IJPPM)	7
Measuring Business Excellence (MBE)	4
Public Administration and Development (PAD)	1
International Journal of Operations & Production Management (IJOPM)	1
International Journal of Health Planning & Management (IJHPM)	2
Industrial Management and Data Systems(IMDS)	2
Indian Journal of Economics and Management (IJEM)	2
International Journal of Public Sector Management (IJPSM)	2
International Journal of Public Administration (IJPA)	1

Reviewed articles in other non-accounting journals[14]	35
b. Total reviewed articles in non-accounting journals	**59**
Total articles (a + b)	**102**

[14] *Public Performance & Management Review (PPMR); International Journal of Emerging Markets (IJEM); International Journal of Electronic Business Management (IJEBM); Journal of African Business (JAB); The Business Review (TBR); Vikalpa; Computers & Industrial Engineering (CIE); European Journal of Economics, Finance and Administrative Sciences (EJEFAS); Management Decision (MD); Economics & Management (EM); International Journal of Health Care Quality Assurance (IJHCQA);Tourism Management (TM); Journal of Manufacturing Technology Management (JMTM); Engineering Economics (EE); International Journal of Human Resource Management (IJHRM); International Journal of Business & Management (IJBM); Journal of Economic and Social Research* (IESR); *Journal of Asia Pacific Business (JAPB); Implementation Science (IS); Perspective of Innovations, Economic & Business(PIE&B) International Journal of Business Research (IJBR); Journal of Business Economics and Management (JBEM); Health Policy; International Journal of Management and Decision Making (IJMDM); Service Industries Journal (SIJ); Bulletin of the World Health Organization; PLOS Medicine; Information Systems Management (ISM); Journal of Cleaner Production (JCP); Libri; Journal for Healthcare Quality (JHQ); Higher Education (HE); International Journal of Educational Management (IJEM); and International Journal of Sustainable Strategic Management (IJSSM).*

Appendix 2.2: Settings used in reviewed papers

Settings	Frequency	Relevant studies
Manufacturing	**28**	Khan et al. (2010a); Khan & Halabi (2009a); Anderson & Lanen (1999); Joshi (2001); Bhagwat & Sharma (2007); Joseph (2008); Jazayeri et al. (2011); Kapugi & Smith (2007); Fleming et al. (2009); Burgess et al. (2007); Jusoh et al. (2008a); Jusoh et al. (2008b); Jusoh et al. (2006); Jusoh & Parnell (2008); Smith et al. (2008); Ong & Teh (2008); Sawalqa et al. (2011); Al-Materneh (2011); Valmohammadi & Servati (2011); Kattan et al. (2007); Eker & Pala (2008); Demirbag et al. (2006); Chaklader & Roy (2010); Hoque & Alam (2004); Thakker et al. (2009); Lau & Sholihin (2005); Taylor et al. (2001); Siti Nabiha & Scapens (2005)
Services	**20**	Chen et al. (2006a); Amir et al. (2010); Amir (2011); Othman et al. (2006); Rabbani et al. (2011); Rabbani et al. (2010); Jardali et al. (2011); Wadongo et al. (2010); Waweru et al. (2004); Avci et al. (2011); Jasiukevicius & Christauskas (2011); Mohamed & Hussain (2005); Wickramasinghe et al. (2007); Lonial et al. (2008); Tsang (2007); Huang et al. (2007); Peters et al. (2007); Hansen et al. (2008); Edward et al. (2011); Satta (2006)
Multiple industries	**16**	Khan et al. (2011); Khan et al. (2010b); Anand et al. (2005); Tsamenyi et al. (2011); Tayles et al. (2007); Ong et al. (2010); Anh et al. (2011); Yongvanich & Guthrie (2009); Pusavat et al. (2009); Juhmani (2007); Ismail (2007); Waweru et al. (2005); Luther & Longden (2001); Gimzauskiene & Kloviene (2011); Kloviene & Gimzauskiene (2009); Curado & Manica (2010)
No settings[15]	**9**	Duh et al. (2008); Rabbani et al. (2007); Kamhawi (2011); Hopper et al. (2009); Sulaiman et al. (2004); Scavone (2006); Solano et al. (2003); Bogicevic & Domanovic (2009); Scapens &Yan (1993)
Public sector	**19**	Li & Tang (2009); Tillema et al. (2010); Mimba et al. (2007); Srimai et al. (2011a); Johnston & Pongatichat (2008); O'Donnell & Turner (2005); Posayanant & Chareonngam (2010); Mmieh et al. (2011); Sinković et al. (2011); Bevanda et al. (2011); Julnes & Mixcóatl (2006); Sharma & Lawrence (2005); Norhayati & Siti-Nabiha (2009); O'Connor et al. (2006); Hoque (2001); Marwa & Zairi (2009); Sˇevic (2005); Tsamenyi et al. (2010); Akbar et al. (2012)
Universities/ colleges	**6**	Tsamenyi et al. (2008); de Waal (2007); Pienaar & Penzhorn (2000); Yu et al. (2009); Umashanker & Dutta (2007); Kagaari (2011)
Financial ins./Banks	**4**	Guerreiro et al. (2006); Al-Enizi et al. (2006); Rhodes et al. (2008); Waweru & Spraakman (2012)
Total	**102**	

[15] This included theoretical and conceptual papers, literature reviews and other analytical pieces where no setting could be identified.

Appendix 2.3: Theories used in reviewed papers

Name of theory	Frequency	Relevant studies
Contingency	**10**	Khan et al. (2011); Khan et al. (2010a); Anderson & Lanen (1999); Fleming et al. (2009); Tsamenyi et al. (2011); Ong & Teh (2008); Kattan et al. (2007); Waweru et al. (2004); Luther & Longden (2001); Avci et al. (2011)
Institutional (NIS/OIE)	**5**	Guerrerio et al. (2006); Tillema et al. (2010); Mimba et al. (2007); Norhayati & Siti-Nabiha (2009); Akbar et al. (2012)
Grounded theory	**3**	Tsamenyi et al. (2008); Wickramasinghe et al. (2007); Pusavat et al. (2009)
Stakeholders' model	**2**	Joseph (2008); Li & Tang (2009)
Contingency & complexity theory	**1**	Kloviene & Gimzauskiene (2009)
Institutional & technical rational theory	**1**	Sharma & Lawrence (2005)
Old institutional economics (OIE) & new institutional sociology	**1**	Siti Nabiha & Scapens (2005)
Goal setting theory	**1**	Lau & Sholihin (2005)
Neo-institutional & actor network theory	**1**	Jazayeri et al. (2011)
Cultural political economy framework	**1**	Hopper et al. (2009)
Contingency, agency	**1**	Taylor et al. (2001)
Multiple, more than two[16]	**1**	Gimzauskiene & Kloviene (2011)
No explicit theories	**71**	Khan et al. (2010b); Khan & Halabi (2009a); Anand et al. (2005); Joshi (2001); Bhagwat & Sharma (2007); Kapugi & Smith (2007); Jusoh et al. (2008b); Jusoh et al. (2006); Jusoh & Parnell (2008); Smith et al. (2008); Sawalqa et al. (2011); Al-Materneh (2011); Valmohammadi & Servati (2011); Eker & Pala (2008); Demirbag et al. (2006); Chaklader & Roy (2010); Thakker et al. (2009); Chen et al. (2006a); Amir et al. (2010); Amir (2011); Othman et al. (2006); Burgess et al. (2007); Rabbani et al. (2011); Rabbani et al. (2010); Jardali et al. (2011); Wadongo et al. (2010); Jasiukevicius & Christauskas (2011); Mohamed & Hussain (2005); Tsamenyi et al. (2010); Lonial et al. (2008); Tsang (2007); Huang et al. (2007); Peters et al. (2007); Hansen et al. (2008); Edward et al. (2011); Satta (2006); Al-Enizi et al. (2006); Rhodes et al.

[16] This included institutional theory, complexity theory and contingency theory.

		(2008); Srimai et al. (2011a); Johnston & Pongatichat (2008); O'Donnell & Turner (2005); Posayanant & Chareonngam (2010); Mmieh et al. (2011); Sinković et al. (2011); Bevanda et al. (2011); Julnes & Mixcóatl (2006); Hoque (2001); Marwa & Zairi (2009); Sˇevic (2005); Duh et al. (2008); Rabbani et al. (2007); Kamhawi (2011); Sulaiman et al. (2004); Scavone (2006); Solano et al. (2003); Bogicevic & Domanovic (2009); Curado & Manica (2010); de Waal (2007); Pienaar & Penzhorn (2000); Yu et al. (2009); Umashanker & Dutta (2007); Tayles et al. (2007); Ong et al. (2010); Anh et al. (2011); Yongvanich & Guthrie (2009); Juhmani (2007); Ismail (2007); Waweru et al. (2005); Scapens &Yan (1993); Waweru & Spraakman (2012); Kagaari (2011)
Others[17]	**3**	Jusoh et al. (2008a); O'Connor et al. (2006); Hoque & Alam (2004)
Total	**102**	

[17] This included the selection approach (n=1), and development of a theoretical model (n=2).

Appendix 2.4: Research methods used in reviewed papers

Research methods	Frequency	Relevant studies
Survey	**45**	Khan et al. (2010a); Khan et al. (2010b); Khan & Halabi (2009a); Khan et al. (2011); Fleming et al. (2009); Anand et al. (2005); Joshi (2001); Kapugi & Smith (2007); O'Connor et al. (2006); Tsamenyi et al. (2011); Jusoh et al. (2008a); Jusoh et al. (2008b); Jusoh et al. (2006); Jusoh & Parnell (2008); Amir et al. (2010); Smith et al. (2008); Burgess et al. (2007); Ong et al. (2010); Ong & Teh (2008); Yongvanich & Guthrie (2009); Srimai et al. (2011a); Sawalqa et al. (2011); Al-Materneh (2011); Juhmani (2007); Ismail (2007); Wadongo et al. (2010); Mmieh et al. (2011); Waweru et al. (2004); Waweru et al. (2005); Luther & Longden (2001); de Waal (2007); Satta (2006); Eker & Pala (2008); Demirbag et al. (2006); Avci et al. (2011); Lonial et al. (2008); Gimzauskiene & Kloviene (2011); Kloviene & Gimzauskiene (2009); Curado & Manica (2010); Huang et al. (2007); Solano et al. (2003); Yu et al. (2009); Taylor et al. (2001); Lau & Sholihin (2005); Akbar et al. (2012)
Interviews	**11**	Bhagwat & Sharma (2007); Joseph (2008); Pusavat et al. (2009); Sˇevic (2005); Jasiukevicius & Christauskas (2011); Bevanda et al. (2011); Mohamed & Hussain (2005); Johnston & Pongatichat (2008); Tsang (2007); Rhodes et al. (2008); Julnes & Mixcóatl (2006)
Interviews and document analysis	**9**	Jazayeri et al. (2011); Othman et al. (2006); Tsamenyi et al. (2008); Kattan et al. (2007); Sharma & Lawrence (2005); Wickramasinghe et al. (2007); Tsamenyi et al. (2010); Waweru & Spraakman (2012); Siti Nabiha & Scapens (2005)
Action research	**1**	Li & Tang (2009)
Archival /desk research/ conceptual papers/ literature review	**18**	Hopper et al. (2009); Tillema et al. (2010); Mimba et al. (2007); Chen et al. (2006a); Duh et al. (2008); Rabbani et al. (2007); Marwa & Zairi (2009); Bogicevic & Domanovic (2009); Sinković et al. (2011); Sulaiman et al. (2004); O'Donnell & Turner (2005); Pienaar & Penzhorn (2000); Umashanker & Dutta (2007); Chaklader & Roy (2010); Hoque (2001); Scavone (2006); Thakker et al. (2009); Scapens &Yan (1993)
Analytical: mathematical	**4**	Rabbani et al. (2010); Kamhawi (2011); Jardali et al. (2011); Al-Enizi et al. (2006)
Mixed methods[18]	**14**	Anderson & Lanen (1999); Amir (2011); Tayles et al. (2007); Rabbani et al. (2011); Anh et al. (2011); Posayanant & Chareonngam (2010); Valmohammadi & Servati (2011); Guerreiro et al. (2006); Peters et al. (2007); Hansen et al. (2008); Kagaari (2011); Edward et al. (2011); Norhayati & Siti-Nabiha (2009); Hoque & Alam (2004)
Total	**102**	

[18] This included interviews, document reviews and a questionnaire all in one study.

Chapter 3
Influences on the use of multi-dimensional performance measures in banks: an institutional perspective

Abstract: This study empirically examines the influences of competition, institutional factors and top management participation on the use of multi-dimensional performance measures (MPM) in banks. Additionally, interaction effects such as the mediating effect of top management participation in the relationship between the influence of the central bank and MPM are also tested. Furthermore, the moderating influence of market competition in the relationship between top management participation and MPM use has also been examined. Data were obtained from a survey of top-level management from the population of locally owned 34 commercial banks in Bangladesh and post-survey interviews of a smaller sample (n=14) of the survey respondents. The new institutional sociology perspective was primarily used to identify the influencing factors. The data were analysed using a partial least squares technique. The results indicate that competitive pressures, influence of the central bank and pressure from the success of peer banks are the factors that drive the use of MPM in commercial banks in Bangladesh. The results also suggest that top management participation is associated with the use of MPM. Nevertheless, there was no evidence to support a relationship between socio-political institutions, professional and trade associations, and the use of MPM. Additional analysis undertaken in this study evidenced the mediating effect of top management participation in understanding the relationship between central bank influence and the use of MPM. The study also found that top management participation in using more MPM is increased when competition is intense in the industry.

Keywords: Multi-dimensional performance measures, new institutional sociology, banks, Bangladesh.

3.1. Introduction

Understanding why firms use contemporary management practices (e.g., the use of multi-dimensional performance measures [MPM]) has received considerable attention in academic research (James, 2009; Ballou et al., 2003). Institutional theory-based research has argued that organisations seeking to achieve social legitimacy and enhance economic efficiency (Powell, 1991; Modell, 2002; D'Aunno et al., 2000) experience the influence of both institutional and competitive forces on their management practices. Specifically, the new institutional sociology (NIS) stream of research has suggested the significance and influence of economic, social and cultural environments on organisational practices such as performance measurement (PM) (e.g., Meyer & Rowan, 1977; Covaleski & Dirsmith, 1988; Scott, 2001, 2008). Scott and Meyer (1991) suggested that responding to these influences is more important in fields such as banks and hospitals, since they operate in environments that demand both economic efficiency and institutional legitimacy (see also Scott, 2008; Carruthers, 1995).

However, earlier MA studies on institutional and competitive influences have provided inconclusive findings. For example, studies by Hoque and Hopper (1997) and Hill (2000) reported that gaining legitimacy (due to institutional forces) contradicts achieving economic efficiency (due to competitive forces). There is other research which has provided evidence that both forces are essential for understanding MA change (Ma & Tayles, 2009; Hopper & Major, 2007; Tsamenyi et al., 2006). A possible explanation for such inconclusive findings could be the different contextual environments where the studies were conducted, indicating the need for further studies in this area. Within PM research, James (2009, p. 385) suggested that further research is necessary to understand the influence of external influences (such as competitive and institutional forces) on adopting contemporary PM practices so as to fill the theoretical gap in the institutional theory-based PM research.

The current study argues that organisations need to respond to external influences not only because they face institutional demands but also to be efficient when operating in a competitive environment. The use of MPM could serve both the economic rationalities (increasing efficiency in the competitive environment) and act as a legitimising technique. Nevertheless, this line of understanding is lacking in the context of banks in developing countries. The study is therefore motivated to understand the influences of competitive forces and institutional forces on the use of MPM in the specific context of banks in developing countries.

In addition to the influence of external forces, recent institutional research has also examined the role of internal actors (e.g., top management) underlining their active role in changing MA practices (Ma & Tayles, 2009; Sharma et al., 2010; Hyvonen et al., 2012). When internal actors are involved in and support change in management practices, change is likely to happen within organisations (Hyvönen et al., 2012). Studies have investigated the role of internal actors particularly when investigating the implementation of MA systems in organisations both in the context of developed countries (e.g., Ma & Tayles, 2009; Hyvönen et al., 2012) and developing countries (Julnes & Mixcóatl, 2006; Akber et al., 2012; Munir et al., 2013). However, these studies were mostly conducted in the non-banking sector. An exception is a very recent study by Munir et al. (2013) which evidenced the role of internal actors (managing directors and boards of directors) in changing the performance measurement system in a public bank in Pakistan. Investigation of the role of internal actors (top-level management participation and support) in the banking sector in another developing country's context would further enhance understanding of this factor's role in the use of MPM within that context.

Over recent decades, the banking industry worldwide has experienced significant pressures to modify and revise its structure, operations and management practices (Helliar et al., 2002; Lapavitsas & Santos, 2008). The recent global financial crisis has further reinforced the necessity to modify the management control and information systems of banks (Arnold, 2009) and has exerted increased pressure on banks to improve their performance (Munir et al., 2011; Wu, 2012). To assess the performance improvement of banks, the use of MPM is necessary as they help banks to deliver and track efficiency, customer service and quality (Wu, 2012; de Waal & Coevert, 2007; Chien-Ta & Dauw-Song, 2004).

Despite the evidence of such modifications in the banking industry, only a relatively limited number of studies (Hussain & Hoque, 2002; Hussain & Gunasekaran, 2002; Munir et al., 2011; Munir et al. 2013) have sought to understand the factors that influence changes of MA practices and, specifically, PM practices in banks. For example, case studies of banks in Japan, Finland and Sweden have revealed the effect of both institutional influences and organisational factors on the use of non-financial performance measures (e.g., Hussain & Hoque, 2002; Hussain & Gunasekaran, 2002). Munir et al.'s (2013) study on a case bank in Pakistan, which experienced major changes as a result of significant external pressures, examined the influence of various institutional factors on the change in its performance measurement system.

However, of the above-mentioned studies, Munir et al.'s (2013) study was the only one conducted in a developing country setting. Hence, the MPM literature related to the banking sector in developing countries appears to be relatively limited. Gooneratne and Hoque's (2013) literature review study on banks' management control systems also revealed that only a few studies (e.g., Guerreiro et al., 2006) had been conducted in the context of developing countries.

It has been suggested that further research needs to be conducted on management control systems in developing countries' banking sectors due to the heterogeneous cultural, social, political and institutional backgrounds of developing countries (Munir et al., 2013; Gooneratne & Hoque, 2013). Banks in developing countries commonly come under the influence of the government (in particular, state-owned commercial banks) and dominant family shareholders (in private sector banks) (Munir et al., 2013; Reaz & Arun, 2006). The question that emerges at this point is whether this difference in heterogeneous background has any impact on banks' control systems and, specifically, on the use of MPM. Further understanding of these issues and their effect on the use of MPM is therefore necessary.

In the specific context of the banking sector in Bangladesh, it has been found that the sector has experienced rapid changes over the last three decades as a result of continuous reforms and the licensing of new commercial banks which has resulted in an extremely competitive environment (Samad, 2008; Purohit & Mazumder 2006; Sufian & Habibullah, 2009). In recent past, the industry has also been subject to the influence of the central bank that has sought to improve performance and accountability, both in terms of financial performance, as well as community and environmental performance (Bangladesh Bank [BB], 2010a; Hossain, 2012). In addition, the industry has also undergone changes in terms of numerous corporate governance reforms: specifically, the roles of executive management and boards of directors of commercial banks have been redefined in recent years (Rahman, 2010). Purohit and Mazumder (2006) mentioned that, in the light of the changing banking environment of Bangladesh over recent decades, decision makers of banks in Bangladesh are required to adopt a contemporary PM approach for assessing banks' performance more accurately (see also Hossain, 2008). However, to date, this context has received limited attention in relation to seeking an understanding of contemporary PM practices (e.g., Morium, 2002; Purohit & Mazumder 2006; Khan et al., 2011a). Specifically, while the studies by Morium (2002), and Purohit and Mazumder (2006) explained the applicability and necessity of banks in Bangladesh using

contemporary PM practices (e.g., MPM tool such as the BSC), the study by Khan et al. (2011a) has also evidenced those commercial banks in Bangladesh that use MPM.

Nevertheless, the external factors (competitive and institutional) that could influence the use of MPM have not been examined empirically in banks in Bangladesh. This current study is therefore motivated to understand the influences of competitive and institutional factors on the use of MPM in the specific context of banks in developing countries. More specifically, the current study examines the influences of competition, different institutional factors and the active participation of internal actors on the use of MPM in banks. The study therefore addresses the following research question:

(RQ): Do the banks in Bangladesh use MPM because of competition and institutional factors?

Examining this research question in the context of the banking industry is important for the following reasons: firstly, the banking sector in general, works in a highly institutionalised environment (Ang & Cummings, 1997) that deals with contradictory views and requirements of different stakeholders (Yasin & Gomes, 2010; Seng, 2007). Secondly, banks in recent decades have played a significant role in many economies; thus, there is a need for their performance to be adequately evaluated (Zineldin & Bredenlow, 2001). According to Seal and Croft (1997, p. 60), the advent of a more competitive and unpredictable business environment has posed new challenges for banks' management control systems.

The banks in Bangladesh are a suitable setting for this study for a number of reasons. Firstly, Bangladesh's banking industry is experiencing growing competition from both local performers and international banks (Sufian & Habibullah, 2009). Secondly, institutional structures in Bangladesh have different features. For example, as the Bangladeshi stock market is not large in terms of external finance, corporate bodies typically depend on the banking industry for external finance (BB, 2009). As mentioned earlier, changes have occurred in the banking environment of Bangladesh owing to constant reforms and financial liberalisation, which have resulted in innovative banking products, processes and technology, and customer preferences. These might necessitate the redesign of control systems of banks and specifically of multi-dimensional performance measurement systems (Morium, 2002). Thirdly, despite growing academic interest in the use of PMSs in Bangladesh (Hossain, 2008), more research is

needed to identify and understand the factors that shape the use of MPM in the context of banks in Bangladesh.

The remainder of this paper has six sections. Section 3.2 sets out the theoretical framework and then describes the institutional environment of the commercial banks of Bangladesh. Section 3.3 presents a literature review and the development of research hypotheses. Section 3.4 outlines the research design. Section 3.5 presents the results and analysis. Section 3.6 provides a detailed discussion of the study's findings based on the results of hypotheses testing and interview data. Section 3.7 presents the conclusions and considers the study's implications and limitations.

3.2. Theoretical framework: the new institutional sociology (NIS) theory

This section highlights the theoretical perspective, specifically, the new institutional sociology (NIS) theory, that is used in this study for capturing factors influencing the use of MPM. According to NIS theory, external pressures tend to influence organisations to adopt common norms, routines and practices (DiMaggio & Powell, 1983, 1991; Powell, 1991). In organisations, these norms and practices are either circulated through formal standards and rules or are adopted from the social environment (Scott, 1987, 2001). Organisations tend to follow these rules and practices, since compliance with them brings many benefits for organisations; for example, this would confirm organisations' legitimacy as well as allow firms access to scarce resources (Scott, 1987, 2008). Increasingly, researchers in management accounting have relied on NIS to understand the implementation and use of MA practices (Tsamenyi et al., 2006; Modell, 2002; Coveleski et al., 1998). The NIS theory explains homogeneity in organisational forms and practices principally by way of isomorphic processes (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Tsamenyi et al., 2006; Granlund & Lukka, 1998). Whilst previous NIS studies discounted the influence of market forces (e.g., DiMaggio & Powell, 1983), later studies recognised the importance of market (competitive) forces in illustrating organisational practices (Powell, 1991; Greenwood & Hinings, 1996; Tsamenyi et al., 2006; Modell, 2002, 2001).

The NIS theory outlines two general types of isomorphism: competitive and institutional (DiMaggio & Powell, 1983; Greenwood & Hinings, 1996). The latter is further categorised into coercive, normative and mimetic isomorphism. Coercive isomorphism, which includes

pressures to conform to standards and regulations, is exerted by external sources, for example, regulators, the certification authority or powerful stakeholders (Powell, 1991; Tuttle & Dillard, 2007; Tsamenyi et al., 2006). Normative isomorphism, on the other hand, stems from participation by professional managers and their staff in professional networks and specialised training conducted by professional training organisations such as the Bankers' Institute, or the business school of a university (DiMaggio & Powell, 1983; Granlund & Lukka, 1998; Beckert, 2010; Mizruchi & Fein, 1999). Mimetic isomorphism takes place when organisations copy/imitate other leading organisations in the same industry as a standard response to uncertainty (DiMaggio & Powell, 1983; Granlund & Lukka, 1998; Tuttle & Dillard, 2007).

NIS theorists have argued that competitive forces and institutional forces are not essentially dichotomous; rather, both are able to exert pressures on firms (Powell, 1991; Tsamenyi et al., 2006; Hopper & Major, 2007). Institutional forces and competitive forces can move hand in hand and, in many cases, institutional forces have essentially emerged from competitive forces (Beckert, 2010; Tuttle & Dillard, 2007). According to Tuttle and Dillard (2007), when an industry has multiple players confronting open competition, the issues of economic efficiency (fitness) are given priority when evaluating organisational action. However, when that industry gradually becomes more stable and established, institutional (external) fitness connects to economic fitness as a reasonable criterion to evaluate organisational action. Indeed, on the one hand, organisations respond to institutional pressures by adopting certain MA practices such as MPM to confirm their external legitimacy: on the other hand, use of such techniques provides organisations with broader information thus assisting management in planning and decision making when faced with competition (James, 2009).

Recent research has also highlighted the role of internal actors in explaining organisational change or in implementing new MA practices (Munir et al., 2013; Akber et al., 2012; Sharma et al., 2010). Internal actors (e.g., top-level management) by dint of their power and resources, play a key role in implementing certain management practices (Hyvönen et al., 2012). Top-level management participation and support are vital since use of an innovative performance measurement system requires a considerable amount of change in firms' operations and structures and, above all, in engaging and motivating workforces (Akber et al., 2012). Management accounting practices are likely to be successfully used when internal agents such

as top-level management have keen commitment and support, involvement and participation (Ma & Tayles, 2009).

The implementation and use of innovative MA practices (e.g., the use of MPM in the current study) in developing countries suggest a link to the changes in their broader political, legal and economic systems (Akbar, 2010). An understanding of countries' historical and institutional systems is therefore imperative to understand the implementation and use of MA practices in developing countries (Akbar, 2010; Hopper et al., 2009). The following subsection thus describes the institutional environment of the banking industry in Bangladesh and its research on MPM.

3.2.1 The institutional environment of Bangladeshi commercial banks

Bangladesh is a developing economy located in South Asia. After its independence during 1971, all commercial banks (CBs) were nationalised and the newly independent government immediately made the Dhaka branch of the State Bank of Pakistan the central bank, renaming it the Bangladesh Bank (Choudhury & Raihan, 2000; BB, 1987). Over the years, Bangladesh has struggled due to a poorly performing banking sector resulting from many reasons such as public ownership, lack of competition, poor governance, non-recovery of loans and credits, and the absence of the central bank's independence and capacity (Choudhury & Raihan, 2000; Bahar, 2009). In the industry, until 1980, there had not been a competitive environment but the sector was revitalised by reforms in the following three decades including the denationalisation of banks and licensing of private commercial banks (PCBs) and foreign commercial banks (FCBs) (Samad, 2008). Prudential regulation subsequently strengthened the oversight capacity of the country's central bank in many areas. For example, now Bangladesh Bank has an on-site supervision office and evaluates commercial banks based on CAMEL[19] ratings (Choudhury & Raihan, 2000). Reforms also included greater participation by private commercial banks, the deregulation of interest rates and the improvement of rules and regulations, that is, the governance system for the banking industry (Bahar, 2009; International Monetary Fund [IMF], 2010).

[19] A composite rating of a Bangladeshi bank's capital (C), asset quality (A), management (M), earning capacity (E) and liquidity (L): commercial banks with CAMEL scores of '4' and '5' are defined as problem banks by Bangladesh Bank (Choudhury & Raihan, 2000).

With the assistance of the World Bank's financial institutions' development project, substantial progress was also made on strengthening the legal framework in the financial industry, and the industry moved to the adoption of international standards during the last two decades (Shah, 2009). The government then corporatised state-owned commercial banks (SCBs) (fully owned by the government) while keeping them under the regulatory purview of the Bangladesh Bank, with a view to eventual privatisation (Shah, 2009). In Bangladesh, as of December 2009, the banking sector comprised four state-owned commercial banks (SCBs), four state-owned specialised banks (SBs), 30 domestic private commercial banks (PCBs), nine foreign banks and 29 non-banking financial institutions. Within the sector, commercial banks dominate the financial system, accounting for the majority of the financial sector's assets (more than 95%) (BB, 2010a). All of the banks have adopted an international standards framework for assessing the capital adequacy of banks under Basel II Accords (BB, 2010c).

Reforms over the last few decades have also covered many other corporate governance issues. For example, the Bangladesh Bank has restricted the number of directors for commercial banks to 13 and imposed the restriction that board membership can be taken from one bank only (Ahmed, 2007). There cannot be more than one member of a family[20] serving as the director of a bank and directors must also now be appointed by the depositors to enhance and protect the rights of shareholders (Ahmed, 2007; Rahman, 2010). In addition, close (immediate) kin cannot be on the board of the same bank, and the responsibilities of the advisor and chief executives were explained through the *'Fit and Proper Test'* principles (Rahman, 2010).[21] The Bangladesh Bank has also revisited the guidelines on the duties and responsibilities of the directors of banks. These now include setting the strategy and work plan annually; setting policies relating to many internal issues such as lending and risk management, human resources management and development; and setting key performance indicators (KPIs) for evaluating the performance of the chief executive officer (CEO) and other key executives (BB, 2010a). The banking industry is therefore more regulated compared to other sectors in the economy (Mohiuddin, 2012) and enjoys a sounder financial base than a decade earlier (Khatun, 2012).

[20] 'Family' as per *Banking Company Act (1991)* includes spouse, parents, children, brothers and sisters of the concerned person and all other persons dependent on him/her (Reaz & Arun, 2006).

[21] This involves meeting many conditions before the appointment of a director of a private bank. The '*Fit and Proper Test*' is also applicable when directors are appointed by the depositors and when appointing the advisor of banks (BB, 2010b).

Many have argued that financial growth (e.g., higher expansion of credit, increased level of profitability and more financial inclusion) in the banking industry of Bangladesh was possible as a result of continuous reforms in the sector (Khatun, 2012). As a matter of fact, the industry was able to continue its improved performance during the last decade even when the global financial sector experienced financial turmoil, bankruptcy and a debt crisis. Greater competition also rapidly changed the quantity and quality of banking services (Ahmed, 2007). A growing commitment to technology-driven modern banking products and processes has been seen in the industry in recent years in response to fulfilling customers' demands (Riyadh et al., 2009; Shah, 2009). The Bangladesh Bank has played a key role in introducing sustainable banking practices in the industry (BB, 2010b). The Bangladesh Bank not only evaluates commercial banks' economic performance but also their social, environmental and customer performance (BB, 2010a, 2012). Currently, following the central bank's guidelines on social and environmental issues, the commercial banks tend to engage in social and environmental activities and include such activities in their management strategic plan and policies (BB, 2010a). This has resulted in increased information provided by commercial banks on their human capital/employees, and community and environmental-related issues (Khan & Khan, 2010; Hossain et al., 2012).

Nonetheless, there are still some challenges for the sector in general and for state-owned commercial banks in particular. High levels of non-performing loans (NPLs), low investor and customer confidence, and inexpert boards of directors have led to the poor performance of state-owned commercial banks (SCBs)[22] compared to private commercial banks (PCBs) (Jibon, 2012; Khatun, 2012). The country's central bank is often unable to exercise full 'regulatory power' on SCBs owing to government interference and possibly owing to the dual policies of government (Jibon, 2012; Siddiqui, 2012; Sayeed et al., 2012; Siddique et al., 2011). Specifically, at the end of 2009, the Government of Bangladesh (GOB) re-established the Bank and Financial Institutions Division under the Ministry of Finance (MOF) to regulate SCBs. Directly blessed by the ruling political parties, directors of SCBs are commonly appointed via

[22] Many have expressed the opinion that the poor performance of SCBs is an outcome of continuous government interference, weak internal control and risk management and, above all, weak governance on the part of the SCBs (Siddiqui, 2012; Jibon, 2012; Khatun, 2012).

political consideration rather than due to their professional and banking education, background and credentials (Jibon, 2012; Siddiqui, 2012; Khatun, 2012).

Given the cultural and socio-political setting of Bangladesh, the appointment of directors of SCBs by political blessing has traditionally been evidenced in SCBs. This practice has resulted in adverse impacts on SCBs' corporate governance, accountability and performance (Rahman, 2012); for example, the granting of loans and credit not by following the proper credit guidelines of the Bangladesh Bank, but with the endorsement of political bosses is often practised in SCBs (Khatun, 2012; Siddiqui, 2012). A significant amount of these loans subsequently becomes uncollectable (Khatun, 2012). Owing to the weak practices of corporate governance and poor accountability, many studies have reported that the performances of SCBs are below that of PCBs in many dimensions. Such dimensions include financial performance (Sayeed et al., 2012); social and environmental performance (BB, 2010a); non-performing loans (Ahmed & Yusuf, 2005); and customer satisfaction, service quality and customer retention (Siddique et al., 2011).

The above discussions suggest that the banking sector in Bangladesh has undergone reforms and faced a competitive environment together with government interference. Yet related research studies in Bangladesh have provided very limited information on factors influencing MPM use in banks (e.g., Morium, 2002; Farjana & Das, 2009; Khan et al., 2011a). The current study examines factors influencing MPM and fills this gap in the context of banks in Bangladesh.

3.3 Literature review and hypotheses development

Drawing upon the NIS theory, the current study has identified many factors, namely, market competition, institutional (coercive, normative and mimetic) and organisation-specific factors (termed as control factors) that are likely to impact on the use of MPM in banks. These factors are considered based on prior literature and, more specifically, on the management accounting (MA) literature, and (where available) in the context of banks. The following subsections formulate formal hypotheses and develop a theoretical model based on the hypothesised relationships.

3.3.1 The use of multi-dimensional performance measures (MPM)

The importance of using MPM is reflected by the sheer volume of research in the last two decades which has underlined MPM's critical role of having a strategic focus and being forward-looking, and its ability to measure performance taking into account all key dimensions of the value chain of a business (Horngren et al., 2009; Kaplan & Norton, 1996; Hoque et al., 2001; Hoque & James, 2000; O'Connor et al., 2004). Nevertheless, the extent of the use of MPM could be driven by many factors. As mentioned earlier, the current study considers the factors using the NIS lens. The next subsections describe the impact of these factors on the use of MPM.

3.3.2 Market competition and MPM use

Market competition prevails when firms (which offer similar products or services) in a particular industry attempt to outdo each other in many areas (Patiar & Mia, 2008). These areas include price, market share, sales revenue, new product or service development and distribution channels (Lee & Yang, 2011; Mia & Clarke, 1999). If competition in the industry is high, decision makers experience a challenge in accurately predicting the external market owing to lack of information (Patiar & Mia, 2008). This challenge requires them to rely on a multi-dimensional performance measurement system (Lee & Yang, 2011). Organisations experiencing intense competition need to fulfil the increased demands for quality and show efficiency in customer service to satisfy customers (Lee & Yang, 2011; Hossain, 2008). The use of MPM stimulates continuous improvement in customer satisfaction; flexibility; business process, product and service quality; and the productivity of employees (Lynch & Cross, 1991), as decision makers receive the necessary information on these issues from the information system to make tactical and strategic decisions in the face of intense competition (Hoque et al., 2001).

Likewise, MPM provide feedback to firms on various dimensions of performance such as process efficiency, response time, product and service quality, and product and service innovation, which, in turn, allow firms to deal with external competitive forces (Kaplan & Norton, 1996; Hoque et al., 2001). Access to this information in relation to such performance dimensions is necessitated in the event of fierce competition where firms need to retain existing customers by providing better products and services to achieve better market share than their competitors (Lee & Yang, 2011; Hoque et al., 2001; Anh et al., 2011). Hoque et al. (2001)

showed that there is a positive and significant relationship between the intensity of market competition and the use of MPM (see also Khan et al., 2010). A case study by James (2009) reported that the case firm implemented a multi-dimensional performance measurement technique, namely, the balanced scorecard (BSC) not only for institutional influences but also to advantageously place the firm in a fierce competitive environment.

In the context of the banking industry, the high level of competition has resulted in considerable profit uncertainty (Soin & Scheytt, 2008). Financial deregulation has opened up competitive pressure in the industry that has enabled many alternative opportunities for customers seeking to fulfil their financial services and/or borrowing needs (Munir et al., 2011). Nevertheless, from the banks' perspective, this has led to a decline in their market share (Gormley, 2007; Munir et al., 2011). As a result, banks have tended to not only broaden financial inclusion (i.e., banks aim to have more customers who are financially included in the banking service), but also to explore new customers and expand their banking operations (Gormley, 2007). Effective control of such activities requires a multi-dimensional approach to performance measurement. A multi-dimensional approach of performance measures could provide relevant information to decision makers enabling them to make informed decisions in this competitive environment (Lapavitsas & Santos, 2008; Geyfman, 2005). Indeed, this change phenomenon encourages banks to use innovative performance measurement techniques and multi-dimensional performance measures. The management of Libyan banks, for example, relied on customer information and other qualitative measures when faced with fierce competition (Fakhri et al., 2009). Hussain and Hoque (2002) reported that Japanese banks rely on using non-financial performance measures, as competition is intense in the industry (see also Hussain & Gunasekeran, 2002). Recently, Munir et al. (2013) reported that intense competitive pressures stimulated a case bank in Pakistan to change from its traditional technique of performance measurement to contemporary PM practices because the former was unable to provide information on diverse product lines that the bank had launched to compete externally.

In the specific context of the banks in Bangladesh, as noted earlier in subsection 3.2.1, commercial banks experience intense competitive pressures as a result of ongoing reforms, licensing of new private commercial banks, and deregulations of interest rates over the last three decades (Choudhury & Raihan, 2000; Baher, 2009). Studies have argued that competitive

pressures make banks in Bangladesh to introduce new banking products and services together with a greater focus on improving service quality, customer satisfaction and the customers–employees' relationship (Fatima & Razzaque, 2012; Fatima & Razzaque, 2013; Siddique et al., 2011). The commercial banks of Bangladesh are required to adopt appropriate PM techniques in the event of competitive pressures since traditional PM techniques are not able to provide information on many key areas such as service quality, customer satisfaction, customer retention and non-performing loans (Morium, 2002; Purohit & Mazumder, 2003; 2006). Purohit and Mazumder (2006) added that, in the competitive environment, banks in Bangladesh are required to rely on performance information in many areas such as ratios of non-performing loans, or time taken to cash a bank cheque, which is why the multi-dimensional approach of performance measurement is essential as it would assist decision makers of banks to make tactical and strategic decisions (see also Purohit & Mazumder, 2003).

Further to this argument, Morium (2002) suggested that, particularly in the event of competitive and volatile environments, measuring the performance of banks in Bangladesh using MPM is necessary due to the need for more accurate and relevant information to measure and monitor their performance. Based on the above discussion, it is therefore argued that banks in Bangladesh are likely to use MPM to improve their economic efficiency when facing extreme competition. This hypothesis is formally stated as:

H_1: *The higher the level of competition, the higher the level of use of MPM in banks in Bangladesh.*

3.3.3 Coercive influences

The central bank, socio-economic and political institutions, and MPM use

Institutional fields have powerful actors who impose structural forms or practices on other organisational units (DiMaggio & Powell, 1983; Scott, 2001). Coercive influence can be exercised both directly and indirectly by powerful external actors who make desired resources accessible to dependent firms subject to firms' compliance with prescribed standards, practices and social norms (Beckert, 2010). DiMaggio and Powell (1983) explained that if firms in an organisational field are dependent upon government agencies or regulators, and if firms have to interact with agencies, they tend to comply with agencies/regulators' rules and guidelines. Within the banking sector, the country's regulators (e.g., the central bank) represent these influences (Hussain & Hoque, 2002; Deephouse & Carter, 2005). Regulatory influence is

intensified in a highly regulated industry such as banking (Deephouse & Carter, 2005), and regulators' guidelines and instructions are followed by subordinate banks as regulators are able to control firms' activities in many ways. For example, regulators may not be inclined to give permission to open a new branch or may increase the statutory reserve requirement of subordinate banks if banks fail to comply with certain guidelines (Beckert, 2010; Deephouse & Carter, 2005).

Financial regulations and guidelines prescribed by the central bank also affect the production and use of both financial and non-financial information (Hussain & Hoque, 2002; Granlund & Lukka, 1998). The risk-adjusted performance measurement guidelines due to the implementation of the Basel II Accords are a significant reformulation of organisational structures, risk management strategies and accounting information requirements for decision makers (Munir et al., 2011). This regulation improves both the quality of reporting and to better depict the performance of banks across various financial and non-financial dimensions (Wignall & Atkinson, 2010). Moreover, banks need to disseminate non-financial information on the measures and steps that they have undertaken to mitigate the numerous risks in their operations (Munir et al., 2011).

In the specific context of the banks in Bangladesh, the Bangladesh Bank (BB) has prescribed the collection and reporting of information to evaluate how commercial banks in Bangladesh engage and perform with the community and in environmental activities, and how banks show their care towards employees and customers (Khan et al., 2011b; Hossain et al., 2012). Specifically, on top of providing financial performance information to Bangladesh Bank, the commercial banks of Bangladesh have also been required to provide performance information on the community, environment and customers within the format prescribed by Bangladesh Bank in every quarter since 2008 (BB, 2010a, 2010b, 2012). Such initiatives of the central bank are likely to influence commercial banks' control systems, specifically, the use of MPM. Furthermore, the adoption of the Basel II Accords has also necessitated broader risk appraisal and management techniques for commercial banks in Bangladesh that require updating of the traditional PM techniques and the use of MPM (Akhtaruzzaman, 2009). Arguably, decision makers of commercial banks in Bangladesh could use multi-dimensional performance measures when the central bank mandates regulations and reporting standards.

Earlier studies have suggested that socio-political institutions also represent external influences on the banking sector (Hussain & Hoque, 2002; Hussain & Gunasekaran, 2002; Munir et al., 2011). Hussain and Hoque (2002) mentioned that socio-political institutions such as the World Trade Organization (WTO) and regional blocs (e.g., the Association of South East Asian Nations [ASEAN]) put pressure on organisations to change their PM practices so that they are compatible with global practices. Other studies have argued that modern banks at times follow international regulations and prescriptions such as quality standards from the International Organization for Standardization (ISO) and environmental standards by the United Nations (UN) in order to conform to the prescriptions of such institutions (Holland et al., 1997; Hussain & Gunasekaran, 2002; Munir et al., 2011). Munir et al. (2011) suggested that the socio-political environments of banks have a propensity to exert influence on PM practices within banks since many transnational institutions such as the Bank for International Settlements, WTO and regional blocs encourage banks to adopt practices that are in line with global standards and practices.

In the context of Bangladesh, in recent years, the International Financial Corporation (IFC) has collaborated with the central bank of Bangladesh to increase investment in sustainable energy, lending and other projects (Khan et al., 2011b) which might require commercial banks to assess the environmental and social performance on top of the economic performance of these project loans. This could induce commercial banks to use both financial and non-financial performance indicators. Following this argument, the following hypotheses are proposed:

H_{2a}: *The higher the level of influence of the central bank, the higher the level of use of MPM in banks in Bangladesh.*

H_{2b}: *The higher the level of influence of socio-political institutions, the higher the level of use of MPM in banks in Bangladesh.*

3.3.4 Normative influences

Professional associations, training institutions and MPM use

Institutional theorists have argued that the normative influences of institutional practices are associated with socialisation procedures in professional training and networks (Beckert, 2010; DiMaggio & Powell 1983; Meyer & Rowan, 1977). These socialisation procedures have consequently resulted in routines and taken-for-granted practices in the organisational field (Tuttle & Dillard, 2007). Management accounting practices (e.g., the use of MPM) may spread

through active participation in a wide array of events (Granlund & Lukka, 1998; Hussain & Gunasekaran, 2002). Such events include conferences, workshops, educational programs, and professional training and management seminars organised by many institutions such as trade and professional institutions and local universities (DiMaggio & Powell, 1983; Granlund & Lukka, 1998). DiMaggio and Powell (1983) explained that professional norms and values, and formal education and training by universities and professional institutions are the key mechanism for imparting normative rules, and organisational and professional behaviour among managers and other employees. Rautiainen (2009) reported that the balanced scorecard (BSC) had been implemented and practised in Finnish municipalities where both professional training and municipal journals' publications had normative influence.

The influence of professional networks and professional institutions' training programs on the use of non-financial performance measures has also been illustrated in previous studies in the context of banks (Hussain & Gunasekaran, 2002; Hussain & Hoque, 2002; Munir et al., 2011). Specifically, Hussain and Gunasekaran (2002) reported that management involvement in professional training and education enhances the possibility of gaining updated knowledge on performance measurement systems. They added that since management comprises 'social beings', they are influenced by normative behaviour to implement non-financial performance measures. Munir et al. (2011) explained that training institutions of banking professionals could have an influence on the use of performance measurement systems in the banking industry.

In the context of banks in Bangladesh, the Bangladesh Institute of Bank Management (BIBM) and the Institute of Cost and Management Accountants of Bangladesh provide relevant training programs and workshops, and promote professional studies in banking and in cost and management accounting (Parry & Grooves, 1990). These training programs and professional studies could influence the use of multi-dimensional performance measurement techniques. From the above discussion, it is plausible that these professional institutions along with the higher education system could create normative influence in changing traditional performance measurement practices in commercial banks in Bangladesh and introducing the use of MPM. Hence, the study proposes the following hypothesis:

***H_3**: The higher the level of involvement by management in professional and trade associations, the higher the level of use of MPM in banks in Bangladesh.*

3.3.5 Mimetic influences

Success of key competitors and MPM use

Institutional theorists have stated that mimicry is an effective institutional norm in an uncertain environment (DiMaggio & Powell 1983; Meyer & Rowan, 1977). When the majority of organisations in an institutional field take the same action, other organisations tend to follow that action (DiMaggio & Powell, 1983). The view of other researchers is that a firm's decision makers assume that mimicry would enable a few benefits for firms; for example, it saves costs for late adopters and avoids the risk borne by early adopters (Teo et al., 2003). Organisations habitually pursue a reference point on the implementation of any new management practices by other organisations in the same institutional field so that their own implementation can be validated (Tolbert & Zucker, 1983). Tuttle and Dillard (2007) have reported that the identification of the best practices of leading players in the field and firms' decisions to follow those practices are steered through social (mimetic) forces.

Nevertheless, top management tends to intensify their support and show their interest towards following industry practices in their own firms only when their competitors become successful (Lai et al., 2006; Ma & Tayles, 2009). The successes of competitors create economic and social pressures on decision makers to use innovative management practices (Galaskiewicz & Wasserman, 1989). Such pressures have more pronounced impact on late adopters when some firms have become successful in their innovative use of management practices (Lai et al., 2006; O'Neill et al., 1998). Information about competitors' successes is disseminated to firms and throughout the industry principally via employee turnover or by external consultants who promote their successful initiatives to other firms in the industry (Ma & Tayles, 2009). Arguably, firms' actions in changing their traditional performance measurement (PM) technique and the use of MPM could be influenced by key competitors' best practices (Norhayati & Siti-Nabiha, 2009); however, these actions would be largely accelerated when decision makers perceive that competitors were successful through using those best practices (e.g., Teo et al., 2003; DiMaggio & Powell, 1983).

In the specific context of banks in Bangladesh, no specific studies have empirically investigated the relationship between mimetic influences and the use of MPM. Previous studies in Bangladesh have described the existence of mimetic behaviours in Bangladeshi commercial

banks in the adoption of management practices (Riyadh et al., 2009; Sobhani & Arman, 2012). Specifically, Riyadh et al. (2009) reported that management practices (e.g., the adoption of internet-based banking products) in the commercial banks in Bangladesh are driven as a result of both regulatory and mimetic influence from other banks in the industry. In a very recent study, Sobhani and Arman (2012) in their two case banks in Bangladesh evidenced that the case banks disclose sustainability-related information (specifically, community, human resource development and environmental) as a result of mimetic influence. Their study further added that the case banks are inclined to copy the best sustainability practices from other banks in the industry because decision makers of banks believe that such behaviour is necessary to rationalise their own actions. Given that in an institutional environment change in MA practices could occur due to social (mimetic) influence (Ma & Tayles, 2009; DiMaggio & Powell 1983), decision makers of commercial banks in Bangladesh are likely to adopt MPM practices as a result of mimetic influence: such initiatives could largely be reinforced when they perceive that key competitors are successful. As mentioned earlier, in the context of the banks in Bangladesh, there has still been little progress towards exploring the relationship between mimetic influence (e.g., success of key competitors) and the use of MPM. Based on the above discussion, the study proposes the following hypothesis:

H_4: *The higher the level of success of key competitors in using MPM, the higher the level of use of MPM in banks in Bangladesh*

3.3.6 Top management participation

Recent studies have directed attention towards understanding the influence and role of internal actors on the implementation of MA practices (Hyvönen et al., 2012; Sharma et al., 2010). Top management's active participation and support play a dominant role in implementing and using management control practices such as MPM (Braam & Nijssen, 2011). Participation and involvement of internal agents (e.g., top-level management) increase an organisation's commitment to initiate innovative organisational practices that could facilitate the implementation and use of MPM (Braam & Nijssen, 2011). Top management has both power and resources to achieve the change process within organisations by questioning existing practices, and managing internal politics by forming groups with other powerful actors within the firms and organising them to practise new management practices (Sharma et al., 2010; Munir et al., 2013). Likewise, since top management typically engages in professional/social networks via professional membership, they enjoy specialised knowledge and training (Scott,

2008; Carruthers, 1995). Consequently, this could prompt top management to implement and use certain management practices (e.g., the use of MPM within the organisation).

Top management actively takes part in the use of MPM on the grounds that traditional MA practices are either not able to provide the necessary information for their tactical and strategic decisions or are unable to work as an appropriate feedback system to meet diverse stakeholders' demands (Munir et al., 2013; Braam & Nijssen, 2011). In their research, Assiri et al. (2006) described the key role of collective actors (managing directors and other top executives' active participation and support) towards the implementation of the balanced scorecard (BSC)-based MPM technique. Very recently, Munir et al. (2013) reported that although external competition acts as the motivating factor to change bank's performance measurement practices, the participation and support from the new president and board were key catalysts for the change in the traditional performance measurement system.

In the specific context of banks in Bangladesh, previous studies have suggested that the role of top-level management participation and support is necessary to adopt MA practices (Morium, 2002; Purohit & Mazumder, 2006). Specifically, Purohit and Mazumder (2006) in their conceptual study suggested that the necessity of adopting contemporary PM techniques such as the BSC in the context of banks in Bangladesh cannot be under-emphasised given that banks in Bangladesh experience increased pressures from stakeholders such as customers and regulators; however, adoption of the BSC technique requires participation and support from internal top-level management. Other studies have explained that top-level management participation and support are essential in the adoption of MA practices including PM techniques as top management is able to provide the strong support which is necessary to encourage and stimulate employees who could resist the adoption of contemporary MA practices (Purohit & Mazumder, 2006, 2003; Morium, 2002). However, in the context of the banks in Bangladesh, to date, there has been little progress towards examining the influence of top-level management participation on the use of MPM. Based on the above discussion, the following hypothesis is proposed:

***H_5**: The higher the level of top management participation, the higher the level of use of MPM in banks in Bangladesh*

3.3.7 Control variables

Dominant shareholders' choice, and the size of banks

In addition to the above-mentioned factors, the current study has also considered two control variables, namely, the choice of dominant shareholders, and banks' size that are likely to influence the use of MPM. Ownership and management styles in developing countries, such as Bangladesh, Sri Lanka, Ghana and Indonesia, were observed to be embedded in familial relationships and close ties (Hopper et al., 2009; Uddin & Chowdhury, 2008; Uddin, 2009) with evidence showing that firms' actions are essentially driven towards satisfying the needs and preferences of dominant owners (Uddin & Chowdhury, 2008; Reaz & Arun, 2006).[23] Because family shareholders dominate private commercial banks in Bangladesh (Reaz & Arun, 2006), they might have influence on the use of MPM. Earlier studies have provided evidence that the implementation of any management control system in firms in developing countries such as Bangladesh is largely influenced by the dominant owners' choices and preferences (Uddin, 2009; Uddin & Chowdhury, 2008). This study therefore cannot discount the point that the choice of dominant shareholders is likely to influence the use of MPM in the banks in Bangladesh.

Lastly, business size is likely to impact on the use of MPM in the banks in Bangladesh, an expectation that is similar to that in earlier research (e.g., Hoque & James, 2000). Therefore, this study has predicted that these variables have the potential to influence the use of MPM in banks.

3.3.8 Theoretical model

Based the above-stated hypotheses, the study has developed the theoretical model shown in Figure 3.1.

[23]These dominant shareholders very often come from one or two families and interlock (Uddin, 2009; Reaz & Arun, 2006).

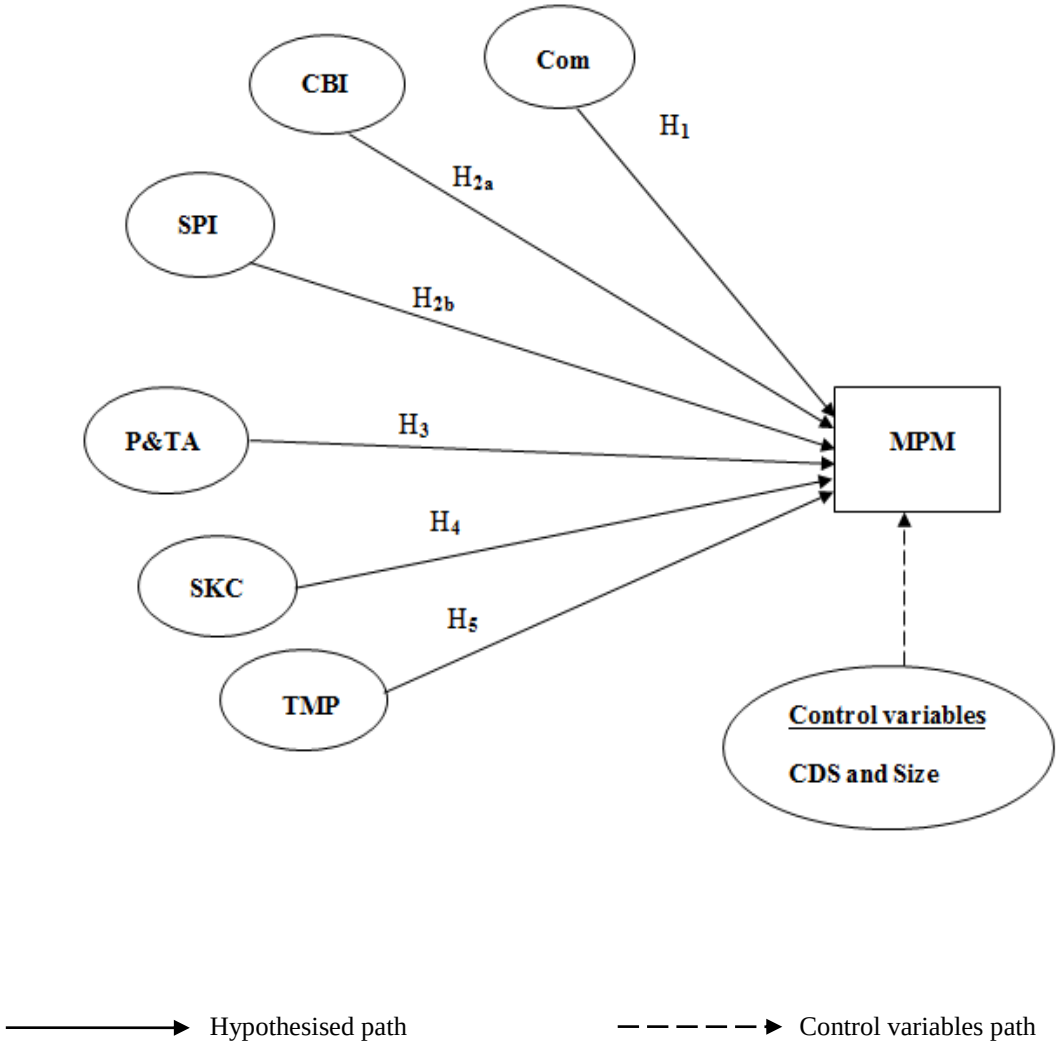

Figure 3.1: Hypothesised model

Notes: MPM=Multi-dimensional performance measures; **Com**=Competition; **CBI**=Central bank's influence; **SPI**=Socio-political institutions' influence; **P&TA**=Involvement in professional and trade associations; **SKC**=Success of key competitors; **TMP**=Top management participation; **CDS**=Choice of dominant shareholders; and **Size**=Banks' size.

3.4. Research design

3.4.1 Data

For the purpose of data collection, a list of all state-owned and private commercial banks in Bangladesh (34 in total) was obtained from the Bangladesh Bank's database during May 2011.[24] Due to their insignificant market share, foreign commercial banks were excluded

[24]On 4 April 2012, the Bangladesh Bank licensed three new private commercial banks, the sponsors of all of which were non-resident Bangladeshis. Likewise, six more banks that are private were approved on 8 April 2012. As per the guidelines, these nine new banks could start their operation from 1 July 2013 subject to managing the

from the study (Ahmed, 2007). The study targeted top-level management to collect data. Top-level management was regarded as the most appropriate group of respondents for this study for three reasons. Firstly, as senior executives, they act as influential gatekeepers having power and influence on the bank's strategic direction and performance management (Ahmed, 2007). As such, they also have influence on the use of MPM. Secondly, they are the most knowledgeable about MA practices (Chenhall, 2005). Finally, these executives are familiar with the institutional environment when making strategic decisions on behalf of their banks, such as whether to use MPM.

3.4.2 Data collection

Primary data were gathered in 2011 through a survey questionnaire and post-survey interviews of top-level executives working at the head office of each participating bank. A combination of qualitative and quantitative methods of data collection was applied which offered the prospect for corroborating 'method triangulation' (Modell, 2005). Other scholars have also advocated such a technique on the grounds of the richness of data (e.g., Punch, 2005; Johnson & Onwuegnuzie, 2004). Punch (2005) suggested that the blend of research methods offers researchers an opening to capitalise the strengths of both methods, as well as adjusting for the weaknesses of each method.

Before the questionnaires were sent to respondents, two steps were followed, namely, the pre-testing of the questionnaire, followed by pilot testing. The questionnaire's pre-testing was carried out with senior academics from March–April 2011. Through pre-testing, comments, suggestions and ideas related to the questionnaire's content, wording and question sequence were obtained with these then duly addressed. The survey instrument was then pilot tested by participants (holding the position of head of bank branch) from three branches of banks in Dhaka City during early May 2011. The purpose of this stage was to evaluate whether or not the questionnaire items and research instrument were valid for the research context and whether any items or issues had been omitted from the questionnaire but would better represent the context in which the data were collected. Following suggestions from the pilot testing, the questionnaire was revised accordingly.

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paid-up capital of BDT 4000 million (BB, 2012); however, these new banks were beyond the scope of the current study.

The first stage of data collection involved personally delivered letters to target respondents inviting their participation in the survey: telephone calls followed two weeks later in June 2011. Participants had the option of either a self-administered questionnaire or a face-to-face questionnaire response. The majority of respondents advised the researcher to collect the questionnaire a week after its initial submission (for a copy of the questionnaire, see Appendix A at the end of the thesis). Methods suggested by Salant and Dillman (1994) were followed to maximise the response rate. For example, to ensure that respondents would have the same understanding of MPM as the researchers, a definition and description of MPM were written in the survey. Participants were guaranteed complete anonymity and the de-identified reporting of results. The participants were also informed that the study had obtained clearance from the Macquarie University ethics committee. For participation in the survey, each respondent was given a small gift (worth less than $10) as a token of gratitude. The process of giving such gifts was subject to the Macquarie University ethics clearance procedure.

The total number of completed and usable questionnaires was 34 representing a 100%[25] response rate, a rate consistent with other Bangladeshi studies (e.g., 81% for Sarker & Yeshmin, 2005).To achieve a high response rate, several personal attempts were undertaken by the researcher. Firstly, before going on the field visit, the researcher's close relatives whose social friends work at a high official level in commercial banks were contacted regarding arranging possible meetings. Secondly, at the time of the field visit, the researcher's university teachers, colleagues and friends were approached requesting referrals to a few potential respondents. Thirdly, direct contact via telephone was made to some respondents following access through the 'Directory of Accounting Alumni'on the strength of the researcher's life membership in the Alumni Association. In this process, the researcher indicated to some respondents that he is a member of the Alumni Association and, by virtue of this identification, the researcher requested their participation. Lastly, requests were made to some respondents to refer to the researcher any of their friends working in peer banks as potential respondents mentioning that they would have the opportunity to receive the findings on MPM for the entire banking industry. As shown in Table 3.1, the respondents occupied a range of hierarchical positions in different divisions at head office level. Other information, such as respondents' years of experience and their work experience at their current bank, is also provided in Table 3.1.

[25] The 100% response rate was explained by the researcher's personal contacts. As in other developing countries, personal contacts play an important role in collecting data in Bangladesh.

Table 3.1: Respondents' profile and years of experience

Respondents	Number	%
Senior Vice-Presidents and Chief Financial Officers (CFOs)	8	23.5
Vice-Presidents (VPs)–Accounts and Finance	7	20.5
Deputy Managing Directors (DMDs)	3	8.8
Senior Assistant Vice-Presidents, Human Resources	5	14.7
Vice-Presidents, IT	1	2.9
Senior Vice-Presidents and Heads of IT	2	5.9
Other high ranking personnel (e.g., GM [General Manager], DGM [Deputy General Manager] and SEVP [Senior Executive Vice-President]	8	23.5
Total	**34**	**100**
Years of experience	**Number**	%
Less than 10 years	3	8.8
10-15 years	17	50.0
16-20 years	5	14.7
More than 20 years	9	26.8
Total	**34**	**100**
Experience at current bank	**Number**	%
5-10 years	8	23.5
11-15 years	15	44.1
Over 15 years	11	32.35
Total	**34**	**100**

The second stage of data collection involved post-survey interviews. Interviews are most useful for obtaining information on how factors and forces affect choices made by participants (Modell, 2005). In the study, the key aim of carrying out a post-survey interview was to gain further in-depth understanding of respondents' views and interpretations of the theme under investigation together with strengthening the survey results (Johnson & Onwuegnuzie, 2004). The survey respondents were invited to participate in post-survey interviews. The 14 interviewees who agreed to participate in this stage of the study included CFOs (5), VPs (6), Head of IT (1) and two (2) senior managers. The semi-structured interviews lasting an average of 45 minutes were conducted between August and September 2011. As with the surveys, participants were guaranteed anonymity and the de-identified reporting of data.

An interview guide (see Appendix 3.1) was used which, *inter alia*, included questions on different factors that influence MPM in Bangladesh. Detailed notes were taken when interviewees did not permit audio recording. As a result, all interviews with the exception of three were completed with notes. The interviewees later confirmed the notes. The recorded interviews were subsequently transcribed. When respondents spoke in their native language, responses were translated into English. To analyse interview data, the researcher repeatedly went through the notes, listened to the tape recordings and then clustered the interview data. This involved focusing on the common themes that were frequently covered in the interviews when answering research questions such as: 'How and why external and internal factors do (do not) influence MPM use in banks?' a procedure consistent with that used by Sharma et al. (2010).

3.4.3 Variables and measurement

To operationalise the set of variables, the study used as many established instruments as possible. However, the scales were modified to suit a banking context. In all cases, respondents indicated their views on a number of statements for each variable, measured on a 5-point Likert-type scale. It is not unusual to use a combination of both single item and multiple items to measure a construct of interest in performance measurement research (see Hoque et al., 2001; Rautiaiuan, 2009). As such, the current study also used the combination of both single and multiple items for measuring different constructs. Research studies have described that cautiously created single-item measures are as acceptable as multiple-item measures of the same constructs as they are the same in terms of the predictive validity of the construct (Rossiter, 2007; Bergkvist & Rossiter, 2007). The measurement techniques for the constructs used for this study are summarised below.

3.4.3.1 MPM use

Seven items taken from Ittner et al. (2003) were used to measure the *use of MPM*. Respondents were asked to indicate whether each financial and non-financial performance measure was currently used in their banks when making various decisions. With a 7-item scale, this yielded an alpha value of 0.752, and factor loadings for these items ranged from 0.67 to 0.91, meeting the minimum cut-off limit (> 0.40) (Hair et al., 1998, 2010).

3.4.3.2 Competition

Competition was measured using five items from Lee and Yang (2011) which were adapted from Hoque et al. (2001). As shown in Table 3.2, the alpha value of this construct is 0.821, and all items loaded perfectly onto the factors having a range of 0.75 to 0.91, a much higher value than the minimum limit of 0.40 (Hair et al., 1998, 2010).

3.4.3.3 Institutional pressures

To operationalise constructs relating to *institutional pressure*, the study adopted a scale from Teo et al. (2003). Items were modified to fit the content and context; the appropriateness was confirmed in the pilot phase prior to being used. Coercive pressures were measured using two sub-constructs: *central bank's influence/requirements* (two items) and *socio-political institutions' influence* (two items). The *involvement in professional and trade associations* was measured using three items to examine normative influence on MPM use. This yielded an alpha value of 0.764 and factor loadings for these items ranged from 0.74 to 0.89. To measure *success of key competitors*, respondents were asked to indicate their level of agreement or disagreement with statements on a 2-item scale, anchored ranging from 'strongly disagree' to 'strongly agree'. The validity statistics of this mimetic influence construct are provided in Table 3.2. They show that all items for *success of key competitors* yielded factor loadings (the range of 0.63 to 0.83) which were far above a cut-off of 0.40 (Hair et al., 1998). This shows that the construct is uni-dimensional (see also Appendix 3.2 for cross-loadings).

3.4.3.4 Top management participation

The measurement scale for *top management participation* was adopted based on Braam and Nijssen's (2011) scale, which was originally from Zaltman et al. (1973). With a 2-item scale, this yielded an alpha value of 0.760, and the factor loadings for the two items were 0.82 and 0.74, which were greater than a cut-off limit of 0.40 (Hair et al., 1998) .The alpha value, factor loadings, average variance extracted (AVE) and composite reliability (CR) of constructs of the study are reported in Table 3.2.

Table 3.2: Factor loading, composite reliability (CR) and average variance extracted (AVE) scores

1	**Multi-dimensional performance measures (MPM) (AVE=0.644; CR=0.827)**	**Loadings**		**Alpha value**
		I	**II**	
1-1	Financial measures: (e.g., net profit margin, ROA, cost reduction, ROI, EVA, EPS, etc.)	0.91		
1-2	Non-financial measures: *customer-related* (e.g., market share, customer satisfaction, customer retention, etc.)		0.70	
1-3	*Employee-related*(employee satisfaction, workforce capabilities, employee stability, employee innovation, number of training sessions)		0.77	
1-4	*Environmental performance* (government citation, environmental compliance, etc.)		0.84	
1-5	*Product, process and service innovation* (number of new service items, process time, transaction efficiency, etc.)		0.86	
1-6	*Operational process and products and service quality* (productivity, cycle time, quality awards, etc.)		0.67	0.752
1-7	*Community* (public image, community involvement, amount invested in various CSR [corporate social responsibility] activities)		0.73	
2	**Competition (Com) (AVE=0.765 &CR=0.858)**			
2-1	Price competition for products/services	0.75		
2-2	Competition in new product/service development	0.80		
2-3	Market competition in marketing and distribution	0.88		0.821
2-4	Market competition in gaining market share	0.91		
2-5	Threat from other behaviours of competing banks	0.78		
3	***Central bank's influence (CBI)* (AVE=0.736; CR=0.864)**			
3-1	The central bank requires my bank to use multi-dimensional performance measures' information.	0.79		0.949
3-2	My bank maintains a good relationship with the central bank.	0.86		
	***Socio-economic and political institutions' influence (SPI)* (AVE=0.775; CR=0.872)**			
3-3	Pressure is placed on my bank to produce MPM by political institutions and international financial institutions (e.g., World Bank, IMF and IFC).	0.97		0.757
3-4	Due to the influence of socio-political institutions, we use many financial and non-financial measures in our bank's operations.	0.78		
4	***Involvement in professional and trade associations (P &TA)* (AVE=0.652; CR=0.848)**			
4-1	Various industry sources (e.g., professional or bankers' associations, training institutions) influence us to use MPM.	0.78		
4-2	Participation in workshops and management seminars organised by local universities' business schools influence us to use MPM.	0.74		0.764
4-3	Participation in training and seminars conducted by industry and professional associations assist us to use MPM.	0.89		
5	***Success of key competitors (SKC)* (AVE=0.782; CR=0.877)**			
5-1	Our key competitors that use MPM benefit greatly.	0.63		0.703
5-2	Others perceive our key competitors that use MPM favourably in our industry.	0.83		
6	***Top management participation (TMP)* (AVE=0.794; CR=0.885)**			
6-1	Top management is very much involved in introducing and monitoring MPM use in the bank.	0.82		0.760
6-2	Top management is well informed and supports attempts to improve the bank's multi-dimensional performance measurement initiative.	0.74		

Notes: **ROA**=return on assets, **ROI**=return on investment, **EVA**=economic value added, **EPS**=earnings per share

3.4.3.5 Control variables

Choice of dominant shareholders was measured by the degree of agreement with the statement: 'MPM practices are designed and used based on the choice of sponsor directors on the board'. Lastly, the *banks' size* was measured by using three measures, namely, the number of employees, log value of total assets and total revenues of banks. The use of the number of employees for measuring business size is an approach similar to that used by Hoque and James (2000). Similarly, the use of log value of total assets is in line with an approach used by Ittner et al. (2003). Measuring business size using total revenues is consistent with others in the literature (see e.g., Ferreira et al., 2010; Hoque et al., 2001).

3.5. Results and analysis

3.5.1 Partial least squares (PLS)

Partial least squares (PLS) regression analysis was used to analyse the data. PLS is a latent variable modelling technique that addresses multiple dependent constructs and clearly recognises measurement error (Fornell & Larcker, 1981). In the past, this technique has also been used in a number of accounting studies (e.g., Hall, 2008; Chenhall, 2005). PLS is particularly useful because it makes few data assumptions (Wold, 1985). Moreover, this analytical approach is suitable for research that has not been tested extensively (Teo et al., 2003). Given the dearth of studies on the role of institutional and competitive pressures on MPM use, the PLS technique was deemed appropriate. PLS includes a measurement model and a structural model. The former shows the relationships between observed items and latent variables, and the latter specifies relationships between latent constructs (Hall, 2008).

Although these two models are estimated concurrently in a PLS approach (Barclay et al., 1995), the models are usually interpreted independently (Hall, 2008). The reliability and validity of the measurement model are first assessed, followed by an assessment of the structural model (Barclay et al., 1995). This process ensures that the measures of the constructs are reliable and valid before assessing the nature of the relationships between the constructs (Hair et al., 1998; Hall, 2008). In the following subsections, the results from an assessment of the measurement model are presented followed by an examination of the relationships between the constructs.

3.5.2 Use of PLS modelling when sample size contains entire population

Partial least squares (PLS) is typically used when analysing a sample of the population. However, in the current study, this statistical technique was used to analyse the whole population which is the 34 commercial banks in Bangladesh. According to the existing literature (e.g., Chin & Newsted, 1999; Goodhue et al., 2006), a sample size of 34 is low for undertaking a PLS analysis. Nevertheless, since 34 cases also represent entire population data, email correspondence with world-renowned experts in PLS path modelling indicated that such a 'rule of thumb' for a sample is not applicable for population data (W. Chin, 2014, pers. comm., 30 January; J. F. Hair., 2014, pers. comm., 31 January; S. Marco, 2014, pers. comm., 31 January; and R. Thompson, 2014. pers. comm., 31 January).[26] Similarly, as suggested, PLS modelling in the current study has been used in a descriptive way where reporting test statistics, statistical significance and standard errors are not required (W. Chin, 2014, pers. comm., 30 January; J. F. Hair., 2014, pers. comm., 31 January; and S. Marco, 2014, pers. comm., 31 January).

3.5.3 Measurement model

To validate the research model, the current study first assessed the convergent and discriminant validity of the measurement scales. The study assessed convergent validity by looking at the reliability of items, composite reliability (CR) of constructs and average variance extracted (AVE). To test for discriminant validity, the AVE statistic was also analysed. The square roots of the AVE were compared with the correlations among the latent variables (Chin, 2010, 1998). This provided an understanding of whether a construct shared more variance with its measures than with measures of other constructs (Fornell & Larcker, 1981). To represent the extent to which measures of a given construct differ from measures of other constructs (discriminant validity), AVE should be calculated (Chin, 2010). Therefore, as suggested by Fornell and Larcker (1981), the percentage of variance captured by the construct in relation to the variance due to random measurement error was computed (it should be > 0.5).

Table 3.3 below shows that the square roots of the AVEs (which are the first numbers on the diagonal line) are all greater than the correlations between constructs. Moreover, the cross-loading analysis (see Appendix 3.2) shows that no item loaded higher on another construct than

[26] For a detailed review of the email correspondences, please see Appendix D at the end of the thesis.

it did on the construct that it was intended to measure (Chin, 1998; Chin, 2010). Altogether, the results of the two tests demonstrated adequate discriminant validity. The results from the PLS measurement model indicated that each construct exhibited satisfactory reliability and validity, enabling the second step of interpreting the structural model. Descriptive statistics (means and standard deviation), based on the weighted average scores of multi-item constructs, correlation matrix and the discriminant validity of constructs are also shown in Table 3.3.

Table 3.3: Descriptive statistics, correlations matrix and assessment of discriminant validity
(The diagonal elements are the square roots of AVEs)

Variables	Mean	Stand. Dev.	Correlations										
			1	2	3	4	5	6	7	8	9	10	11
1. MPM	4.26	0.39	0.802										
2. Com	4.43	0.34	0.28	0.874									
3. CBI	4.85	0.26	0.39	-0.16	0.857								
4. SPI	2.95	1.15	-0.13	0.35	0.19	0.88							
5. P&TA	4.19	0.32	0.32	0.11	0.06	0.04	0.81						
6. SKC	4.57	0.29	0.22	0.05	0.01	0.36	0.65	0.891					
7. TMP	3.98	0.85	0.56	-0.24	0.09	0.54	0.16	0.03	0.884				
8. CDS	2.18	1.35	0.03	-0.03	0.02	-0.11	0.18	0.02	0.19	1.00			
9. Size(emp)	3545	567	0.35	0.14	0.04	0.05	0.05	0.02	0.13	0.03	1.00		
10. Size(rev)	13214.3	23160	0.26	0.44	0.05	0.34	0.08	0.38	0.09	0.11	0.87	1.00	
11.Size(LTA)	5.09	0.436	0.23	0.06	0.14	0.55	0.02	0.04	-0.02	0.24	-0.07	0.37	1.00

Notes: MPM=Multi-dimensional performance measures;**Com**=Competition; **CBI**=Central bank's influence; **SPI**=Socio-political institutions' influence; **P&TA**=Involvement in professional and trade associations; **SKC**=Success of key competitors; **TMP**=Top management participation; **CDS**=Choice of dominant shareholders; **Size_emp**=Banks' size measured in number of employees; **Size_rev=**Banks' size measured in total revenues (in million Tk); **Size_LTA=**Banks' size measured in log of total assets (in million Tk).

3.5.4 Tests of hypotheses

As PLS makes no distributional assumptions, no proper goodness-of-fit measures exist for models using PLS (Chin, 1998). PLS produces standardised βs for each path coefficient which are interpreted in the same way as ordinary least squares (OLS) regressions. Bootstrapping

allows the generation of *t*-statistics and standard errors. As mentioned earlier, the study tests the relationships using population data (W. Chin, 2014, pers. comm., 30 January; J. F. Hair., 2014, pers. comm., 31 January; S. Marco, 2014, pers. comm., 31 January; and R. Thompson, 2014. pers. comm., 31 January); therefore, it does not use t-statistics for interpreting the hypothesised relationships. The structural model was evaluated by examining the R^2 value and size of the structural path coefficient.

The results in Table 3.4 (see also Appendix 3.3) show that H_1 (on the positive effect of competition on the use of MPM), was supported (β=0.191). The same result was found for Hypothesis H_{2a} (on the positive relationship between the central bank's influence and the use of MPM) (β=0.309). The hypothesis relating to the influence of mimetic pressures, namely, H_4 (on the relationship between the success of key competitors and MPM use), was also supported (β=0.163). Similarly, H_5 (on the positive relationship between top management participation and the use of MPM) was also supported (β=0.332). However, there was no evidence to support the influence of socio-political institutions (H_{2b}) or the influence of involvement in professional and trade associations (H_3) on the use of MPM by Bangladeshi commercial banks (β=0.029 and β=0.034, respectively). In terms of the first control variable which predicted a positive relationship between management's perceptions of choice from dominant shareholders and MPM use was supported (β=0.268).

Table 3.4: PLS results: path coefficients, R^2 and results of hypotheses tests

Paths	Path coefficients	Hypothesis numbers	Results
Com→MPM	0.191	H_1	Supported
CBI→MPM	0.309	H_{2a}	Supported
SPI→MPM	0.029	H_{2b}	Not supported
P&TA→MPM	0.034	H_3	Not supported
SKC→MPM	0.163	H_4	Supported
TMP→MPM	0.332	H_5	Supported
CDS→MPM	0.268	Control variable	Supported
Size(emp)→MPM	-0.313	Control variable	Supported
Size (rev)→MPM	0.204	Control variable	Supported
Size (LTA)→MPM	0.045	Control variable	Not supported
Adjusted R^2	0.496		

With regard to the other control variable, the influences of the size on the use of MPM was supported (β=-0.313). The path coefficient of size measured through revenues (β=0.204) shows impact on MPM use, but when size is measured through total assets (Size_LTA), it shows very low impact on MPM use (β=0.045).

3.5.5 Additional analysis

In addition to testing the additive model (i.e., the linear independent-dependent relationships between two or more constructs in the path model shown in Figure 3.1), the current study also tested mediating and moderating effects in the path model. In other words, following the prescription of Luft and Shields (2003), the intervening variable (mediation) model and interaction (moderating) model have been tested in the current study. On the one hand, mediators provide additional information about how or in which way the predictor and outcome variables are strongly associated: moderators, on the other hand, explain the circumstances about when the relationship occurs between the predictor and outcome variables (Bennett, 2000). In general, mediators and moderators are third variables, whose purpose is to enrich a deeper and more precise understanding of a causal relationship between a predictor (independent variable) and the outcome variable (Wu & Zumbo, 2008). Also known as the indirect effect/intermediate effect/intervening effect (MacKinnon et al., 2002), in a mediation model, the predictor is assumed to cause the mediator and, then, the mediator causes the outcome variable (Wu & Zumbo, 2008; Baron & Kenny, 1986). Also known as the interaction effect, in a moderation model, a moderator is perceived to change the strength or direction (i.e., positive or negative) of association between predictor and outcome variable (Wu & Zumbo, 2008; Bennett, 2000; Baron & Kenny, 1986). Indeed, on top of an additive model, it is necessary to consider the potential impacts of mediator and moderator in the path model (Baron & Kenny, 1986; Bennett, 2000). Otherwise, a more precise picture for an outcome variable may be overlooked. Considering the mediating and moderating effects, the models tested for the current study are discussed below.

3.5.5.1. Model-1: Mediating effect of top management participation (TMP) on the relationship between central bank influence (CBI) and MPM use

The first model tests the mediating effect of top management participation (TMP) on the relationship between central bank influence (CBI) and MPM use. The premise for considering top management participation as a potential mediator is based on the ongoing discussion in recent institutional research on the role of top management participation in the use of MA

practices (Munir et al., 2013; Ma & Tayles, 2009; Braam & Nijssen, 2011). These studies have explained that, as an internal change agent, top management participation and active support play a key role in implementing external guidelines, rules and regulations within organisational MA practices. As such, the current study expects that top management participation could mediate in the relationship between central bank influence and the use of MPM.

To establish the mediating relationship, researchers have prescribed some guidelines/conditions that need to be met (Baron & Kenny, 1986). These include: (a) there must be a significant relationship between the predictor and the dependent variable; (b) the predictor must have a significant relationship with the mediating variable; (c) the relationship between the mediating variable and the dependent variable must be significant; and (d) the relationship between the predictor and the dependent variable should be changed once the mediating variable is added to the model (Baron & Kenny, 1986; Hair et al., 2010). If the relationship between the predictor and the dependent variable does not change once the mediating variable is added to the model, then the mediating effect is not established (Baron & Kenny, 1986; Hair et al., 2010, p. 867). However, if the relationship between the predictor and the dependent variable is reduced to a point close to zero after the mediator is included in the model, then full mediation is supported (Hair et al., 2010, p. 867). And, in the presence of the mediator, if the relationship between the predictor and the dependent variable is reduced but remains significant, then the effect of the predictor on the dependent variable is 'partially' mediated by the mediator (Hair et al., 2010, p. 867).

To test model-1 (i.e., the mediating effect of TMP on the relationship between central bank influence and MPM use), it was necessary to establish whether or not the first condition (i.e., there must be a significant relationship between the predictor and the dependent variable) was met (the CBI- > MPM link in the study; see also H_{2a}). As noted in Table 3.5, the study met this condition (β=0.337). Secondly, the predictor must have a significant relationship with the mediating variable. As shown in Table 3.5, the results of the CBI -> TMP path satisfied the condition that the relationship between the mediating variable (top management participation [TMP]) and the predictor (CBI) was significant. Thirdly, the relationship between the mediating variable and the dependent variable must be significant (β=0.318). In this case, the relationship between the mediating variable (top management participation [TMP]) and the dependent variable (MPM use) (i.e., the TMP -> MPM link) was also supported as shown in

Table 3.5 (see also H_5 in Table 3.4). Finally, the relationship between the independent variable and the dependent variable was reduced (from 0.337 to 0.117) when the mediating variable was added to the model. This suggests that top management participation mediates the relationship between central bank influence and MPM use in commercial banks in Bangladesh.

Table 3.5: Mediating effect of top management participation (TMP) on the relationship between CBI and MPM use

Paths	Path coefficients	R^2
Step-1:Direct path: CBI -> MPM	0.337	0.114
Mediation path after TMP included in the model:		
Step-2: CBI -> TMP	0.318	0.101
Step-3: TMP -> MPM	0.260	0.100
Step-4: CBI -> MPM	0.117	
Direct and indirect effect calculation (a)=Direct effect of CBI on MPM: (b)=Indirect effect of CBI on MPM through TMP (0.318* 0.260) Total effect (a+b) =	 0.117 0.083 **0.20**	

Also, as shown in Table 3.5, the direct effect of central bank influence (CBI) on multi-dimensional performance measures (MPM) was 0.117. However, the total effect (both direct and indirect) was increased (i.e., 0.200). These findings suggested that the direct relationship from CBI to MPM was mediated by TMP. Indirect effect accounted for 0.083 (i.e., 0.200-0.117) of this total effect. This implied that 8.3% of the effect of CBI on MPM went through the mediator (top management participation) and the remaining 91.7% of the effect was direct (i.e., the direct effect of CBI on MPM). This low proportion of the mediator role in explaining the predictor and the outcome variable is rather understandable, in particular, in the context of a regulated industry such as the banking industry. The findings are consistent with interview discussion that commercial banks in Bangladesh need to follow the central bank's guidelines, prescription and regulations for the use of MPM (see subsection 3.6.2) as they rely on the central bank's guidelines, rules and regulations for their operations. Top management of commercial banks complies with the central bank's requirements by providing information through the use of non-financial performance measures for social, environmental and employees' performance. Such an approach helps them to keep a good relationship with the

central bank since the central bank can exert influence on commercial banks via their guidelines, rules and regulations. Consequently, the evidence of the low percentage of the mediating effect of top management participation in the relationship between central bank influence and MPM use is rather understandable in the specific context of banks in Bangladesh.

3.5.5.2. Model-2: Moderating effects of market competition on the relationship between top management participation (TMP) and MPM use

In the second model, the study tests the top management participation (TMP) and MPM use relationship, in which market competition is considered as the moderator. While earlier studies have evidenced the relationship between top management participation and MPM use (Munir et al., 2013; Akber et al., 2012), it is not yet established in the literature whether (or not) top management participation has any impact on the use of MPM under the condition of a competitive environment. The prospect of understanding the moderating effect of market competition is in line with arguments that the competitive environment moderates the effectiveness of MA practices (Banker & Mashruwala, 2007; Hoque & Hopper, 1997; Hambrick, 1983). These studies suggest that the associations between certain organisational factors (e.g., top management participation in the current study) and MA practices (e.g., MPM use in the current study) may also be moderated (i.e., changed) by situations in the external environment such as the level of competition.

Based on the above discussion, it is reasonable to expect that due to the increased level of competition in the banking environment of Bangladesh, top management shows more commitment to participate and provides greater support for PM change within organisations (i.e., use of MPM). Given that external market competition is intense, top management would require more information on customers, products, quality, employees and communities in their decision making; hence, their participation and support for the use of multi-dimensional performance indicators would increase, an argument which is in line with other researchers (e.g., Kaplan & Norton, 1992, 1996; Bourne & Neely, 2002). Nevertheless, top management participation would be decreased in the event of a less competitive environment. Indeed, the precise relationship between top management participation and MPM use can be better understood by taking into account the role of the intensity of market competition. Therefore, the current study has examined the possible moderating role of market competition in the relationship between top management participation (TMP) and MPM use. Furthermore, as

explained earlier (see H_1 and H_5 results in Table 3.4), the empirical results of the current study have provided evidence of the direct relationships between market competition and MPM, and between top management participation and MPM use. Such findings have also provided motivational grounds to test the moderating effect of market competition in the current study.

Two popular approaches are available in PLS to test moderating effects depending on the nature of independent and moderator variables. These are the *product terms* approach and the *group comparisons* approach (Chin et al., 1996, 2010; Henseler & Fassott, 2010). If moderators are metric (i.e., variables are measured using either an interval or ratio scale), then the product terms approach is applicable (Chin et al., 1996, 2010). But if moderators are categorical (i.e., variables are measured using an ordinal or nominal scale such as gender, culture, etc.), then the group comparisons approach is suitable (Chin et al., 1996, 2010; Henseler & Fassott, 2010). The current study applies the former approach (i.e., the product terms approach) since the moderator variable, namely, market competition is metric. To detect whether a moderating effect is in place, researchers have to examine whether path coefficients of the interaction effects (e.g., moderator x independent variable) differ significantly from zero irrespective of the size of the other path coefficients (Henseler & Fassott, 2010; Baron & Kenny, 1986). Moderating effects take place when the predictor and the moderator with their interaction effects cause incremental variance in the outcome variable beyond what is caused by the main effects (Eberl, 2010; Jonsson, 1998). The results of the moderating effects are shown in Table 3.6.

Table 3.6: Moderating effects of market competition (Com) on the relationship between top management participation (TMP) and MPM use

Paths	Path coefficients	R^2
Main effects model: (before considering interaction of predictor with moderator)		0.129
TMP -> MPM	0.298	
Com -> MPM	0.213	
Interaction effects model: (after considering interaction of predictor with moderator)		0.175
TMP -> MPM	0.173	
Com -> MPM	0.162	
(TMP x Com) -> MPM	**0.252**	

To investigate moderating effects using the product terms approach in PLS path modelling, it is necessary to create the interaction effects between the predictor and the moderator (Henseler & Fassott, 2010). In this regard, it is necessary to calculate the products of each item of the independent variable with each item of the moderator variable (Chin et al., 2003). In this study, since top management participation was measured using two items and competition was measured using five items, consequently, in total there were 10 (2 x 5) items representing the interaction effects of these two constructs. Table 3.6 shows a standardised path coefficient of 0.173 from path TMP to MPM use; 0.162 from competition to MPM use path; and an interaction effect of 0.252 with a total R^2 value of 0.175. This implies that one standard deviation increase in market competition will not only impact on MPM use by 0.162, but it would also increase the impact of top management participation on MPM by 0.08 (0.252-0.173). The table also shows that the path coefficient of the interaction effect (i.e., TMP x Com -> MPM path) is significantly different from zero (i.e., 0.252). As a result, the moderating effect of market competition to predict the impact of top management participation on MPM use is confirmed. As expected, the results in Table 3.6 show a higher R^2 (i.e., R^2 of 0.175) for the model with interaction effects than the R^2 of 0.129 for the main effects model. Chin et al. (2003) explained that even a small moderating effect can be meaningful under extreme moderating conditions: if the resulting beta changes are meaningful, then it is important to take these conditions into account (p. 211). The moderating result found in the current study therefore has practical implications. From these results, it can be argued that participation of top management in banks in Bangladesh in the use of MPM use is modified with the level of competition in the environment as changes in path coefficients are noteworthy. That is, when competition is intense in the industry, decision makers of banks show more commitment to participate in the use of more MPM.

3.6 Discussion

In this section, the findings of the current study are discussed in the light of the results of hypotheses testing coupled with the qualitative data collected from interviews.

3.6.1 Competition and MPM use (Hypothesis H_1)

The current study found that competition has a positive effect on the use of MPM in banks in Bangladesh (Hypothesis H_1). This finding is consistent with existing literature (Hoque et al., 2001; Hussain & Hoque, 2002; Tsamenyi et al., 2006). However, whereas earlier studies were

conducted in the developed countries' context, the results of the current study provide evidence from the banking sector of a developing country, specifically, from Bangladesh. The findings are also in line with information on the Bangladesh banking industry discussed previously in subsection 3.2.1. Interviewees 6, 7 and 9 have suggested that financial reform in the Bangladeshi banking industry has resulted in an intense competitive environment, and the banks' decision makers therefore struggle for customer retention, market share and market position. As a result, they need to know their level of service efficiency and the performance of their new products and service innovation developed to satisfy customers. Owing to the intense competitive environment, banks in Bangladesh rely on many non-financial measures in order to take informed decisions regarding their customers: these include measures in the areas of products and service innovation, strategic alliances, employees' productivity, quality of assets and on-time delivery. Interviewee 7 commented:

> 'Fierce competitive force is a driving power for changing traditional performance measurement systems in the industry. Continued reform and liberalisation in the banking sector makes our environment extremely competitive for market share and customer retention. As a result, in recent years we broadened our performance measures to get accurate customer information, improve our service standards, assessing competitive advantages and our performance in customers, social and environment issues'.

Similarly, participants suggested that owing to the intense competitive environment in the last few decades, many banks have attempted to gain market share and acquire new customers by offering technology-driven banking products and services. In response to the intense competition, Bangladeshi top managers also collect and analyse data relying on the industry or on other external sources. This enables them to see their market position relative to their competitors and monitor the new products launched by competitors. Further, it also enables them to understand whether these products are successful and whether there is any other competitor behaviour that is likely to convey a threat to their own market share. Consequently, they require a significant amount of non-financial information on customers, products and processes as well as competitors' actions. As stated by interviewee 10:

> 'In our bank, we rely on various information from external sources to evaluate our position in terms of products and in comparison with competitors. Whether competitors are introducing new products and other actions of competitors are a part of our strategic thinking. Because competitors erode our market share, using performance indicators, we evaluate our performance and compare with the industry performance'.

3.6.2 Coercive pressures (central bank's influence) and MPM use (Hypothesis H_{2a})

The current study evidenced the central bank influence on the use of MPM in banks in Bangladesh (Hypothesis H_{2a}). Specifically, the influence of the country's regulator has a positive impact on the use of MPM in banks in Bangladesh. Earlier studies have argued that in an institutional environment when organisations face constant regulatory influences and mandates, dependent organisations (e.g., commercial banks in the case of the Bangladeshi banking industry) follow regulators' mandates and expectations. In the specific context of commercial banks in Bangladesh, this finding offers an understanding of the association between regulatory pressures and the use of MPM. The current finding on the association between central bank influence and the use of MPM is in line with previous research in management accounting using the NIS perspective (e.g., Hussain & Hoque, 2002; Hussain & Gunasekaran, 2002). Regulatory influences are exerted on business environments on the grounds of better customer service, investors' protection, improved accountability and improved overall performance of the industry. As stated by interviewee 2:

> 'The Bangladesh Bank has a key role in shaping and upgrading our performance measurement system through their various requirements and guidelines. For regulatory requirements, we need to evaluate and report plenty of customers, employees, and community and environmental-related information, risk assessment information and report to them with their prescribed format'.

This comment is in line with earlier research about the inclusion of environmental management and community practices in performance measurement systems (Tsai & Hung, 2009; Bititci et al., 2011). Interviewees 13 and 14 indicated that the central bank opened a hot-line for 'customer complaints' in 2008, and instructed all scheduled banks to take the necessary steps to handle customers' complaints and improve customer service. At the same time, the central bank monitors the social and environmental-related performance of commercial banks. As a result, commercial banks are required to report in the prescribed form/templates every six months. These interviewees also suggested that the banking regulations prescribed by the central bank have induced commercial banks to focus massively on capital adequacy and on different risk assessment, which addresses many types of risk assessment, and on the ratio of non-performing loans and other non-financial information. As a result, commercial banks produce and use both financial and non-financial information.

Consultation of the interview data has revealed that banks in Bangladesh incorporate social and environmental issues into their management control systems. Since the country of Bangladesh is environmentally vulnerable as a result of global warming (BB, 2012), banking institutions are gradually playing their role with regards to environment-friendly lending policies, the financing ban in the tobacco industry, and by adopting sustainable practices in their internal management practices. Interviewees 8, 9, 11 and 12 suggested that, driven by the central bank's initiatives, guidelines and encouragement, decision makers of commercial banks in Bangladesh use many non-financial performance indicators relating to customers, and social and environmental issues to assess their performance.

These social and environmental initiatives are principally driven as a result of a few motives. Firstly, in addition to economic performance, they report their social, customer and environmental performance as per the central bank's guidelines. At the same time, as discussed earlier (in subsection 3.2.1), social and environmental initiatives by banks such as the incorporation of environmental risk management into banks' risk management strategy; allocation of budgets for social and environment-friendly lending; allocation and utilisation of budgets for a climate risk fund; and above all, measuring and reporting environmental and social activities (as per the central bank's prescribed format) are considered as 'management efficiency' when evaluating commercial banks' performance under the CAMEL rating. Such evaluations are actively considered when granting permission to open new bank branches in Bangladesh. To facilitate decision making and improve sustainability performance, performance indicators consisting of financial and non-financial aspects of performance are used in the banking sector of Bangladesh. Interviewee 8, in this regard, commented:

> 'Previously our bank's community and environmental activities were need-based, i.e., when situations arose, we were involved in social and environmental activities such as a donation to the Prime Minister's relief fund for natural disaster or donation of blankets for winter-affected areas during winter season. Since the last couple of years, we incorporate social and environmental issues in our banks' corporate strategy and practise [these activities] routinely. As such, to assess social and environmental performance, we have to use many non-financial performance indicators relating to community and environmental activities'.

From the banks' perspective, however, there are some context-specific motivating factors that drive them to incorporate sustainability into management practices. For example, access to the 'refinancing scheme' offered by the central bank is a motivating factor that stimulates banks in

Bangladesh to be involved in banking operations that support sustainability. Under this 'refinancing scheme', commercial banks in Bangladesh are able to borrow funds from the central bank at a reduced rate of 5%, but can lend to customers at a competitive rate for social and environmental activities. Consequently, commercial banks are motivated to use social and environmental performance indicators in their control system, which assists them in preparing the report that has to be submitted to the central bank. Access to the 'refinancing scheme' is a driving force for banks to be involved in sustainability initiatives, and in the use of performance indicators for obtaining performance information. According to interviewee 3:

> 'The central bank has a massive amount of funds under the refinancing scheme that we can access. That is a good way to motivate us to be involved in sustainable practices. For continuous access to this scheme, we report our performance to them and keep our performance data using performance indicators'.

Similarly, another new motivator for using MPM (specifically, for employee, community and environment-related measures) in the specific context of Bangladesh is to claim tax exemptions from the tax authority. It should be noted that the taxation office of Bangladesh, the National Board of Revenue (NBR), has had a provision for granting 10% tax exemptions for the corporate sectors of Bangladesh including the banking industry since 2008 (Government of Bangladesh, 2008, 2011). Under this guideline, all institutions in Bangladesh including banking institutions can claim 10% tax exemption when they are involved in sustainability activities in 24 prescribed areas provided that the firms have structured corporate social responsibility activities for their internal employees. Interview data revealed that many banks emphasise the internal benefits for employees, using the employee-related measures so as to satisfy the requirement, and claim the tax exemption from the taxation office. Interviewee 7 explained:

> 'We can reduce the tax burden when we show performance in terms of community, environmental, or given our care for our internal employees, although a lot of formalities and procedure are involved to get the money back from the taxation office. So we keep our records on social, environmental and employee performance information'.

Given that the banking sector in Bangladesh pays income tax at 45% (the corporate tax rate in Bangladesh is 35% for those that are not financial institutions), attempts to save income tax and reduce the tax burden are quite reasonable for the decision makers of banks in Bangladesh.

Consequently, commercial banks in Bangladesh use MPM to assess customer, social and environmental performance. While previous studies in the MA literature show that PM practices include many non-financial indicators as a result of external competition and firms' intentions to retain customers, the current study has added a new dimension. Specifically, the current study advances the understanding that banks operating in a developing country (specifically in Bangladesh) have upgraded their performance measurement systems, not only to assist them to measure and improve financial soundness, or to make internal decision about customers, but also to produce, evaluate and report their social and environmental performance to the external regulators (e.g., the central bank).

Overall, while earlier studies (e.g., Hussain & Hoque, 2002; Hussain & Gunasekaran, 2002) investigated the effect of the central bank on the use of non-financial performance measures in the banking sector, the current study has provided further in-depth understanding on the role of the central bank in the use of MPM. Specifically, with the help of interview data, the current study provides accounts of how regulators in Bangladesh influence the use of MPM in banks in Bangladesh and why commercial banks in Bangladesh tend to generate and report information using multi-dimensional performance indicators. Therefore, the current study lends additional insights into the influence of regulators on the use of management control systems (specifically MPM use).

However, both market forces and central bank influence are perceived to be key drivers in the use of MPM in banks in Bangladesh. Participants expressed the opinion that both these factors place pressure on them to develop their performance measurement techniques. For example, through specific credit risk guidelines for granting loans, the central bank takes the necessary steps to reduce the ratio of non-performing loans (the loan defaults); however, the interest rates charged for loans and paid for deposits are at the discretion of commercial banks with these being fully dependent on market forces. Owing to the pressure from both the central bank and market competition, decision makers of banks emphasise the use of multi-dimensional performance information so that they have the required information on customers, about the proportion of collectable and uncollectable loans, and on any provisions for uncollectable loans, etc. As reported by participants, in order to reduce credit risk, the central bank has made it compulsory for commercial banks to collect their customers' past performance reports (named '*credit information bureau (CIB) reports')* of their customers' performance since 2001.

From 2011, the CIB report became accessible online for scheduled banks. This might enable commercial banks to make prudential decisions before granting credit to existing and potential borrowers. Interviewee 12, in this regard, explained:

> 'To reduce the loan defaults rate in our industry, the central bank made it compulsory for us to collect past customer data from the database maintained by them. It helps us to take wise decisions before granting new loans for new customers. In this regard, we have to also report our customer-related performance to them at a regular interval'.

Nevertheless, commercial banks are given the option of charging an interest rate that is largely market driven, essentially guided by improvement in customer satisfaction, customer retention and quality service of banks. According to interviewee 7:

> 'The central bank does not stipulate a fixed rate of interest for loans and deposits; here, the rate is charged depending on how many existing customers we can retain, and the new customers that we can attract by offering our quality customer service, above all, the profitability of customers from our perspective. Therefore, we need to evaluate a lot of non-financial information'.

3.6.3 Coercive pressures (socio-economic and political institutions' influence) and MPM use (Hypothesis H_{2b})

The current study found that socio-economic and political institutions have no impact on the use of MPM in banks in Bangladesh (Hypothesis H_{2b}). Specifically, the results of the current study could not confirm the effects of socio-economic and political institutions on the use of MPM in banks as was projected in Hypothesis H_{2b}, a finding that is inconsistent with those of prior studies (e.g., Hussain & Hoque, 2002; Granlund & Lukka, 1998; Munir et al., 2011). A number of participants such as interviewees 10, 8 and 12 did not perceive that transnational institutions such as the International Monetary Fund (IMF) and World Bank (WB) monitored the operations of commercial banks nor that those commercial banks were accountable for reporting their performance to them. They felt that these institutions did not dictate changes in banks' PM practices. In this regard, comments made by interviewee 10 are:

> 'See the World Bank, IMF do not monitor our bank's operations, neither are we accountable to report to them … Our performance measurement practices, any improvement thereon are not dictated by them at all'.

In the literature, Hussain and Hoque (2002) reported that transnational institutions put pressure on banks to change their PM practices so that they would be compatible with global practices (see also Munir et al., 2011). Nevertheless, the findings, in particular, comments by interviewees 3, 8 and 12, elaborated on the point that transnational institutions actively work

with the Bangladeshi government, different ministries of government and the country's central bank. As a result, these transnational institutions might exert influence on accountability, governance, performance and other issues at the ministry, government department or central bank level of the banking industry, but not at the individual bank level. In this regard, comments made by interviewee 3 are:

> 'No, I do not think that donor agencies influence us when changing our PMS. They neither guide us to improve our performance nor subsequently monitor us. Well, they could have direct association or influence with the government and regulators, but not with us'.

3.6.4 Normative pressures and MPM use (Hypothesis H_3)

Earlier studies in MA research that have applied institutional theory have argued that higher levels of involvement by management in professional and trade associations induce decision makers to use management practices (DiMaggio & Powell, 1983). Note that in the current study, Hypothesis H_3 predicted that the use of MPM in banks in Bangladesh was associated with management involvement in professional and trade associations. This hypothesised relationship between management involvement in professional and trade associations and MPM use was not supported. As suggested by interviewees 5, 8 and 11, neither professional institutes such as the Bangladesh Institute of Bank Management (BIBM) nor university seminars have had any influence on the use of new MA systems and, specifically, MPM. As was delineated in participants' comments, the BIBM is simply a wing of the government. They are principally engaged in educating commercial banks' executives when the central bank issues guidelines on numerous themes such as risk management, performance measurement or a green initiative. Similarly, local universities' initiatives are not at all adequate. Interviewee 11 in this regard made the following comments:

> 'Local universities and banking professions have no influence on our MPM practices. I think these organisations' management seminars and workshops are too scanty to influence us on MPM practices. Externally if required, we take some assistance from international CA [chartered accountancy] firms'.

Such findings are not consistent with some management accounting studies (see Grandlund & Lukka, 1998) and even with previous studies in the context of the banking industry (e.g., Munir et al., 2011; Hussain & Gunasekaran, 2002). As was suggested by interviewee 12, when the training and workshops are conducted by these institutions and business schools, bank executives sometimes attend as an invited guest. Likewise, junior employees of banks also complete further degrees from these institutions for their promotion. But these

institutions' workshops and training have no influence on the use of MPM in banks in Bangladesh. On the other hand, internal training and lectures conducted by banks' own training institutions are helpful for management control purposes, specifically PM issues. Interviewee 12 commented:

> 'Participation in the Bank Management Institute's seminars, or local universities' training and workshops has no impact on improving our performance measurement system. Rather, training and workshops conducted by our internal training institute are much more beneficial for us for changing the internal control system of banks. Resource persons of the internal training institute deliver lectures on many issues. It could be on risk management, performance measurement or new lending guidelines. Their job is to deliver lectures on new rules and guidelines on a regular basis and make it familiar to banks' staff'.

3.6.5 Mimetic pressures and MPM use (Hypothesis H_4)

Studies have suggested that organisations try to copy their peers' practices as a typical response to uncertainty and this mimicry attitude is intensified when competitors' actions are successful (DiMaggio & Powell, 1983; Mizruchi & Fein, 1999). Note that this study's Hypothesis H_4 in this regard was supported. The interview data suggested that many banks in the industry are motivated to imitate competitors' practices, for instance, when implementing their performance-based rewards systems and setting pay structures for new employees. The top management of Bangladeshi banks is interested in mimicking the choices and actions of their successful peers since mimicking successful competitors' practices helps to reduce the risk of failure and creates legitimacy for their decisions.

The interview data revealed that top management has to follow some industry norms when setting new policies, for example, policies for remuneration and the rewards system in their performance measurement system. In these cases, they model what other banks are already practising, for example, the introduction of a minimum one or two profit bonuses irrespective of the divisional/branch level of performance when the profit figure is greater than last year's figures. Similarly, at the time of fixing the remuneration package for new employees, they follow industry practices in a way that keeps this consistent with others in the industry. Even in the case of developing annual performance assessment criteria for employees, top management reviews industry practices before individual or group level KPIs are developed. One respondent, specifically, interviewee 6 commented:

> ‘In many cases, we try to use industry/competitor practices and evaluate information. For example, each year when we give a profit bonus, it is common to see how many bonuses are given by our competitor banks in comparison to annual performance. Even when we set new employees’ salary packages and their performance evaluation indicators, and targets and promotions criteria, we see what is practised in other banks in the industry’.

In the interviews, the researcher was interested to know how bank executives were able to know competitors’ management plans or competitors’ internal management practices. Respondents mentioned several ways. Firstly, they and the entire industry learn about competitors’ practices when competitors become very successful as this information is disseminated through external reporting. Secondly, this occurs through the hiring of mid- and top-level management team members from competitors’ banks, a finding in line with previous studies (see DiMaggio & Powell, 1983). Thirdly, professional consultants who have been successful in implementing certain management techniques for competitors promote their own achievement. Lastly, commercial banks in Bangladesh very often work closely with other banks (competitors) due to strategic alliances in which each party can perceive the strength of their competitors indirectly. Although not examined in the current study, the role of consultants in spreading performance measurement practice is in line with previous MA literature (Ma & Tayles, 2009; Sharma et al., 2010).

However, bank executives believed that in the case of the implementation of new management practices, they did not copy peer banks without thought; rather they relied on cost–benefit calculations, observed whether peer banks were successful in implementing new practices and analysed whether they had the room to step forward or not. The copying of peers’ practices intensified when competitors’ successes were highly praised and accepted in the banking environment. Interviewee 13 commented:

> ‘In the industry, it is not uncommon to follow others’ management practices, in particular, if it is successful. By knowing competitors’ performance and position, and their successful practices in the industry, we can also evaluate ourselves on how to improve our performance in many areas, such as environmental, customers, social, etc. and adopt it in our banks’.

3.6.6 Top management participation and MPM use (Hypothesis H_5)

Apart from the external forces that influence the use of MPM, the active participation and support from internal top management were also important. The hypothesis in the current study that reflected this line of thought was also supported (see Hypothesis H_5). Top management, in

particular, the Managing Director (MD), actively participated and supported the implementation and use of MPM. Interviewee 10 commented in this regard:

> 'I think we in the past emphasised how to improve the bottom line, but did not focus much on improving the drivers of the bottom line. With the MD's active participation, support and action, we realised that, in order to improve the fruits of a tree, we needed to take care of the stem, leaves and flowers of a tree. I think the multi-dimensional performance measurement technique makes a perfect balance of these factors in our bank control system and is now practised in day-to-day operations'.

Such a finding is consistent with some MA studies (see Greenwood & Hinings, 1996) and with a recent study in the context of the banking industry (Munir et al., 2013). Respondents opined that support and commitment from internal actors are necessary in understanding the change process of MA practices (specifically, the use of MPM). Interviewee 8 explained:

> 'Look, the banking industry is very much unique from other industries, because as a financial institution we need to comply with additional strict rules set by regulators. However, in all cases, we receive impressive support and cooperation from our MD. He has a charismatic leadership role in this regard to get the jobs done. In that sense, internally he is the key change agent for our bank to implement new management practices including the implementation of the multi-dimensional performance measurement system. Our branch level senior executives' support is also important as they basically consult with other staff that could resist any change in our bank'.

3.6.7 Control variables and MPM use

The hypothesised relationship between the choice of dominant shareholders and MPM use was supported; a finding consistent with earlier research in developing countries (Uddin, 2009; Reaz & Arun, 2006). As discussed in subsection 3.2.1 of the current study, the Bangladesh Bank has promulgated rules that curb the tendency for dominant families to be excessively represented on the boards of directors of banks in Bangladesh. This finding could thus be justified in the light of indegeneous practises of a developing country even though the stringent corporate governance regulations issued by the central bank of Bangladesh (see subsection 3.2.1). Moreover, the banking sector is a highly regulated industry where regulators specified responsibilities both to directors and executive members of management. Executive members of banks remain accountable to both the board and regulators for achieving financial and other business targets by efficiently implementing business plans, prudent administration and financial management techniques. Accordingly, the board of directors is informed of all executive management functions and strategic and tactical decisions, and directors evaluate

executive management performance using KPIs as per the guidelines of the central bank. Interviewee 9 commented:

> 'We give regular updates to them every month in executive committee (EC) meetings. However, I do not think that they [would] oppose a PMS change in our banks if it were required. When regulatory guidelines are in place, sponsor directors do not get involved in the functioning of management ...'.

Lastly, the effect of control variables such as banks' size on MPM (specifically, the impact of size on the use of MPM) is in line with earlier studies (see Khan et al., 2011a). The impact of business size (measured using total revenue) on MPM use is consistent with others in the literature (Ferreira et al., 2010); however, it is not consistent with the findings of Hoque et al. (2001), who found no relationship between business size and MPM use. It should be noted that when size is measured through total assets, it shows no impact on MPM use (see Table 3.4). The result of no impact of size (measured through the log of total assets) is consistent with the results of Ittner et al. (2003).

3.7 Conclusion, implications and limitations

The study examined the influence of market competition, institutional factors and the role of internal actors (top-level management participation) on the use of MPM in banks using data from the banking sector in Bangladesh. A theoretical model has been developed using the NIS lens to understand the influence of such external and internal factors on the use of MPM. The study found that the influence of the central bank, competitive pressures and pressure from peer banks' success are key drivers for the use of MPM in the commercial banks in Bangladesh. Banks use MPM based on the rationale of both economic efficiency (market force) and legitimacy (central bank influence). The findings also confirmed that the active participation of top-level management is an influential factor in the use of MPM. There was, however, no evidence to support a relationship between socio-economic and political institutions, professional and trade associations, on the use of MPM in banks in Bangladesh. From the results of the additional analysis, the current study evidenced the mediating effects of top management participation in understanding the central bank influence and use of MPM relationship. It has further been evidenced in the additional analysis that participation of top management in banks in Bangladesh in the use of MPM is moderated by the level of competition in the environment. That is, when competition is intense in the industry, they show more commitment to participate in the use of more MPM.

From a theoretical perspective, the current research extends the understanding of the drivers of MPM use in commercial banks in Bangladesh. In particular, the study is able to provide insights into competitive force and different types of institutional forces and examine their effects on the use of MPM by Bangladeshi commercial banks. In the specific context of banks in Bangladesh, the findings of the current study provide new insights that external forces such as competitive force and institutional forces (specifically, the central bank's influence and peer banks' successful practices) are necessary factors that stimulate decision makers of banks to use MPM in their performance measurement system. In the specific context of banks in Bangladesh, the study have also evidenced that in addition to external forces, the participation and support of internal actors (top-level management) are also important for the use of MPM. This line of understanding was not advanced earlier in previous studies in the context of banks in Bangladesh.

Also, the findings of the current study provide further evidence on the impact of market competition on MPM. Specifically, based on interview data, the current study provides evidence on the types of information and the reasons why decision makers of banks in Bangladesh use multi-dimensional performance measures in response to specific elements of market competition (e.g., competition for market share and competitor behaviour) which has not been previously advanced in the performance measurement literature (see discussion in subsection 3.6.1). Moreover, while earlier studies (e.g., Hoque et al., 2001) investigated the effect of market competition on the use of multiple performance measures at the business unit level, the current study has been carried out at the corporate level.

Furthermore, in terms of theory, the current study has offered new insights that external factors such as regulatory pressures (specifically, central bank influence and encouragement) and banks' intention to capitalise context-specific benefits (discussed in subsection 3.6.2) influence the use of performance indicators that relate to employees, social and environmental performance in the organisational control system. The current study therefore contributes to PM literature with a specific reference to commercial banks in Bangladesh because it provides additional insights regarding the interplay between regulatory influences (e.g., central bank influence) and context-specific benefits that motivate commercial banks in Bangladesh to use MPM. Moreover, from the perspective of banks in a developing country (e.g., the banks in Bangladesh), the study sheds further light that MPM are used not only for assessing financial

performance but also for measuring community, customer, employee and environmental performance as part of environmental management initiatives which are new in the PM literature on banks.

In addition, the study has evidenced the mediating effect of top management participation (TMP) in the relationship between central bank influence and MPM use, which has not been explored previously in the literature. To the best of the researcher's knowledge, no earlier study in the PM literature has examined the mediating effects of top management participation in understanding the central bank influence and MPM relationship. Likewise, the study tests the moderating role of market competition to predict the TMP and MPM relationship, which is a novel attempt in the PM literature. While earlier studies have shown that top management participation is associated with MPM use (Braam & Nijssen, 2011; Munir et al., 2013), the findings of the study show that it is also important to evaluate the conditions under which such participation and support are worthwhile for MPM use. The study assumed that a contextual factor (i.e., market competition) could moderate these relationships. To the best of the researcher's knowledge, no prior research in the management accounting literature has investigated the moderating effects of market competition in understanding the TMP and MPM relationship.

Methodologically, the study has contributed to institutional theory-based MPM research by adopting the survey method in its research design. Lastly, this study used both survey and interview data in order to gain a better understanding of the theme of the study. As the current study represents the case of commercial banks in Bangladesh, the combination of the survey with post-survey interviews has enabled the study's findings to be better explained and more clearly understood.

The study also has implications for practice. Understanding the influence of competitive and institutional forces on the use of MPM is useful for practitioners and government regulators. The central bank exerts influence on commercial banks in their use of MPM through various activities and regulations. The influence of peer banks' success in the sector suggests that innovations in performance measurement could be best spread through trade associations. Top management should be encouraged to exchange successfully implemented contemporary PM

techniques through industry, trade and professional events as banks in Bangladesh have a tendency to copy best management practices from their peers.

The study's findings also suggest that the regulators of banks in Bangladesh promote both efficiency and the legitimacy-oriented rationale, specifically through the use of coercive influence on the use of MPM. Although legitimacy-pursuing factors (institutional factors) have a different degree of impact on the use of MPM in banks (i.e., not all institutional factors have an impact on the use of MPM in the context investigated) and given the strong influence of the central bank, it is important to mention that it would seem sensible for regulators to encourage the use of MPM by commercial banks and other institutions (e.g., non-banking financial institutions in the financial industry). Likewise, active participation from internal decision makers (top-level management) could also be advocated. The reason is that banks' decision makers may not eventually be committed to improving much in their traditional control techniques if the decision to use MPM is merely steered by legitimacy-oriented rationale.

Similarly, given the low proportion of the mediating effect of top management participation in understanding the relationship between regulatory influence (specifically, central bank influence) and MPM use as evidenced in the current study, it is suggested that ongoing initiatives taken by the central bank towards improving MPM use should continue. Regulators are encouraged to continue their evaluation by assessing the performance of commercial banks both from the perspective of financial dimensions and other performance dimensions such as community, environment, customers and employees. As indicated by the findings of the current study, such evaluation assists commercial banks in Bangladesh to use multi-dimensional performance indicators to generate performance information.

Furthermore, based on the findings of the current study, the central bank and the country's other regulators are encouraged to come up with new motivational incentives to attract the involvement of commercial banks in social, environmental, employee and customer activities, resulting in the greater use of MPM for performance information. The reason is that it is much easier for regulators to persuade decision makers of commercial banks to be more participative and committed in improving their control techniques when the decision to use MPM is navigated through both legitimacy-oriented reasoning and any potential benefits to be derived from their use.

With regards to the moderating effects of market competition in understanding the relationship between top management participation and MPM use, it is suggested that when decision makers of banks in Bangladesh are planning to participate in and support the use of MPM, they should do so according to the level of competition that they are experiencing from the external environment. The reason is that the level of competition moderates (changes) the extent of MPM use in their firms as evidenced in the current study (Table 3.6). These findings also suggest that, in response to the competitive environment, decision makers of banks in Bangladesh have to understand and evaluate the acuteness of the competitiveness in the environment which would lead them to reinforce their participation in changes in the traditional performance measurement system (specifically, the use of MPM). However, such reinforcement of top management participation is not necessary when competition in the industry is low: participation and support for using MPM in this case would be unnecessary, probably because customers and competitors pose little threat in terms of eroding a firm's market share in the event of a less competitive environment.

The findings of this study, however, are subject to certain limitations. Firstly, although the study collected data from all private and state-owned commercial banks in Bangladesh, the total cases numbered 34, but the current study excluded foreign-owned commercial banks in Bangladesh: therefore, the generalisation of the study's findings to foreign banks operating in Bangladesh, other sectors and other countries should be made with great care. Secondly, there is always a social desirability bias in surveys and interviews despite assurances of anonymity to respondents and a great deal of care being taken in data collection. Thirdly, in the banking environment, other factors (e.g., organisational structure and external uncertainty) could possibly influence MPM use: these were not considered in the current study. Future research could examine a combination of institutional pressures and these constructs on the use of MPM. Moreover, much needs to be understood about why, how and in what way internal actors perform a crucial role in using MPM practices within banks. A case study research preferably of a single bank covering different years' data could delineate an in-depth understanding of the role of internal actors in the implementation and use of performance measurement techniques (specifically, MPM). Lastly, this study has measured the construct '*choice of dominant shareholders'* using one item. Future attempts are welcome to improve the scale using multi-item constructs.

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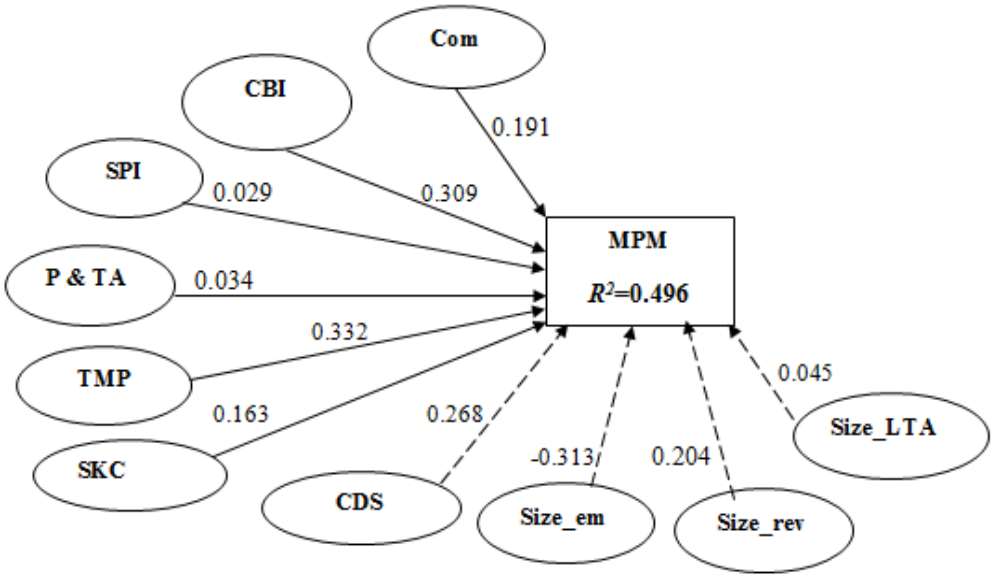
Appendix 3.1: Interview guide

Q-1	In the questionnaire answer, you mentioned that your bank typically relies on many non-financial and financial performance measures, could you please explain when did you start the MPM use, and why?
Q-2	What factors motivated your bank to change the traditional performance measurement system?
Q-3	Why and how do you think that intense competition affects adoption of a new performance measurement system?
Q-4	Could you please elaborate in detail how the central bank affects multi-dimensional performance measurement practices of banks?
Q-5	Do you have to follow any guidelines from the Bangladesh Bank to provide non-financial information?
Q-6	Please discuss how your bank knows your competitors' management practices?
Q-7	Why do professional associations and local universities have no influence on MPM practices? Nevertheless, we know the banking industry entirely depends on training by BIBM, could you please explain a bit of detail on this?
Q-8	What about socio-political institutions, i.e., donor agencies? They generally work with the Bangladesh Government, even with the central bank.
Q-9	Why do you think that MPM are practised as a choice of dominant shareholders?
Q-10	'Directors have some responsibility as well as per BB guidelines: they could thus be involved in strategic management issues'. Please explain.
Q-11	Explain with an example, how market competition and the central bank have impact on your performance measurement?
Q-12	Why do you think that MPM are practised as an active support of top management shareholders?

Appendix 3.2: Cross-loadings of constructs

CODE	Items	1	2	3	4	5	6	7
1. MPM	MPM1	**0.86**	-0.10	0.06	0.00	0.17	-0.06	0.19
	MPM2	**0.57**	-0.14	0.11	0.37	0.14	-0.13	0.18
	MPM3	**0.59**	-0.15	0.22	0.21	0.04	-0.55	0.22
	MPM4	**0.77**	-0.32	0.30	0.10	0.10	-0.54	0.13
	MPM5	**0.85**	0.02	0.18	0.22	0.15	0.24	0.28
	MPM6	**0.84**	-0.01	0.14	0.00	0.22	0.43	0.25
	MPM7	**0.61**	-0.15	0.29	0.19	0.24	-0.11	0.26
2. Com	COM 1	0.10	**0.74**	-0.24	0.12	0.05	0.17	0.05
	COM 2	0.04	**0.58**	0.01	-0.02	-0.07	-0.25	0.18
	COM 3	-0.09	**0.87**	-0.16	-0.02	-0.05	0.11	0.11
	COM 4	0.21	**0.91**	0.12	-0.25	-0.03	0.14	-0.08
	COM 5	-0.13	**0.79**	-0.20	-0.54	0.16	0.02	0.12
3. CBI	CB1	0.24	0.16	**0.79**	0.12	0.12	-0.12	0.21
	CB2	0.26	0.34	**0.66**	-0.19	0.08	0.11	0.13
4. SPI	SPI1	-0.16	0.28	0.12	**0.77**	0.04	0.23	-0.08
	SPI2	-0.12	0.17	-0.14	**0.71**	0.14	-.01	0.04
5. P&TA	P&TA1	-0.14	0.02	-0.12	0.04	**0.77**	0.04	0.20
	P&TA2	0.10	0.16	0.15	-0.12	**0.72**	-0.12	0.33
	P&TA3	0.29	-0.05	0.21	0.01	**0.90**	0.01	0.14
6. SKC	SKC1	0.19	0.14	0.20	0.04	-0.02	**0.75**	0.12
	SKC2	0.11	0.31	0.33	0.13	0.11	**0.95**	-0.14
7. TMP	TMP1	0.16	0.01	0.04	0.09	0.28	0.22	**0.82**
	TMP2	0.30	0.07	0.09	-0.22	0.33	0.14	**0.95**

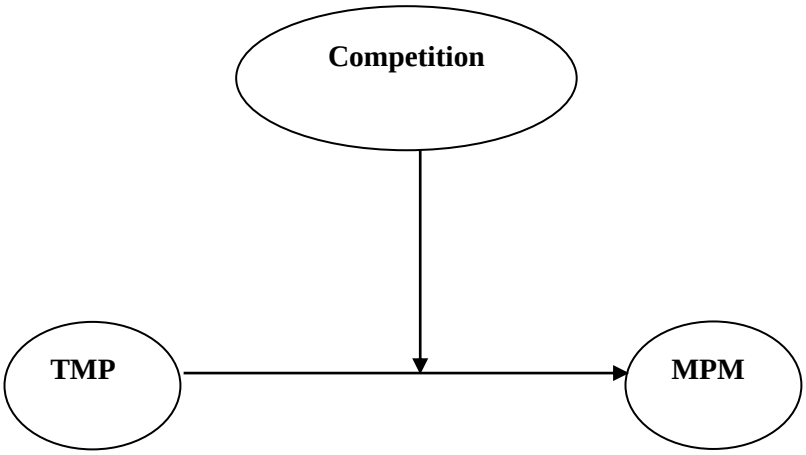
Appendix 3.3: PLS model path coefficients



Hypothesised path ⟶ ⟶ control path

Note: **MPM**=Multi-dimensional performance measures;**Com**=Competition; **CBI**=Central bank's influence; **SPI**=Socio-political institutions' influence; **P&TA**=Involvement in professional and trade associations; **SKC**=Success of key competitors; **TMP**=Top management participation; **CDS**=Choice of dominant shareholders; **Size_emp**=Banks' size measured in number of employees; **Size_rev=**Banks' size measured in total revenues (in million Tk.); **Size_LTA=**Banks' size measured in log of total assets (in million Tk.)

Appendix 3.4: Graphical model for moderating effects of market competition in TMP and MPM relationship



Notes: MPM=Multi-dimensional performance measures; and **TMP**=Top management participation

Chapter 4

Intangible assets, multi-dimensional performance measures and organisational performance: a direct and mediating relationship

Abstract: This study investigates the impact of change in investment in intangible assets on the use of multi-dimensional performance measures (MPM) and organisational performance (OP). It also investigates the mediating effect of MPM on the relationship between change in investment in intangible assets and OP. Additionally, the current study investigates the moderating effects of market competition and banks' size on understanding the change in investment in intangible assets and organisational performance relationship. The study collected data using survey questionnaires distributed to the top-level management of Bangladeshi banks (n=34) and post-questionnaire interviews. A partial least squares technique was used to test the hypothesised model. There were three major findings: 1) change in investment in intangible assets positively affects organisational performance; 2) there is a significant relationship between change in investment in intangible assets and MPM use; and 3) the relationship between change in investment in intangible assets and organisational performance is partially mediated by MPM. Additional analysis undertaken in the current study also found the moderating effects of market competition and banks' size on understanding the change in investment in intangible assets and organisational performance relationship.

Keywords: Investment in intangible assets, multi-dimensional performance measures, banks, organisational performance, Bangladesh.

4.1. Introduction

With the pace of the knowledge-driven, technology-focused global environment, firms are increasingly investing in numerous intangible assets such as human resource development, information technology (IT), customer relationship management (CRM), advertising, research and development (R&D), and other intellectual properties (Seemann et al., 2000). Changes in investment in these intangible assets by many firms across the globe have been evidenced in many studies (Zéghal & Maaloul, 2011; Sharif et al., 2013; Hung, 2012; Beccalli, 2007; Martin-Oliver & Salas-Fumus, 2008; Caron et al., 1994). For instance, Zéghal and Maaloul's (2011) study on the growth of annual investments in R&D of firms from more than 40 countries reported that annual R&D investment increased by more than 5% (increased from 4% to 9.1%) between the years of 2001-2007. Sharif et al. (2013) documented that this growth rate in R&D spending as a percentage of gross national product (GNP) was 0.02% for firms in Bangladesh (a rise from 0.01% to 0.03%) and 0.46% for Malaysian firms (a rise from 0.13% to 0.59%) between the years of 1994-2008. Martin-Oliver and Salas-Fumus's (2008) study in Spain provided evidence that the change in investments in IT during the period from 1989 to 2003 was 4.8% on average.

Understanding the impact of changes in investment in intangible assets including R&D is beneficial for various reasons. To illustrate, there has been increasing acknowledgement that investment in intangible assets is crucial for firms not only for achieving sustainable competitiveness (Wang et al., 2008), but also for enjoying other benefits such as building strategic capabilities, enhancing employees' excellence, attracting new customers and, above all, increasing organisational performance (Tayles et al., 2007; Kaplan, 2010; Widener, 2006; Marr & Adams, 2004). Likewise, changes in investment in human resource management (e.g., employees' training and development) enhances employees' skills and learning which has implications for employees' productivity (Bassi et al., 2002; Huselid, 1995; Chauvin & Hirschey, 1993). Similarly, investments in relational capital (e.g., CRM) have the potential not only to increase customer retention but also to attract new customers and increase customer satisfaction (St-Pierre & Audet, 2011; Young et al., 2007; Webster & Jensen, 2006). Therefore, understanding the impact of changes in investment in intangible assets on organisational performance is of key interest to both practitioners and academics.

Many researchers, however, have suggested that the lack of an appropriate performance measurement tool for measurement and management of intangible assets can lead to an under-investment in intangible assets (Lev, 2001; Bose & Thomas, 2007). Without an appropriate performance measurement system, decision makers within firms would hardly be able to capture the performance of intangible assets (Lönnqvist & Mettänen, 2005; Kaplan & Norton, 2004a). As decision makers increasingly understand the significance of intangible assets in producing value for business, calls have been made on management accounting academics to investigate how firms capture and measure such value and also to investigate the impact of investment in intangible assets on organisational performance through the use of an appropriate performance measurement system (Marr & Chatzkel, 2004; Tayles et al., 2007). In this regard, the use of multi-dimensional performance measures (MPM) provides relevant and timely information on intangible assets' investment (Zigan & Zeglat, 2010; Zéghal & Maaloul, 2011; Kaplan & Norton, 1996). Furthermore, MPM enable the assessment of value derived as a result of investment in intangible assets. It also assist decision makers to assess and understand the extent to which firms are able to attain long-term goals associated with intangible assets and to monitor organisational performance on many intangible assets (Usoff et al., 2002; Marr et al., 2003).

However, the research undertaken in this area is relatively limited. In the MA literature, studies have suggested that, as an appropriate performance measurement system, MPM (or MPM tools such as the balanced scorecard [BSC]) are required for firms to assess the value derived as a result of investment in intangible assets (Hendricks et al., 2004; Hendricks et al., 2012). In the literature, Hendricks et al. (2004) hypothesised, but did not find, a direct association between investment in intangible assets and the adoption of the BSC (see also Hendricks et al., 2012). It follows that the effect of investment in intangible assets on PM techniques has not been well established. Hendricks et al. (2012) suggested further investigation to understand the role of investment in intangible assets in the use of performance measurement. Widener's (2006) study provided empirical evidence on the importance of the mediating role of the use of MPM in the relationship between strategic resources (human capital, structural capital and physical capital) and financial performance (return on assets).

The current study investigates the impact of intangible assets' investment not only on financial performance, but also on other performance parameters, namely, employees' productivity and

customer satisfaction. This investigation is worthwhile as the value generated from intangible assets has the potential to justify, not only the firm's investment commitment (Khallaf, 2012) in the form of financial performance, but also through improvement in other performance dimensions in an organisation including customer service and employees' productivity (Kaplan & Norton, 2004b).

Similarly, while there is a growing view that change in firms' investment in intangible assets would assist in improving organisational performance (Wang et al., 2008; Tayles et al., 2007), the extant literature provides limited understanding into the mechanisms by which such improvement can be assessed. That is, the understanding of the mediating effect of MPM use in explaining the relationship between change in investment in intangible assets and organisational performance is limited. In a mediating effect relationship, the relationship between the independent variable and the dependent variable is not treated merely as direct; rather, their relationship is explained via a mediator (Baron & Kenny, 1986; Kim et al., 2001). Specifically, in a mediating effect relationship, it is attempted to 'identify the intermediary process' that leads from the independent variable (predictor) to the dependent variable (Muller et al., 2005, p. 852). As has been discussed in detail in the literature review and hypotheses development section, the current study assumes that change in investment in intangible assets (independent variable) would lead to organisational performance (dependent variable), but in this relationship, MPM would act as a mediator. Given that financial performance measures are neither able to provide complete information on firms' investment in intangible assets nor assess the impact of change in firms' investment in many intangible assets on organisational performance (Khallaf, 2012; Zéghal & Maaloul, 2011), MPM could offer a rich source of performance information on changes in investment in intangible assets to decision makers. Information on intangible assets through the use of MPM has the potential to enable decision makers in the efficient management of intangible assets, leading to a positive impact on organisational performance (Zigan & Zeglat, 2010; Kaplan & Norton, 1996).

It is proposed that the impact of changes in investment in intangible assets on improving organisational performance could be predicted, but to assess the impact, the use of a multi-dimensional approach for performance measures is required (Kaplan & Norton, 2004b; Zigan & Zeglat, 2010). While earlier studies have evidenced that change in investment in intangible assets are associated with organisational performance (e.g., Martin-Oliver & Salas-Fumus,

2008; Aboody & Lev, 2001; Bassi et al., 2002), in today's intangible assets-intensive business environment, it is also important to investigate the mechanism through which such change in investment in intangible assets could impact on organisational performance. If there is a factor that mediates the relationship between change in investment in intangible assets and organisational performance, then an understanding of this factor would have managerial implications, the results of which can be used both in managerial decision making as well as the internal reporting systems of management.

The current study has thus been motivated to examine the mediating effect of MPM use in the relationship between change in investment in intangible assets and organisational performance. The rationale behind this motivation is that firms invest in intangible assets expecting these investments to add value to their firm, and to measure such value, they need to use multi-dimensional measures. Following the widespread performance measurement mantras that '*what gets measured gets done*,' '*if you do not measure results, you cannot tell success or failure'* and '*if you cannot measure an activity, you can neither manage nor improve it*' (Kaplan & Norton, 1992; Balanced Scorecard Institute, 2014), the current study argues that in order to assess the expected benefits from change in investment in intangible assets, organisations need to use MPM. This study has examined the following research questions (RQs):

(RQ-1): Does change in investment in intangible assets have an impact on the use of MPM and organisational performance?
(RQ-2): Does the use of MPM mediate the relationship between change in investment in intangible assets and organisational performance?

The above-mentioned research questions have been examined using data from the context of the banking industry in a developing country (specifically in Bangladesh). There are several reasons for selecting the banking industry to answer these research questions. Firstly, banks have been cited for their massive investment in intangible assets in recent years due to changing banking environments (Shih et al., 2010). Secondly, banks have adopted innovative performance measurement frameworks in order to take account of growing investment in intangible assets (Wu, 2012). The banking sector of Bangladesh has been chosen for several reasons. Firstly, the banking sector in Bangladesh, where the study was undertaken, is

characterised by a high level of competition as a result of liberalisation of the market, which has resulted in offering banking services by emphasising numerous intangible assets such as technology-focused financial services and human resource development in the recent past (Riyadh et al., 2009; Raihan, 2007). Secondly, the banking industry in Bangladesh has progressively moved into substantial investment in intangible assets in recent years in areas such as human resource development, technology-driven banking products and services, and internal process improvement (Raihan, 2007). This context therefore provides an opportunity to understand how banks' investment commitment to intangible assets and the use of MPM affect their performance.

The remainder of this paper has six sections. Section 4.2 discusses the conceptual understanding of intangible assets and MPM research and is followed by a short description of contingency theory used as the theoretical perspective of the study. Section 4.3 presents a literature review and hypotheses development. Section 4.4 describes the method and section 4.5 analyses the results. Section 4.6 discusses the empirical findings of the study. The final section concludes the paper and provides the implications and limitations of the study.

4.2. Conceptual basis and overview of intangible assets and multi-dimensional performance measures (MPM)

This study has adopted Petty and Guthrie's (2000, p. 158) definition of intangible assets which refers to the sum of *human capital* (human resources within the firm, and resources external to the organisation, namely, customers and suppliers) and *organisational capital* (including software systems, information system, distribution networks and supply chains). Despite the absence of agreement on the classification of intangible assets (Sveiby, 1997), Bukh et al. (2001) have outlined that there has been a general convergence on three common aspects of intangible assets; namely, their connection to human resources (human capital); their processes and structures (structural capital); and their relationship with customers and suppliers (relational capital). *Human capital* is the intelligence of the organisation's workforce. *Structural capital* includes the knowledge and the information system, embedded within the organisation's routines. *Relational capital* (i.e., the capacity to collaborate) refers to the knowledge flowing from suppliers, customers, government and other stakeholders external to the organisation (Kaufmann & Schneider, 2004). This classification of intangible assets is also

adopted in Petty and Guthrie's (2000) study where they explicitly mentioned two types of intangible assets, namely, organisational/structural capital and human capital (p. 158).

Intangible assets are often treated as strategic resources (Amit & Schoemaker, 1993; Widener, 2006). To realise benefits from such strategic resources, the measurement and management of such assets are essential (Coff, 1997). In order to measure the benefits of investing in such strategic resources (Khallaf, 2012; Tayles et al., 2007), it is necessary for decision makers to use an appropriate performance measurement system (Widener, 2006; Simons, 2000). Scholars have suggested that growing investment in many intangible assets such as employees' competence and the customer relationship management program lead to customer satisfaction and loyalty which positively contribute to shareholders' value (Ittner & Larcker, 1998; Marr, 2005). From the strategic management perspective, firms must not only take into account the competitive forces, threats and opportunities in a given industry (Porter, 1979), but also their core intangible assets in order to track future opportunities that require detailed financial and non-financial information (Marr, 2005). To enable decision makers to make strategic decisions, detailed, timely and reliable non-financial information on intangible assets is needed (Kaplan, 2010; Neely et al., 1996; Kaplan & Norton, 1996). Consequently, it is essential to have suitable performance measurement systems (Kaplan & Norton, 1996, 2004a) that enable firms to measure their intangible assets performance (Neely et al., 1996; Ittner & Larcker, 1998).

4.2.1 Theoretical perspective: contingency theory

This study draws on contingency theory. Contingency theorists have argued that organisational performance arises as a result of fitting management control systems with many contingencies that represent the operating context of organisations (Otley, 1980; Chenhall, 2003, 2005; Langfield-Smith, 2007). The key proposition of the contingency theory is that there is no universally accepted management control system that fits all organisations (Otley, 1980; Chenhall, 2003; Lee & Yang, 2011). Rather, it is the composite of many contingent factors that result in better organisational performance when these factors are properly aligned with the control system in an organisation, for example, a performance measurement system (Fisher, 1998; Otley, 1999; Chenhall, 2005). Earlier studies have examined the influence of numerous contingent factors such as the external environment (Hoque, 2005); organisational size (Hoque & James, 2000); market competition (Lee & Yang, 2011; Hoque et al., 2001); business strategy (Gosselin, 2011; Govindarajan, 1986, 1988); organisational structure (Lee & Yang, 2011;

Gosselin, 2011; Gordon & Narayanan, 1984); corporate culture (Henri, 2006; Hall, 2008); and investment in intangible assets (Hendricks et al., 2004; Kaplan & Norton, 2004a; Kaplan, 2010). In the *contingency* approach, fit is understood by examining the relationship between contextual factors (e.g., structure, strategy or intangible assets), and how these contingent factors fit affects organisational performance. [27]

This study has examined the effect of a contingent factor, namely, change in investment in intangible assets on the use of multi-dimensional performance measures and their joint effect on organisational performance. More specifically, the study provides an account of the mediating effect of MPM use in the relationship between change in investment in intangible assets and organisational performance. The significant role of 'change in investment in intangible assets' in implementing a management control system has been emphasised in earlier performance measurement literature (Tayles et al., 2007; Hendricks et al., 2004, 2012; Kaplan & Norton, 2004a, 2004b; Kaplan, 2010) but has been under-researched in the literature.

This study has argued that, in the context of the services sector and, specifically, the banking industry, the use of MPM acts as a vehicle assisting decision makers to measure and understand the impact of changes in investment in intangible assets on organisational performance. Following Venkataraman (1989) and Gerdin and Greve (2004), the current study tests the mediating effect. The mediating effect occurs when there is an impact by the predictor (i.e., change in investment in intangible assets) on the outcome variable (i.e., organisational performance) through the mediator (i.e., the use of MPM).

4.3. Literature review and hypotheses development

This section reviews the relevant literature and develops the hypotheses in relation to the association between change in investment in intangible assets, the use of MPM and organisational performance.

[27] This approach, however, is different from the *congruence* approach that focuses on investigating the fit between contextual factors without further examination of whether this relationship has an impact on performance (Gerdin & Greve, 2004).

4.3.1. Investment in intangible assets and organisational performance: a direct link

Existing research has suggested that firms' investment in intangible assets influences their performance as intangible assets are considered key success factors of firms (Brynjolfsson & Yang, 1999; Bharadwaj et al., 1999; Youndt et al., 2004; Greenhalgh & Longland, 2005; Hyvonen & Tuominen, 2006; Aboody & Lev, 2001). Studies have evidenced that change in investment in intangible assets (e.g., IT, R&D & customer relationship management program) impacts on organisational performance. For example, collecting data on IT investments from 1989-1993, Bharadwaj et al.'s (1999) study on US listed companies reported that IT investments had a significantly positive association with organisational performance. Using eight years of data on Fortune 1,000 companies, the results of Brynjolfsson and Yang's (1999) study showed that each dollar increase in IT investment was associated with generating about 10 dollars' increase in market value. Aboody and Lev (2001), in their research evaluating the return on R&D investments from 1980-1999 on publicly-traded chemical companies in the US, reported that each dollar increase invested in R&D, increased current and future operating income by two dollars. Relying on a longitudinal assessment between 1989 and 1993, Caron et al. (1994) in their case study research reported that, as a result of substantial change in investment in IT, the customer relationship management program and the firm's quality control led by a re-engineering project have resulted in increased improvement of organisational performance in many areas for the case firm. These include over 40% reduction of operating costs, 100% improvement of cycle times, 50% increase in customer satisfaction and 75% increased improvement of service quality.

Providing further support to this discussion, Weill's (1992) longitudinal study in the US valve manufacturing industry has provided evidence that change in IT investment in the valve industry (which grew from 3.5% to 4.0% of sales over the six-year period from 1982-1987) contributed to organisational performance of which, on average, return on assets (ROA) and sales growth were increased by 3.0% and 7.5%, respectively, together with a rise in employees' productivity by 0.6% during the study period.

Changes in investment in intangible assets have also been found to contribute to future cash flows. For example, relying on six years of panel data, a recent study by Boujelben and Fedhila (2011) reported a positive and significant change in intangible asset investments (investments in R&D, quality and training, and brand building activities such as advertising) affecting future

operating cash flows. Studies have also suggested that when firms attempt to implement effective human resource management (HRM) practices, they allocate (invest) financial resources to select appropriate personnel, and offer training and monetary incentives as well as initiating future development programs for human resources so as to increase the value and uniqueness of those assets (Shaw et al., 2013). Increased investment in HRM practices enables the creation of a competent workforce leading to many benefits including increase in employee productivity, reduction in employee turnover and increased employee satisfaction (Delery & Shaw, 2001; Hitt et al., 2001).

Research studies have also revealed that changes in investment in HRM significantly affect organisational performance (Bassi et al., 2002; Hitt et al., 2001, cited in Shaw et al., 2013; Huselid, 1995). To illustrate, collecting data from the American Society of Training and Development database for a three-year period, Bassi et al. (2002) in their study on US listed firms reported that changes in investment in employees' training and expenditure on education had a positive impact on organisational performance (measured by total stockholders' return). Huselid (1995) in his study reported that organisations that changed their investment in the HRM practises by approximately 30%, contributed to, on average, over 5% increase in financial performance and a decrease in employee turnover by more than 6% (from 18.4% to12.3%). Other researchers have reported that firms' higher level of investment in employees' training positively contributes to decreasing employee turnover (Arthur et al., 1994, cited in Hansson et al., 2004).

In the context of the banking industry, changes such as deregulation, competition and developments in IT have placed banks' profitability under threat forcing them to focus increasingly on investment in intangible assets such as customer satisfaction programs, employees' training, advertising, IT, and information and communications technology. It was expected that this focus would help to innovate new products and services and to find better ways of serving customers (Hung et al., 2012; Beccalli, 2007; Martin-Oliver & Salas-Fumus, 2008; Leckey et al., 2011; Byers & Lederer, 2001; Wang et al., 2008).

Empirically, in a recent study, Leckey et al. (2011), using panel data for 10 years (1997-2007) on the banks in Ghana, reported that banks which maintained high levels of investments in IT improved their performance. Martin-Oliver and Salas-Fumus (2008) in their longitudinal study

of Spanish banks evidenced that change in investment in IT and information systems (an element of organisational capital) and investment in branding activities such as advertising positively contributed to the banks' output. Specifically, the change of investment in IT (on average 4.8%) during the period 1989-2003 positively affected up to one-third of the growth rate of the aggregate output of banks (measured through the sum of loans and deposits). Their study provided further evidence that changes in spending on advertising (on average from 3.54% to 4.72% for the period studied) increased the supply of deposits by 22% and increased the demand for new loans by 11% (Martin-Oliver & Salas-Fumus, 2008). Relying on data for the five-year period from 1995-2000, Beccalli's study (2007) on five European countries evidenced that changes in investment in IT service have a significant effect on accounting profit and cost reduction. Specifically, the increase in investment in IT services (over 12%) resulted in more than 0.90% decline in accounting profit, but reduced operating cost by 0.06%. It therefore follows that, when banks show a higher level of investment commitment to intangible assets, this would impact on organisational performance.

In the specific context of banks in Bangladesh, recent studies have revealed that the technological environment of the industry has changed considerably owing to changes in investment in IT, information systems, networking systems and other areas such as the Bangladesh Automated Clearing House, mobile phone-based financial service, e-commerce, online banking, etc. (BB, 2013a; Shah, 2009; Riyadh et al., 2009). In addition, the increased investment in other intangible assets (e.g., relational capital and human capital) with an intention of building strategic alliances for sharing ATM machines with more than one bank, together with developing human capital, have also been evidenced in other studies (BB, 2013b; Afroj, 2012; Kabir et al., 2012). In Bangladesh, two previous studies (i.e., Najibullah, 2005; Mohiuddin et al., 2006) using the value-added intellectual coefficient (VAIC) model, showed that intellectual capital plays a positive role in the financial performance of a bank (a component of organisational performance).

Nevertheless, in the specific context of banks in Bangladesh, to date, there have been no studies that have evidenced the relationship between change in investment in intangible assets and organisational performance. The aforementioned discussion on change in investment in intangible assets in the context of banks in Bangladesh offers *a priori* rationale to assume a

positive relationship between change in investment in intangible assets and organisational performance. Based on the above discussion, the study therefore proposes that:

H_1. *Change in investment in intangible assets positively affects organisational performance of banks in Bangladesh.*

4.3.2 Investment in intangible assets and multi-dimensional performance measures (MPM)

The performance measurement literature has proposed that tracking and measuring investment in intangible assets requires the use of multi-dimensional performance measures (e.g., Kaplan & Norton, 1996, 2004b) as the conventional financial-focused performance measurement technique is unable to holistically measure the performance of intangible assets (Cater & Cater, 2009; Lev et al., 2009). Furthermore, the accounting-based traditional technique for performance measures is unable to specify how value drivers of entities such as the skills, motivation and capabilities of employees, customer acquisition and retention, innovativeness, human resources development and relational capital add value for firms (Lönnqvist, 2006). The use of a multi-dimensional approach of performance measures has therefore been advocated in recent years. MPM help decision makers to understand the measurement of intangible assets and to recognise the contribution of intangible assets towards organisational performance (Usoff et al., 2002; Ranatunga, 2002; Chareonsuk & Chansa-ngavej, 2010). Measuring intangible assets through the use of multi-dimentional performance measurement system enables firms to justify their investment in intangible assets (Khallaf, 2012). Khallaf (2012) indicated that multi-dimensional performance measures are well suited for intangible assets such as investment in IT. Kaplan and Norton (2004b) also indicated that the measurement of intangible assets includes many operational and strategic performance indicators for which the use of MPM is essential.

Realising the importance of intangible assets in today's knowledge-driven economy and recognising the increased growth of investment in intangible assets globally (Zéghal & Maaloul, 2011; Lev et al., 2009), the use of both financial and non-financial performance indicators has been promoted in recent decades by some accounting regulators in a number of countries. For example, the Canadian Institute of Chartered Accountants (CICA) suggested that listed firms should use non-financial performance measures for measuring and reporting investment in intangible assets after the 1990s (CICA, 1995). In 2001, the US Financial Accounting Standards Board (FASB) issued reports which included a framework encouraging

voluntary disclosure of information on the company's key success factors, including intangible assets' performance together with information about value creation indicators and, above all, indicators of the future strategies and plans of the company (FASB 2001a, 2001b). Since 2003, two regulators, namely, the US Securities and Exchange Commission (SEC) and Canadian Securities Administrators (CSA) made it mandatory to produce a report titled 'Management and discussion analysis' in the opening of listed firms' annual reports highlighting both narrative and analytical non-financial information about value drivers of intangible assets (SEC, 2003; Zéghal & Maaloul, 2011). These initiatives were subsequently implemented by the European Commission which changed its company law directives from 2005 (Zéghal & Maaloul, 2011).

In the context of developing countries, regulators have taken similar initiatives. Specifically, in 2010, South Africa was considered the first developing country to make it a mandatory requirement for intangible assets information to be included in financial reporting under an integrated reporting framework[28] for companies listed in Johannesburg Stock Exchange: this has been applied since 2011 (OECD, 2012; Integrated Reporting Committee, 2011). Collectively, it can be argued that the above-mentioned initiatives taken by different regulators will stimulate decision makers to integrate initiatives that involve investment in intangible assets into their management control system: consequently, it would lead firms to use a multi-dimensional approach for performance measures to evaluate and assess intangible asset expenditure, not only to provide information externally, but also to assess internally whether changes in investment in intangible assets add value for firms.

Indeed, measurement of intangible assets using MPM adds value for firms in many ways. For example, measurement of intangible assets enables management to get a holistic idea of firms' overall resources/capabilities (Zigan & Zeglat, 2010) and facilitates the feedback process of management control so as to determine firms' success factors (Lönnqvist, 2006). Further to this argument, the use of MPM assists management to set priorities in terms of the improvement of intangible assets according to firms' key success factors, and provides information about many

[28] This approach call for reporting financial, social and environmental corporate governance-related information on top of intangible assets-related information in a single report, is beyond the scope of this study (see Integrated Reporting Committee (2011) and Institute of Directors in South Africa (2009) for a detailed discussion).

internal processes such as lead time, cycle time, etc. (Fullerton & McWatters, 2002; Widener, 2006; Kaplan & Norton, 2004b; Henricks et al., 2004).

In the context of developing countries, many studies have revealed that firms in developing countries have changed their investment in many intangible assets. For example, Dutz et al.'s (2012) study in Brazil showed that total investment in intangible assets in Brazilian organisations during the period from 2000-2008 changed from 3.5% of gross domestic product (GDP) to almost 4.8%. Total investment in computer software and computerised databases changed from 0.2% to nearly 0.8% of GDP, and expenditure on brand building activities such as advertising went up from 0.6% to 0.8% of GDP. A recent study by the Government of the Russian Federation (2011) reported that investment in software and ICT services has changed from $345 million to $3.3 billion between 2002 and 2010 in Russia. In their study, Indjikian and Siegl (2005) reported that many firms in developing countries such as India, China, Egypt, Tunisia and Chile have made massive investments in IT in the last two decades through the establishment of effective telecommunication infrastructure, the development of the software industry, e-governance, etc. Although such changes in investment in intangible assets are evidenced in many developing countries, there has been little understanding of whether such changes of investment in intangible assets by firms in developing countries impact on the use of MPM. An exception is the study by Tayles et al. (2007) in Malaysia in which they found that firms that made enormous investments in intangible assets gave greater importance to employing contemporary MA practices including the practice of both non-financial and financial performance indicators.

In the specific context of banks in Bangladesh, past studies have shown that commercial banks use a multi-dimensional performance measures (Morium, 2002; Farjana & Das, 2009). However, little is understood about the relationship between banks' use of MPM and changes in investment in intangible assets in the context of banks in Bangladesh. The current study has argued that decision makers of commercial banks in Bangladesh could be motivated to use MPM which would enable them to measure the benefits of change in intangible assets' investment as well as to measure the performance of intangible assets. This argument is feasible because, in recent years, commercial banks operating in Bangladesh concentrated on massive investment in many intangible assets (Raihan, 2007; Shahid et al., 2003; Kabir et al., 2012). For example, through considerable investment, they introduced new business

collaboration, customer loyalty programs, marketing and distributing systems, and improved customer services (Raihan, 2007; Shahid et al., 2003); as well as human resource training and development practices (Afroj, 2012); and invested in the launch of various e-banking products and services and in the development of IT infrastructure (Riyadh et al., 2010; Al-Amin & Rahman, 2010). Other recent studies have shown that banks in Bangladesh have increased the provision of revealing intellectual capital-related information in external reporting. To illustrate, Belal and Ali (2013) in their recent longitudinal research over 27 years (1983-2010) on a case bank in Bangladesh reported that intellectual capital information for the bank had increased over the last two decades, with information on organisational capital being the most dominant. In another longitudinal study for a three-year period (2007-2009), Khan and Khan (2010) evidenced that the banking sector provided more human capital-related information than any other sectors such as the food, IT, textiles and leather goods industries.

From the above-mentioned discussion, it is argued that, as a result of changes in investment in intangible assets in the banking industry of Bangladesh, decision makers of banks are motivated to use MPM with the intention of assessing the performance of intangible assets both for internal decision making and to deliver information on intangible assets externally. The previous discussion therefore offers *a priori* reasoning to assume a positive association between change in investment in intangible assets and the use of MPM in banks in Bangladesh. Formally, this study proposes that:

H_2. *Change in investment in intangible assets positively affects the use of MPM in banks in Bangladesh.*

4.3.3. MPM use and organisational performance

The performance measurement literature has also claimed that the use of MPM positively affects organisational performance (Hoque & James, 2000; Davis & Albright, 2004; Schulz et al., 2010). A recent study by Schulz et al. (2010) found that firms using MPM were able to improve their performance particularly when a mix of various financial and non-financial measures was used in their performance measurement system. Davis and Albright (2004) in their research on banks in the US showed that the use of the MPM technique (the use of the balanced scorecard [BSC]) had a positive effect on organisational performance. This line of understanding had been empirically evidenced in other studies as well (e.g., see Hoque and James's [2000] study in Australia).

Nevertheless, there are other empirical studies that have provided inconsistent findings. For example, Ittner et al. (2003) in their study on US financial institutions reported that the use of non-financial measures was associated with improved performance (measured through a one-year stock return). However, they were not able to confirm any relationship between this performance and that of financial measures (measured by return on assets [ROA], sales growth and a three-year stock return). In the same year, based on data from the manufacturing industry, Maiga and Jacobs (2003) also found no significant association between the use of multi-dimensional performance measurement tools (e.g., BSC use) and organisational performance. In his research on New Zealand manufacturing firms, Hoque (2005) reported that the use of non-financial performance measures had no direct impact on organisational performance.

The above discussion suggests that the impact of MPM on organisational performance is not well established and the findings of research are mixed, indicating the need for further research to investigate this issue (i.e., the MPM and organisational performance relationship). No prior research in the context of banks in Bangladesh has examined the relationship between the use of MPM and organisational performance. As there is *a priori* reason to anticipate that a firm's multi-dimensional approach towards performance measures will affect organisational performance and as previous studies in Bangladesh evidenced that banks in Bangladesh use MPM (e.g., Khan et al., 2011), the hypothesis developed below has explored the direct effect of MPM use on organisational performance in the specific context of the banking sector in Bangladesh assuming that adoption of MPM use in banks in Bangladesh will positively affect organisational performance. Based on the above-mentioned discussion, the study posits the following hypothesis:

H_3. *The use of MPM positively affects organisational performance in banks in Bangladesh.*

4.3.4 Investment in intangible assets and organisational performance: mediating role of MPM

In the formulation of Hypothesis H_1, it was argued that change in investment in intangible assets has a positive effect on organisational performance. However, the PM literature has also suggested that the relationship between investment in intangible assets and organisational performance can be captured and understood if and only if the multi-dimensional approach for

performance measurement is used (St-Pierre & Audet, 2011; Kaplan & Norton, 1996, 2004a). The importance of multi-dimensional performance measures has been acknowledged since MPM enable decision makers to measure and communicate tangible benefits that may be generated by investment in intangible assets. MPM also help to provide relevant information to operational and strategic levels relating to human capital, structural capital and relational capital (Zigan & Zeglat, 2010; Hendricks et al., 2004; Kaplan & Norton, 1996, 2004a).

Without using multi-dimensional approach of measuring performance, it is not possible for firms to measure and identify how change in investment in intangible assets adds value to organisations for few reasons. Firstly, unlike tangible assets, intangible assets seldom directly add value (Kaplan & Norton, 2004b). Secondly, intangible assets never create value in isolation (Kaplan & Norton, 2004b, 2004c). Rather, they create value by combining with other tangible and intangible assets. Kaplan and Norton (2004b) illustrated that investment in IT, for example, will have little value unless it is complemented with a human resources training program, and many human resources training programs are unable to add value unless accompanied with contemporary technological tools. Hence, from a management control perspective, the value added within firms as a result of investment in intangible assets is not direct (St-Pierre & Audet, 2011; Kaplan & Norton, 2004b; Young et al., 2007). Rather, this process works indirectly via the mechanism of a performance measurement system (Widener, 2006).

The literature has suggested that a control system that emphasises a higher level of investment in intangible assets should be evaluated against the firm's multi-dimensional performance measurement techniques for a few reasons, for example, to monitor its ability to help develop strategic capabilities, identify key success factors and assess any value added as a result of changes in investment in intangible assets (Kaplan & Norton, 2004b; Zéghal & Maaloul, 2011; Bapna et al., 2013; Kim et al., 2010). Furthermore, the use of MPM enables the provision of essential information to decision makers so that they can properly manage intangible assets (Ittner, 2008; Widener, 2006). Given that firms' investment in intangible assets has increased considerably in today's information age as discussed earlier, to appropriately measure and manage those assets, and to recognise whether funds committed on intangible assets help to increase organisational performance, managers need to use a PMS which includes a multi-dimensional perspective (Zéghal & Maaloul, 2011; Kim et al., 2010). MPM are necessary for

firms because when firms increase their investment in intangible assets (e.g., HR training and development), they expect that such action will then increase employee commitment and work-related knowledge, resulting in increased customer satisfaction and loyalty, and customer retention which is a lead indicator of firms' profitability (Ulrich & Smallwood, 2005; Kim et al., 2010). In order to assess such lead and lag performance, decision makers ideally should use a PMS that contains both financial and non-financial indicators (Zéghal & Maaloul, 2011; Ulrich & Smallwood, 2005; Bapna et al., 2013; Kim et al., 2010).

Based on the above discussion, this study has argued that change in investment in intangible assets (e.g., training, workforce development programs or IT) could positively impact on many aspects of organisational performance, such as employees' capabilities, customer satisfaction and reduction of costs. However, decision makers of banks need to use a holistic performance measurement approach such as MPM to assess such performance (Ulrich & Smallwood, 2005; Claver-Cortes et al., 2008; Kaplan & Norton, 2004b; Ranatunga et al., 2004). The reason is that MPM enable them to measure and monitor firms' continuous improvement initiatives in many areas such as customer satisfaction, employees' capabilities and skills, employees' productivity, quality, the marketing and distributing system, and on-time delivery (Zigan & Zeglat, 2010; Dion, 2000). Through the use of MPM, firms are able to effectively measure and monitor changes in intangible assets' investment, leading to improved organisational performance (Claver-Cortes et al., 2008). Arguably, the use of multi-dimensional approaches of performance measures is a vehicle that helps transform the value of firms' investment in intangible assets into superior performance for organisations. The study therefore posits the relationship between change in investment in intangible assets and organisational performance in which the use of MPM has a mediating role.

Although the literature has illustrated the role of MPM use in the relationship between change in investment in intangible assets and organisational performance, no prior research in the PM literature has provided empirical evidence on this relationship. Nevertheless, since there is *a priori* theoretical reasoning (explained above) to anticipate that a firm's multi-dimensional approach for performance measures will affect the relationship between change in investment in intangible assets and organisational performance, the hypothesis developed below explores the mediating effect of MPM on the relationship between change in investment in intangible

assets and organisational performance in the specific context of the banking sector in Bangladesh. Stated formally, this study proposes that:

H_4. *The use of MPM mediates the relationship between change in investment in intangible assets and organisational performance in banks in Bangladesh.*

4.3.5 The theoretical model

Based on the above-mentioned discussion and the development of hypotheses, this study offers the following theoretical model shown in Figure 4.1.

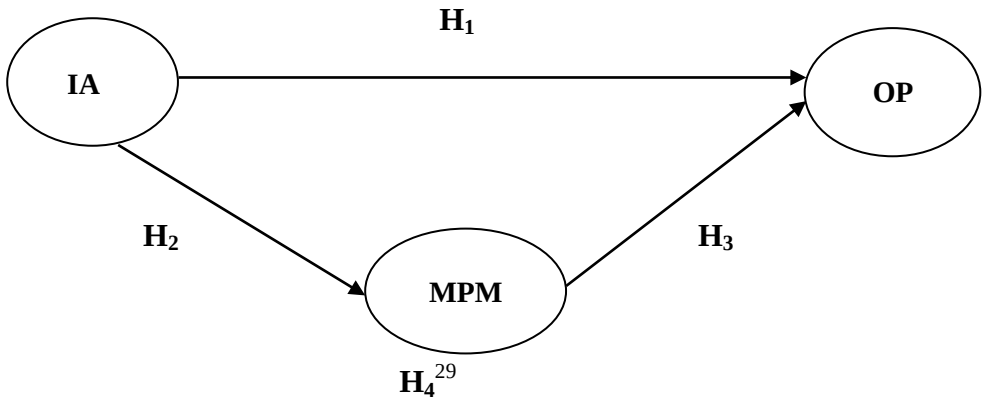


Figure 4.1: Theoretical model of the study

Notes: IA=Change in investment in intangible assets, **MPM**=Multi-dimensional performance measures, **OP**=Organisational performance

4.4. Research design

4.4.1 Sample

This research was based on data collected from the mix of a questionnaire survey and semi-structured interviews with senior management of Bangladeshi commercial banks in 2011. The unit of analysis comprised all private and state-owned commercial banks whose senior management (working at head office level) were the units of enquiry. Foreign commercial banks were not considered due to their insignificant market share which is below 5% (Ahmed, 2007). The study selected a single industry (the banking industry) so as to minimise

[29] Denotes IA-MPM-OP relationship

environmental divergence (Gani & Jermias, 2010). The selection of senior management was motivated by three reasons. Firstly, as senior managers, they performed the key strategic role of focusing their organisation's strategic directions and performance management (Khan et al., 2010), thereby influencing the degree of MPM use and the commitment of funds to intangible assets. Secondly, they possessed the greatest share of knowledge of MA practices (Chenhall, 2005). Finally, they had a deeper awareness of their banks' control systems which was needed when making strategic decisions in areas such as investment in intangible assets and the performance measurement framework of their banks.

4.4.2 Data collection

The first stage of data collection for this study was the questionnaire survey. The questionnaire included a number of variables other than intangible assets and multi-dimensional performance measures that could relate to organisational performance 'thereby allowing significant research efficiency' (Dunk, 2004, p. 406). The questionnaire was initially pre-tested by senior academics in the research area of intangible assets and performance measurement. It was then pilot tested by three banks executives in the Dhaka city area in order to check the clarity and relevance of the questions; minor modifications to the questionnaire were then made accordingly. Respondents participating in the pilot phase were also top-level management; however, they were not included in the main study since, as stated earlier, the data collection was undertaken at the head office level.

Using Salant and Dillman's (1994) survey strategy, steps were taken to maximise the likelihood of a higher response rate (also see Dillman, 2002). This stage of data collection commenced through administration of the survey which entailed the following steps. Firstly, the senior management of Bangladesh commercial banks working at the head office were contacted soliciting their willingness to take part in the study. At this stage, letters of invitation explaining the purpose of the study and other information on the study were delivered in person by the researcher to each bank's chief executive and a follow-up telephone call was made a week later. Following the request to nominate an appropriate person to respond, chief executives selected appropriate respondents to participate in the study. Participants were then given the option to indicate whether they preferred to receive the self-administered questionnaire or respond to a face-to-face survey. The majority of respondents (above 90%) advised the researcher that the questionnaire should be given to them with the completed

questionnaire to be collected a week after the initial submission (see Appendix A at the end of the thesis for a copy of the questionnaire). Absolute anonymity and de-identified reporting of results were guaranteed. Lastly, follow-up phone calls were made to relevant respondents a week later. In all cases, questionnaires were distributed and collected in person.

The total number of completed and usable questionnaires was 34, representing a 100% response rate. This response rate can be explained due to personal attempts of the researcher. Specifically, collection of data from respondents from all commercial banks involved several personal attempts undertaken by the researcher. These consisted of: (i) communicating with the researcher's relatives whose social friends work at a high official level in commercial banks; (ii) requesting the researcher's university teachers, friends and colleagues to refer potential respondents; (iii) telephoning directly during the field visit using the 'Directory of Accounting Alumni' as a guide with the authority of the researcher's life membership in the Alumni Association. This procedure allowed the researcher to share with some respondents that he is a member of the Alumni Association and as a result of this membership, the researcher requested their participation. Above all, (iv) requests were made to some respondents to refer the researcher to any of their friends, colleagues, etc. Furthermore, the respondents were informed that the study had a participation consent letter and had duly received clearance from the Macquarie University Ethics Committee. Overall, the above-mentioned personal initiatives and snowball effects enabled the researcher to collect data from all commercial banks in Bangladesh. As is evident in other studies in developing countries, personal contacts and snowball effects play an important role in collecting data in Bangladesh (Sharker & Yesmin, 2005). Information on respondents' designation within different departments of the banks, their years of experience in the banking industry and experience gained in the current bank are shown in Table 4.1.

Table 4.1: Respondents' profile and years of experience

Respondents	Number	%
Senior Vice-Presidents and Chief Financial Officers (CFOs)	8	23.5
Vice-Presidents (VPs)-Accounts and Finance	7	20.5
Deputy Managing Directors (DMD)	3	8.8
Senior Assistant Vice-Presidents, Human Resources	5	14.7
Vice-President, IT	1	2.9
Senior Vice-Presidents and Heads of IT	2	5.9
Other high ranking personnel (e.g., GM [General Manager], DGM [Deputy General Manager] and SEVP [Senior Executive Vice-President])	8	23.5
Total	34	100
Years of experience	**Number**	%
Less than 10 years	3	8.8
10-15 years	17	50.0
16-20 years	5	14.7
More than 20 years	9	26.8
Total	34	100
Experience at current bank	**Number**	%
5-10 years	8	23.5
11-15 years	15	44.1
Over 15 years	11	32.35
Total	34	100

The second stage of data collection involved post-survey interviews. Interviews were most useful for obtaining information through yielding an in-depth understanding of the survey results, providing further explanations of the study's themes and confirming the survey's findings (Tayles et al., 2007). The study collected post-survey interview data in order to gain a better understanding of survey responses and to offer compound sources of data. Fourteen (14) interviewees comprising CFOs (5), VPs (6), Head of IT (1) and two (2) senior managers consented to participate. The interviews were conducted at the interviewee's place of business

during the fourth quarter of 2011 and were of nine hours' duration in total. As with the survey, respondents were assured of anonymity and that they would be de-identified in the reporting of data. An interview guide was used (see Appendix 4.1) which included, *inter alia*, questions on intangible assets, MPM and organisational performance. Detailed notes were made in cases when audio recording was not permitted. The notes were later confirmed by the interviewees. The majority of the interviews (eleven) were completed with notes. The rest were audio recorded and later transcribed.

When respondents indicated that they wished to speak in Bengali, their native language, their responses were translated into English by the researcher. In analysing interview data, notes and tape recordings were continually revisited. Following a procedure in line with that used by Sharma et al. (2010), interview data were compiled to answer questions such as 'what impacts does investment in intangible assets have on MPM use in banks?' This was then coordinated with the survey results so that an in-depth insight into the overall findings could be determined.

4.4.3 Variables measurement

In operationalising the variables, the study used as many established scales from earlier studies as possible. However, they were modified to suit a banking context. In all cases, respondents were asked their views on a number of statements for each variable, measured on a 5-point Likert-type scale.

4.4.3.1 Organisational performance

To measure *organisational performance*, the study relied on Lee and Yang's (2011) 5-item scale which was derived primarily from Hoque and James (2000) and supplemented by measures developed in the performance measurement literature. Respondents were asked to indicate how well their banks had performed over the past five years when compared to their competitors (1=well below average, 5=well above average). Since performance improvement could take time to materialise either as a result of MPM use or the benefits of intangible assets' investment, a time lag was anticipated. As such, the study used a notional period (five years) when assessing organisational performance. Table 4.2 shows that all items of organisational performance yielded a factor loading (ranging from 0.722 to 0.882) which was well above the acceptable limit of 0.40 (Hair et al., 1998). The descriptive statistics and Cronbach's alpha value of the constructs are reported in Table 4.3.

Table 4.2: Exploratory factor analysis (EFA) for all constructs

OP	**Organisational performance (OP)** (Percentage of variance explained=65.27%)	**Factor Loadings**	
		I	II
OP1	Return on investment (ROI)	0.879	
OP2	Level of profitability (net margin)	0.807	
OP3	Customer satisfaction	0.735	
OP4	Product and service quality	0.882	
OP5	Return on investment (ROI)	0.879	
MPM	**Multi-dimensional performance measures (MPM)** (Percentage of variance explained=75.2%)		
MPM1	Financial measures: (e.g., net profit margin, ROA [return on assets], cost reduction, ROI [return on investment], EVA [economic value added], EPS [earnings per share], etc.)		0.910
MPM2	Non-financial measures: *Customer-related* (e.g., market share, customer satisfaction, customer retention, etc.)	0.702	
MPM3	*Employee-related* (e.g., employee satisfaction, workforce capabilities, employee stability, employee innovation, number of training sessions, etc.)	0.770	
MPM4	*Environmental performance (*e.g., government citations, environmental compliance, etc.)	0.843	
MPM5	*Product and service innovation* (e.g., number of new service items, process time, transaction efficiency, etc.)	0.858	
MPM6	*Operational process* and *products and service quality* (productivity, cycle time, quality awards, etc.)	0.672	
MPM7	*Community* (e.g., public image, community involvement, amount donated in CSR [corporate social responsibility] activities, etc.)	0.731	
IA	**Change in investment in intangible assets** (Percentage of variance explained=61.08%; 37.003% for first factor; eigenvalue [EV]=3.199 and for second factor, percentage of variance explained=24.08%; EV=1.07)		
IA1	Human resources development programs (e.g., training and workshops; employees' compensation and benefits)	**0.571**	0.040
IA2	Banks' IT services and networking systems	**0.852**	-0.095
IA3	Customer and supplier relationships (e.g., customer database and information; customers' and other stakeholders' feedback survey)	**0.590**	0.357
IA4	Research and development for new services/products (e.g., R&D investment)	**0.663**	0.259
IA5	Investment in business relationships (e.g., distribution agreements, contracts and arrangements with other banks and stakeholders, and other business collaboration)	**0.750**	-0.053
IA6	Investment in brand enhancement (e.g., advertising and other promotional activities)	**0.849**	0.049
IA7	Other intellectual property (e.g., goodwill acquired or internally generated, software and copyright).	0.128	**0.66**[30]

[30] This item was not considered in the final analysis.

Table 4.3: Composite reliability (CR), Cronbach's alpha, average variance extracted (AVE), descriptive statistics and correlation

Variables	CR	Alpha	AVE	Mean	St. Dev	1	2	3
1. Organisational performance	0.901	0.864	0.649	4.24	0.57	**0.805**		
2.Multi-dimensional performance measures	0.864	0.813	0.522	4.30	0.49	0.682	**0.722**	
3. Change in investment in intangible assets	0.794	0.721	0.442	4.05	0.74	0.511	0.294	**0.665**

Notes: The bold-faced diagonal elements are the square roots of AVE.

4.4.3.2 Multi-dimensional performance measures

Multi-dimensional performance measures were measured with a 7-item scale taken from Ittner et al. (2003) on which respondents were asked to indicate each financial and non-financial performance measure currently used in their banks for their decision making, ranging from '1' (not at all) to '5' (always). With a 7-item scale, this yielded an alpha value of 0.752 and factor loadings for these items ranged from 0.672 to 0.910 which was well above the recommended value (> 0.40) (Hair et al., 1998, 2010). The factor analysis results for these constructs are shown in Table 4.2.

4.4.3.3 Change in investment in intangible assets

Seven items were used (see Table 4.2) to operationalise *change in investment in intangible assets,* all of which were drawn from the literature (see Appendix 4.2). As Hendricks et al.'s (2004, 2012) measurement of investment in intangible assets relied on secondary information; this study has attempted to develop a construct following Churchill's (1979) recommendation. The applicability of items to banks was first confirmed by reference to the opinions of two scholars with recognised expertise in intangible assets' research and then validated in the pilot phase. Respondents were asked to specify their bank's level of change in various intangible assets' investment in the last five years, from '1' (decreased substantially) to '5' (increased substantially). This study included both a classical framework for developing measures (i.e., Churchill, 1979) and a contemporary statistical technique (i.e., exploratory factor analysis [EFA]) for assessing the dimensionality and reliability of the scale. Bartlett's test of sphericity and Kaiser-Meyer-Olkin's (KMO) test were also used to check the factorability of the data. The results indicated that Bartlett's test of sphericity (Bartlett, 1954) was statistically

significant and that the KMO measure of sampling adequacy was 0.727, exceeding the recommended value of 0.60 (Kaiser, 1974). A principal components analysis (PCA) with Varimax rotation was then performed that yielded two factors (see Table 4.2) with an eigenvalue greater than 1.0 explaining 61.08% of the total variance. At the confirmatory factor analysis phase, one reflective indicator (IA7) for this construct was removed as it loaded below the recommended threshold of 0.5 (Chin, 1998). The robustness of the data and the validity of the study's constructs were further assessed using other established statistical techniques (e.g., convergent validity of the constructs, composite reliability and average variance extracted [AVE]) commonly used in structural equation modelling (SEM), which are discussed in the next section.

4.5. Results and analysis

4.5.1 Partial least squares (PLS)

In this study, the partial least squares (PLS) technique was used to analyse the data. This technique fits well with structural equation models that include latent variables and a sequence of cause-and-effect relationships (Bontis et al., 2007), and has been used in earlier management accounting studies (Hall, 2008; Chenhall, 2005; Schulz et al., 2010). PLS presents more precise estimates of interaction effects such as mediation and is generally treated as robust for small to moderate sample sizes (Chin, 1998, 2010). In PLS, two components of model analysis comprising a measurement model and a structural model are considered in which the former indicates the relationships between observed items and latent variables and the latter specifies relationships between latent constructs (e.g., Chenhall, 2005; Hall, 2008). In the current study, the reliability and validity of the measurement model were assessed first, followed by the assessment of the structural model. This approach was followed to confirm that the constructs were reliable and valid before assessing the nature of the relationships between the constructs (Hair et al., 1998; Hall, 2008).

To generate the results, SmartPLS software (Ringle et al., 2005) was used in the current study. Personal email correspondence between the researcher and international PLS experts (i.e., W. Chin, 2014, pers. comm., 30 January; J. F. Hair., 2014, pers. comm., 31 January; S. Marco, 2014, pers. comm., 31 January; and R. Thompson, 2014. pers. comm., 31 January) suggested that PLS path modelling is suitable for the current study's case in which the total observation is 34, which also represents the whole population, not just a sample (see Appendix D at the end of

the thesis to review the email correspondence). As per their suggestions, in the current study, PLS path modelling has been used in a descriptive way with no attempt to use bootstrapping to produce *t*-statistics or standard errors.

4.5.2 Measurement model

To test the research model, the study examined both the convergent validity and discriminant validity of the measurement scales. The convergent validity of the constructs was tested using three statistics, namely, the items' reliability, composite reliability (CR) and average variance extracted (AVE). For convergent validity, it is recommended that the AVE be higher than 0.5 (Fornell & Larcker, 1981), but researchers can accept less than 0.5 as suggested by Fornell and Larcker (1981, p. 46). Specifically, Fornell and Larcker (1981) stated that if the AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is adequate (see also Huang et al., 2013). In the current study, as shown in Table 4.3, the AVE of change in investment in intangible assets is less than 0.5, but composite reliability of this construct is above 0.6. Therefore, convergent validity of this construct is adequate. Furthermore, for a new construct (such as change in investment in intangible assets in the current study), an AVE less than 0.5 is quite usual as argued in previous studies (e.g., Ping, 2009; Lance, 1988).

In the current study, construct reliability was checked using Cronbach's alpha (Cronbach, 1951), the results of which are shown in Table 4.3. Two techniques were used to assess the adequacy of discriminant validity. Firstly, in terms of the AVE statistics, the square roots of the AVEs were compared to the correlations among the latent variables (Chin, 1998). AVE statistics provided an obvious signal of whether a construct shared more variance with its measures than it shared with other constructs (Fornell & Larcker, 1981). Table 4.3 shows that the square roots of the AVEs (diagonal value) were all greater than the respective correlation between constructs. Secondly, using a matrix of cross-loadings, the discriminant validity of the constructs was assessed (Chin, 2010; Fornell & Larcker, 1981). The cross-loading analysis (shown in Appendix 4.3) revealed that no item loaded higher on another construct than it did on the construct that it was intended to measure (Chin, 1998; Fornell & Cha, 1994). Overall, the results of these two tests showed that the constructs had sufficient discriminant validity. This implies that each latent construct (e.g., organisational performance, multi-dimensional performance measures and change in investment in intangible assets) is appropriately distinct

from other constructs. The results from the measurement model therefore indicated that each construct exhibited satisfactory reliability and validity, enabling interpretation of the structural model. Descriptive statistics based on the weighted average scores of multi-item variables are also shown in Table 4.3.

4.5.3 Tests of hypotheses

PLS makes no distributional assumptions so no appropriate goodness-of-fit (GoF) measures exist for models via PLS (Chin, 1998). Since PLS produces standardised βs for each path coefficient, bootstrapping (500 samples with replacement) is commonly used to evaluate the statistical significance of path coefficients (Chin, 1998; Chenhall, 2005). However, for the purpose of the current study, the structural model was evaluated examining the R^2 value and size of the structural path coefficient as it sample data includes entire population from commercial banks of Bangladesh. To examine the mediation effect, certain conditions had to be met (Baron & Kenny, 1986; Bontis et al., 2007). Firstly, there must be a direct relationship between the predictor and the dependent variable. Secondly, a direct relationship between the predictor and the mediator variable must be fulfilled. Thirdly, the mediator must have a significant relationship with the dependent variable. Finally, the relationship between the predictor (independent variable) and the outcome variable must be significantly reduced when the mediator is added to the model (Baron & Kenny, 1986). These four steps were followed in this study using PLS to test the study's mediating hypothesis. Noted that the underlying idea in a mediating hypothesis is that the independent variable is presumed to cause the mediator and, in turn, the mediator causes the dependent variable (Wu & Zumbo 2008).

The results, as shown in Table 4.4, demonstrated that the impact of change in investment in intangible assets on organisational performance (H_1); the direct relationship between change in investment in intangible assets and multi-dimensional performance measures (MPM) (H_2); and the impact of the use of MPM on organisational performance (H_3) were all significant (β=0.529; β=0.412; and β=0.690, respectively).

Table 4.4: Results of hypotheses testing

Hypotheses	Path coefficients	R^2	Comments
H_1: IA -> OP	0.529	0.279	Supported
H_2: IA -> MPM	0.412	0.170	Supported
H_3: MPM -> OP	0.690	0.475	Supported
H_4:IA -> OP after MPM in the model (IA -> MPM -> OP) IA -> OP IA -> MPM MPM -> OP <u>Direct and indirect effect calculation</u> Direct effect of IA and OP link **(a)=** Indirect effect between IA and OP through MPM **(b)=** **Total effect (a+b)=**	 0.339 0.295 0.582 0.339 0.172 (0.295*0.582) **0.511**	 0.087 0.571	Partially supported

Notes: IA=Change in investment in intangible assets; **MPM**=Multi-dimensional performance measures; **OP**=Organisational performance.

To test Hypothesis H_4 (i.e., the mediating effect of MPM on the relationship between banks' change in investment in intangible assets and organisational performance), the study examined whether the four conditions suggested by Baron and Kenny (1986) were met (see also Hair et al., 2010). These researchers explained that in order to establish the mediating relationship, there should be significant correlations among all three constructs (e.g., Hair et al., 2010). Similarly, if the relationship between the predictor and the dependent variable does not change (i.e., it remains unaffected) once the mediating variable is added to the model, then the mediating effect is not supported (Baron & Kenny, 1986; Hair et al., 2010, p. 867). On the other hand, if the relationship between the predictor and the dependent variable is reduced to a point where it is not significantly different from zero after the mediator is included in the model, then full mediation is supported (Hair et al., 2010, p. 867). And if the relationship between the predictor and the dependent variable is reduced but remains significant in the presence of the mediating variable, then the effect of the predictor on the dependent variable is 'partially' mediated by the mediator (Hair et al., 2010, p. 867).

The typical technique used to examine the effect of mediation (full, partial or no mediation) is to check the beta coefficients of the independent variable to the dependent variable (Bontis et al., 2007). Additionally, the effect of the mediating variable in the relationships between the independent and dependent variables has to be theoretically argued in the literature (Hair et al.,

2010). The current study has tested the mediating effect of Hypothesis H_4 based on Baron and Kenny's (1986) instruction: this is discussed in the next paragraph (see also Figure 4.2).

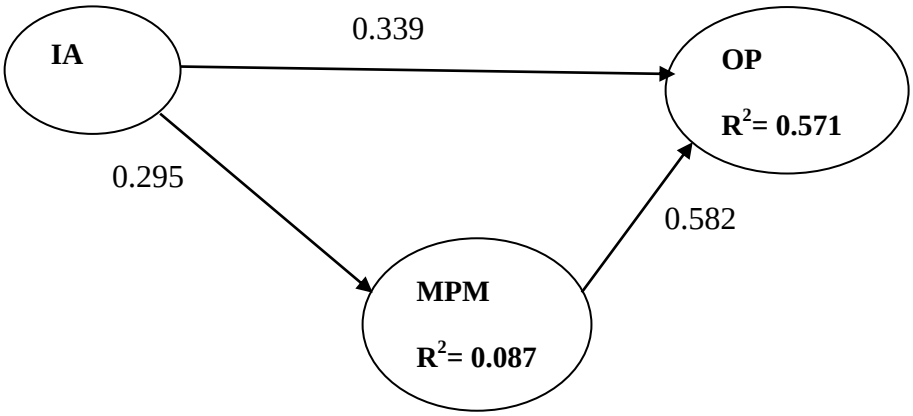


Figure 4.2: PLS model: significant path coefficients

Notes: IA=Change in investment in intangible assets, **MPM**=Multi-dimensional performance measures, **OP**=Organisational performance

To test Hypothesis H_4 (i.e., the mediating effect of MPM on the relationship between banks' investment in intangible assets and organisational performance), the researcher had to ensure whether or not the first condition (there must be a significant relationship between the predictor and the dependent variable) was met (IA -> OP link in the study). As noted in Table 4.4, the study's results (H_1) met this condition. Secondly, the predictor must have a significant relationship with the mediating variable. As shown in Table 4.4, the results of H_2 satisfied the condition that the relationship between the mediating variable (the use of MPM) and the predictor (IA) was significant. Thirdly, the relationship between the mediating variable and the dependent variable must be significant. In this case, the relationship between the mediating variable (the use of MPM) and the dependent variable (organisational performance) (i.e., MPM -> OP link in this case) was also supported as shown in Table 4.4. Finally, the relationship between the independent variable and the dependent variable was reduced when the mediating variable was added to the model (from 0.529 to 0.339).

As shown in Table 4.4, although the direct effect of IA (change in investment in intangible assets) to OP (organisational performance) was strong (i.e., 0.339), the total effect (both direct and indirect) was also noticeable (i.e., 0.511). Therefore, these findings suggested that the direct relationship from IA to OP was mediated by MPM. Indirect effect accounted for 0.172

(i.e., 0.511-0.339) of this total effect. This implied that 17.2% of the effect of change in investment in intangible assets on organisational performance went through the mediator (the use of MPM) and the remaining 82.8% of the effect was direct. Therefore, the relationship from change in investment in intangible assets to organisational performance was partially mediated by the use of MPM.

4.5.4 Additional analysis: Change in investment in intangible assets and organisational performance relationship: moderating effects of market competition and size of banks

In addition to investigating the hypothesised relationship between change in investment in intangible assets and organisational performance as in Hypothesis H_1 (i.e., direct effect of change in investment in intangible assets on organisational performance in the path model shown in Figure 4.1), the current study also tests the moderating effects of an external factor (e.g., market competition) and an internal factor (e.g., size of banks) on this relationship. In other words, following the prescription of Luft and Shields (2003), interaction (moderating) effects have been tested in the current study. Specifically, in this subsection, the current study examines the relationship of change in investment in intangible assets and organisational performance, in which (a) market competition and (b) banks' size are considered as moderators (see Figure 4.3).

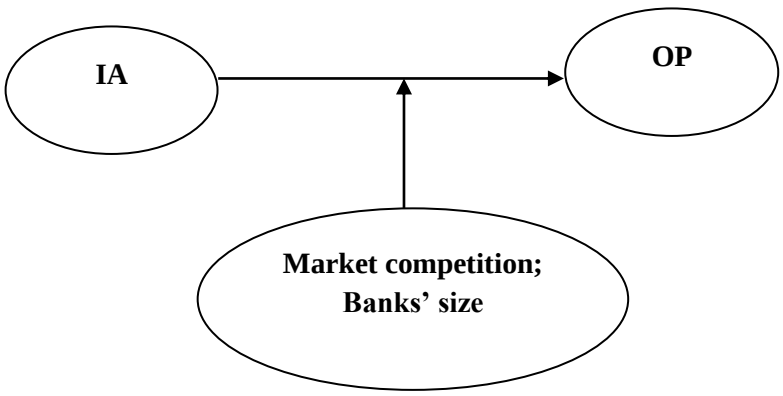


Figure 4.3: Moderating model

Notes: IA=Change in investment in intangible assets, **OP**=Organisational performance

Explicitly, the current study investigates whether the change in investment in intangible assets impacts on organisational performance and, more essentially, whether such relationship is moderated by the market competition faced by banks in Bangladesh and the size of banks.

While earlier studies have evidenced the relationship between change in investment in intangible assets and organisational performance (Boujelben & Fedhila, 2011; Aboody & Lev, 2001; Caron et al., 1994), it is not yet established in the literature whether (or not) change in investment in intangible assets has a positive relationship with organisational performance under the condition of intense market competition. The probability of the moderating effect of market competition is in line with contingency arguments that the competitive environment moderates the level of investment in intangible assets (Sirmon & Hitt, 2009; Ulrich & Smallwood, 2005; Ahituv & Machlin, 1998; Li & Ye, 1999). These studies have argued that the relationship between certain organisational factors (e.g., change in investment in intangible assets in the current study) and organisational performance could be contingent and changed on the level of external competition.

Specifically, the fit (or the lack thereof) between change of firms' investment in intangible assets and the competitive environment is expected to have an effect on organisational performance. In an environment characterised by greater market competition, decision makers typically experience greater uncertainty related to the current state of the environment, customer demands and competitor behaviour, and the potential impact of these factors on their firms' growth (Li & Ye, 1999; Ahituv & Machlin, 1998). In this regard, the underlying idea is that a competitive environment enables the firm to commit its spending to intangible resources so as to improve its key success factors and gain benefits (Li & Ye, 1999; Aragon-Correa & Sharma, 2003). Such benefits include ensuring operational efficiency, controlling cost, improving product and service quality, synergy (which involves the leveraging of resources and building employees' competence) and improving internal processes (Li & Ye, 1999; Sethi & King, 1994; Sirmon & Hitt, 2009).

As a result, in a competitive environment, the change in investment in intangible assets is perceived as an essential part of a firm's attempts to deal with external competitive challenges. Recent research has shown that low levels of investment in intangible assets (both human resources and organisational capital) relative to competitors and/or the industry in a competitive industry have a negative effect on firms' performance (Sirmon & Hitt, 2009). To accommodate external competitive challenges, investment in intangible assets such as IT, human resources and customer relationship management may therefore be an effective way for top managers to improve employees' productivity and service quality (Sirmon & Hitt, 2009;

Ahituv & Machlin, 1998). From the above-mentioned discussion, the current study assumes that the greater the degree of market competition, the stronger the impact of change in investment in intangible assets on organisational performance.

In addition to market competition, the current study also assumes that the relationship between change in investment in intangible assets and organisational performance is contingent on the banks' size (larger firms versus smaller firms). Studies have argued that changes in investment in intangible assets are contingent on firms' size, as larger firms logically have more resources than smaller firms not only to invest into varied intangible assets but also they have more manpower and expertise to utilise these to improve organisational performance (Sirmon & Hitt, 2009; Kivijarvi & Saarinen, 1995). Other researchers have suggested that small firms experience more difficulties with resources and knowledge than larger firms when investing in intangible assets such as IT or an information system and the adoption of new technology (Wiengarten et al., 2013; Ifinedo, 2007; Laukkanen et al., 2005). Indeed, the size of businesses has an impact on the changing pattern of investment in intangible assets which may have an impact on organisational performance (Ifinedo, 2007). From the above-mentioned discussion, the study expects that the relationship between change in investment in intangible assets and organisational performance will be moderated by the size of banks.

Taken together, the study examines that the relationship between change in investment in intangible assets and organisational performance is likely to be moderated by the market competition and size of banks in Bangladesh (see Figure 4.3). As stated earlier, the questionnaire collected data relating to other variables. In the current study, market competition was measured using a multi-item scale adapted from Lee and Yang (2011): the alpha value, AVE and composite reliability of this construct were 0.821, 0.765 and 0.858, respectively. These results demonstrate that this was a valid and reliable measure for market competition. Size was measured using two proxies, namely, the number of employees and total revenue, an approach which is in line with other researchers (e.g., Kivijarvi & Saarinen, 1995; Li & Ye, 1999).

The current study examines moderating effects by following the product terms approach[31] with this approach chosen as both moderators are metrics, and is therefore an approach suggested by others (Chin et al., 1996. 2010; Henseler & Fassott, 2010). Researchers can detect the presence of moderating effects when the predictor and the moderator with their interaction effects cause an incremental variance in the dependent (outcome) variable beyond what is caused by the main effects (Eberl, 2010). To see if there is a moderating effect, the study examines whether the path coefficients of the interaction effects (e.g., moderator x independent variable) differ significantly from zero irrespective of the size of the other path coefficients, following the prescription of Henseler and Fassott (2010) and others (see e.g., Baron & Kenny, 1986). The results of the moderating effects are provided in Table 4.5.

[31] This is an approach which tests the moderating effect of a moderator on an independent variable when the moderator is measured using a metric scale (for a detailed discussion, see Chin et al., 2010; Henseler & Fassott, 2010).

Table 4.5: Results of moderating effects of market competition and banks' size on the relationship between changes in investment in intangible assets and organisational performance

Paths	Path coefficients	R^2
Market competition as moderator		
Main effects model: (before considering interaction of predictor with moderator)		
IA -> OP	0.524	0.324
Com -> OP	-0.218	
Interaction effects model: (after considering interaction of predictor with moderator)		0.406
IA -> OP	0.428	
Com -> OP	-0.107	
(IA x COM) -> OP	-0.359	
Banks' size (revenues and number of employees) as moderator		
Main effects model (revenues):		
IA > OP	0.505	0.310
Size_rev -> OP	0.166	
Main effects model (number of employees):		
IA > OP	0.493	0.339
Size_ emp -> OP	0.251	
Interaction effects model (revenues):		
IA -> OP	0.510	0.386
Size_ rev -> OP	0.114	
(IA x Size_rev) -> OP	0.260	
Interaction effects model (number of employees):		
IA -> OP	0.605	0.373
Size_emp -> OP	0.101	
(IA x Size_emp) -> OP	0.183	

Table 4.5 shows a path coefficient of 0.428 from path IA to OP, from market competition (Com) to OP path of -0.107 and an interaction effect of -0.359 with a total R^2 of 0.406. The table also shows that the path coefficient of interaction effect (i.e., IA x Com -> OP path) is significantly different from zero. As a result, market competition has a moderating effect in predicting the effect of change in investment in intangible assets on organisational performance. The results of Table 4.5 show a higher R^2 value (i.e., R^2 of 0.406) in the interaction effects model than the R^2 value (R^2 of 0.324) in the main effects model.

It is important to note that the results of the interaction effects model, as shown in Table 4.5, revealed that the interaction of change in investment in intangible assets and market competition (i.e., IA x Com path) has a negative effect (i.e., -0.359) on organisational performance. The interpretation of the negative interaction effect would be that, if competition becomes higher (i.e., competition is increased by one standard deviation point), the relationship between change in investment in intangible assets and organisational performance would decrease by the size of the interaction effect. Consequently, when competition in the market increases, change in investment in intangible assets becomes less important for explaining organisational performance. (Of course, exactly the opposite kind of interpretation is also applicable for situations when there is a lower level of market competition.) That is, when market competition is intense, it does not matter if organisations change their investment in intangible assets as this will not help them to improve performance. This result has practical implications for managers (which is discussed in section 4.7). It is also important to note that the path coefficient between the market competition and organisational performance relationship (i.e., Com -> OP path) in the main effects model is negative (-0.218), indicating that when firms are experiencing more intense competition, this results in lower performance. This negative relationship between market competition and organisational performance is not surprising; rather, it is consistent with the recent study by Lee and Yang (2011).

Table 4.5 also provides results of the relationship between change in investment in intangible assets and organisational performance when the size of banks is considered as moderator. Table 4.5 shows a path coefficient of 0.510 from path IA to OP; from banks' size (measured by revenue) to OP path of 0.114; and interaction effects of 0.260 with a total R^2 value of 0.386. The table also shows that the path coefficient of the interaction effect (i.e., IA x Size_rev -> OP path) is significantly different from zero. As a result, banks' size has a moderating effect in predicting the relationship between change in investment in intangible assets and organisational performance. A higher R^2 value in the interaction effects model (i.e., R^2 of 0.386) compared to R^2 of 0.310 in the main effects model is also evidenced in the results shown in Table 4.5. The results also show that the impact of change in investment in intangible assets on organisational performance is moderated by the size of banks. These results indicate that when banks are larger in size, the change in investment in intangible assets becomes of key importance for banks in explaining improvements in organisational performance. Conversely, when banks are

smaller in size, changes in investment in intangible assets become less important for explanations of organisational performance.

These findings provide evidence that the impact of change in investment in intangible assets on banks' performance is dependent on contextual factors such as market competition and banks' size. More importantly, the findings signify the importance of understanding market competition and banks' size as they are relevant factors for understanding the relationship between change in investment in intangible assets and organisational performance. The study has determined that, as larger banks possess more revenue and resources than smaller banks to change their investment in intangible assets, this result in better organisational performance than can be achieved by smaller banks.

Nevertheless, as mentioned earlier, the interaction effect of market competition and change in investment in intangible assets is negative. Consequently, the findings of the study indicate that for firms operating in a more competitive environment (specifically banks in Bangladesh), managers should carefully allocate investment since greater investment in intangible assets will result in lower organisational performance in the event of intense competition in their environment. The results suggest that managers would benefit from greater change in investment in intangible assets if there is less competition in their environment. In the event of fierce competition, the decision to make changes in the investment in intangible assets is probably not sufficient to gain benefit from change in investment in intangible assets. Rather, under an intense competitive situation, it may be necessary for decision makers to consider that investment made (and change thereof) in intangible assets would be guided based on the strategic priorities of their firms. Future studies can explore these issues.

4.6. Discussion

This section discusses the findings of the study based on the results of hypotheses testing and the post-questionnaire interviews.

4.6.1 Change in investment in intangible assets and organisational performance (H_1)

Hypothesis H_1 predicted that change in investment in intangible assets would positively impact on organisational performance. As expected, the study found a significant relationship between

change in investment in intangible assets and organisational performance. The finding was in line with previous research (see Boujelben & Fedhila, 2011; Hitt et al., 2001; Huselid, 1995).

However, while earlier studies have investigated the effect of change in investment in intangible assets on organisational performance by relying on panel data (Hung et al., 2012; Bharadwaj et al., 1999; Bassi et al., 2002; Boujelben & Fedhila, 2011; Caron et al., 1994), the current study used survey and interview data to examine this relationship. Similarly, while previous studies have been mainly based on the context of developed countries, the empirical findings of the current study relate to a developing country. Therefore, the current study provides initial insights in the context of banks in developing countries. Interview results revealed that respondents such as interviewees 7 and 10 believe that banks gain benefits as a result of changing their investment in intangible assets. This not only improves their financial performance (e.g., reduction of costs), but also improves non-financial aspects such as increased customer satisfaction and improved banking service delivery, as well as improving employees' productivity and work-related knowledge. As commented by interviewee 7:

> 'Well, it is not possible to evaluate benefits in merely financial terms, but benefits of changing investment in intangible assets could be in other dimensions. For example, when we increase our investment in the bank's IT facilities, it increases efficiency in our internal operation and reduces costs. Similarly, customers are satisfied since we are able to provide them with more modern banking service these days. Also, investment in human resources development increases their productivity and efficiency, when we allocate increased funds to their training and development. Investment in intangible assets has added value for us in these aspects of the bank's performance'.

4.6.2 Change in investment in intangible assets and the use of MPM (H_2) and the use of MPM and organisational performance (H_3)

This study found a significant relationship between change in investment in intangible assets and the use of MPM. Therefore, Hypothesis H_2 which proposed a positive relationship between change in investment in intangible assets and the use of MPM was also supported. This finding is consistent with prior expectation arising from the work of Kaplan and Norton (2004b) but not with the findings of Hendricks et al. (2004) who did not find that investment in intangible assets was an explanatory factor in the adoption of the BSC technique. A possible argument could be that Bangladeshi executives faced no practical difficulties in measuring intangible assets as they relied on multi-dimensional perspectives of performance indicators. One recent study in Bangladesh has reported that MPM, even BSC-based, were practised by banks (Khan

et al., 2011). Similarly, as interviewees 7 and 10 noted, the banking sector has made significant investment in many intangible assets such as IT, e-banking products and services, human resource development, customer relationship management and in many strategic alliances and therefore, the banks used multi-dimensional performance measures. According to interviewee 10:

> '[o]ur multi-dimensional performance measurement system provides necessary information for all decisions. The bank invests not only in improving employees' capabilities or in internal IT infrastructure. Ongoing investment in building relationships with other parties, suppliers and competitors helped us to upgrade our business process and better customer services. For this reason, we have adopted a multi-dimensional performance measurement system for rich sources of information'.

Comments made by respondents suggested that many banks now undertake considerable investment in technological innovation in areas such as electronic clearing and payment systems known as BACH (Bangladesh Automated Clearing House), and have created inter-bank electronic funds transfer (EFT), e-commerce and internal banking operations such as enterprise resource planning (ERP). Arguably, commercial banks in Bangladesh not only use advanced technology for cost reduction and process efficiency, but have also upgraded their traditional performance measurement systems to measure the benefits that they expect as a result of investing in many intangible assets. In this regard, interviewee 3 made the following comment.

> 'We have made numerous technological investments for our business process improvement. We try to give the best service to the customers ... by improving our service quality, and the use of the latest technology in the banking operation. In return, we get good outcomes, evidenced by our prior year's performance, essentially measured by the comprehensive PM framework'.

The hypothesis on the positive relationship between the use of MPM and organisational performance (Hypothesis H_3) was also supported, a finding consistent with earlier studies (e.g., Albright, 2004; Hoque & James, 2000; Schulz et al., 2010). However, while earlier studies have investigated the effect of MPM use on organisational performance by relying on data from the manufacturing industry (e.g., Hoque & James, 2000; Schulz et al., 2010), the current study has used the banking sector to examine this relationship. Similarly, while previous studies have been conducted in the context of developed countries, the empirical findings of the current study relate to a developing country's context (e.g., banks in Bangladesh). Therefore, the current study provides primary insights in the specific context of banks in a developing country.

4.6.3 Mediating effect of multi-dimensional performance measures (MPM) in the relationship between change in investment in intangible assets and organisational performance (H_4)

The hypothesis on the mediating effect of MPM in the relationship between change in investment in intangible assets and organisational performance (Hypothesis H_4) had partial support: any direct relationship between change in investment in intangible assets and organisational performance was possible given that firms' performance measurement systems were multi-dimensional. However, the full mediating effect of MPM in the relationship between change investment in intangible assets and organisational performance was not confirmed in this study.

A few explanations can be given to explain this finding. Researchers have claimed that the value generated as a result of investment in intangible assets is guided by some underlying principles, for example, that the value created from intangible assets works through a complex cause-and-effect chain of the performance measurement system; thus, intangible assets' value creation is usually indirect (Schulz et al., 2010; Kaplan & Norton, 1996; Lev, 2001; Kaplan, 2010)**.** Investment in intangible assets adds value for firms; however, in some cases, this might have no financial value even if firms were able to measure it, an argument in line with others (e.g., Kaplan & Norton, 2004b). For instance, an intensive training program for the workforce at the time of implementing a new management system (e.g., the implementation of a comprehensive risk management and measurement technique such as the Basel Accords in a bank) could improve employees' capabilities and familiarity with how to manage and measure various risks that could impact on the organisation, how to provide data for internal management and how to report to regulators in compliance with regulatory guidelines. However, this value (employees' capabilities) may not have a direct and immediate financial implication for the organisation; rather, it would impact on the internal processes of the organisation initially, and then lead to improved performance over time.

Indeed, often performance outcomes of changes of investment in intangible assets do not result immediately. For example, the benefits of complying with any regulatory guidelines (e.g., allocating funds in community and environmental activities) could be available in the long term in many ways. For example, it could lower employee turnover, create the brand's image or form a reputation in the community as a responsible firm (Kaplan, 2010; Kaplan & Norton,

2004b). It generally takes a long time for any investment commitment in intangible assets to offer tangible benefits to firms, even if organisational measurement systems are multi-dimensional (Kaplan & Norton, 2004b; Kaplan & Norton, 1996). The benefits yielded for firms as a consequence of change in intangible assets' investment arguably would be noticeable subject to the above-mentioned time-dimension issues. Although the current study used a notional time period (five years) in assessing organisational performance, the focus on the actual time lag was not possible in the cross-sectional research used in the current study. To address this issue, future research would be needed to add further insights relying on longitudinal data.

4.7. Conclusion, implications and limitations

Based on the data collected from commercial banks in Bangladesh, this study investigated the direct impact of change in investment in intangible assets on the use of MPM and organisational performance. It also investigated the mediating role of MPM in the relationship between change in investment in intangible assets and organisational performance. In undertaking additional analysis, the current study examined the moderating role of external and organisational factors (specifically, market competition and banks' size) in understanding the relationship between change in investment in intangible assets and organisational performance. The study found that: (i) change in investment in intangible assets positively affects organisational performance; (ii) change in investment in intangible assets positively affects the use of MPM; and (iii) the relationship between change in investment in intangible assets and organisational performance was partially mediated by the use of MPM. Lastly, (iv) market competition and size of banks moderate the relationship between change in investment in intangible assets and organisational performance.

This study contributes to the literature in a number of ways. Firstly, the findings have confirmed the positive relationship between change in investment in intangible assets and the use of MPM, which offers an incremental contribution to earlier studies. Specifically, while earlier studies did not provide support for a positive link between investment in intangible assets and the implementation of MPM techniques (Hendricks et al., 2004; Hendricks et al., 2012), this study found a direct association between change in investment in intangible assets and MPM use. Likewise, the study provides evidence that the use of MPM has a mediating role in the relationship between change in investment in intangible assets and organisational

performance. This relationship has rarely been explored in earlier studies in the MA literature. To the best of the researcher's knowledge, this study is the first in the MA/PM literature which has developed a theoretical model and provided empirical evidence for understanding the mediating effect of MPM in predicting the relationship between change in investment in intangible assets and organisational performance. By collecting data from a developing country (specifically from banks in Bangladesh), and by providing empirical evidence on these issues, the current study provides insights on these issues and contributes in the context of developing countries.

Lastly, additional analysis (discussed in subsection 4.5.4) of the current study to understand the moderating effects of external and organisational factors such as market competition and banks' size in the relationship between change in investment in intangible assets and organisational performance has also made a new contribution to the MA literature. To the best of the researcher's knowledge, the current study is the first in the PM literature to test the moderating effects of external and organisational factors (market competition and the size of banks) in order to understand the relationship between change in investment in intangible assets and organisational performance. The finding of the current study on the role of moderators thus also has implications for managers, specifically in banks in Bangladesh (as discussed below).

The findings of the current study have implications for practice. The findings suggest that change in investment in intangible assets has a direct impact on the use of MPM. In this respect, managers of banks in Bangladesh should ensure that relevant non-financial measures are incorporated into the multi-dimensional performance measures used by their banks particularly when they have placed greater focus on investing in intangible assets. Otherwise, it is unlikely that they would have comprehensive information across various dimensions such as products, processes, customers, employees and other areas of intangible assets. Similarly, they would not be able to identify how these intangible assets add value for their organisations.

Likewise, change in investment in intangible assets is not sufficient on its own in creating value for firms. Change in investment in intangible assets without making the appropriate connection with a multi-dimensional approach of performance measures could potentially waste shareholder funds rather than creating any value. Without the use of an appropriate

performance measurement system (e.g., MPM use), managers of banks in Bangladesh would lack the information on investment in intangible assets that is necessary for decision making and it would not be possible for them to assess the benefits that could be added to their firms as a result of change in investment in intangible assets. The study has also highlighted that the use of MPM is important as it positively affects organisational performance. Therefore, managers of commercial banks in Bangladesh can be motivated to continuously use MPM.

Furthermore, additional analysis of the current study (see subsection 4.5.4) provides an important insight for practitioners. That is, although the study confirms that change in investment in intangible assets positively affects organisational performance (Hypothesis H_1), it also reveals that the relationship between change in investment in intangible assets and organisational performance is moderated by market competition and that this moderation effect is negative. Specifically, the results have revealed that in the event of intense market competition, change in investment in intangible assets does not improve organisational performance; rather, the performance of banks in Bangladesh is decreased. Consequently, when competition is intense in the market, it is recommended that managers should be cautious in making changes in investment in intangible assets because such changes are less important in explaining improved organisational performance in these highly competitive situations. It is important for bank managers to add value to their firm when they experience an intense competitive environment. This probably requires that the decision to make changes in investment in intangible assets and appropriate decisions on how to best deploy such intangible assets by linking with their firms' strategy.

Moreover, the study has provided evidence that benefits naturally flow into firms as a result of changes in investment in intangible assets, with these benefits being contingent on the size of the banks. Understandably, it is much easier for managers of larger banks to attain such benefits than it is for smaller banks since the former possess more resources and skills than the latter and thus can make better use of investment in intangible assets.

The findings of the current study, however, are subject to limitations. Firstly, the current study has collected data from a single industry. Data from a single industry and from a single country might limit the generalisability of the findings to other sectors as well as to other countries. Furthermore, the theoretical model developed in this study needs further validation. Secondly,

the data collection was carried out at a particular point in time. A longitudinal study or a multiple-case study approach may provide deeper insight into areas beyond this study's scope. The theme of the current study could be extended with small-sample case-based findings, or research in different contexts or industries. Similarly, the construct 'change in investment in intangible assets' is original and might benefit from further refinement in future studies by replication in a different context. Likewise, although care has been taken in the data collection, the study acknowledges the potential response bias commonly associated with survey research. Finally, although the study has developed a theoretical model, this is not all-inclusive since other contingent factors, namely, business strategy and environmental uncertainty could have influences that have not been considered in the current study. The existing PM literature has offered a conceptual grounding in terms of constructs such as environmental uncertainty and business strategy (see Chenhall, 2003, for a detailed review).

In the face of a competitive environment, in order to improve organisational performance, a future study could explore whether change in investment in intangible assets is further subject to intangible resources' deployment decisions of banks guided by the banks' strategy. In particular, based on organisations' strategic priorities, managers may change their investment in intangible assets with the intention of improving the performance of their organisations. Therefore, the business strategy may moderate the relationship between change in investment in intangible assets and organisational performance. Addressing how strategy, organisational structure and external uncertainty influence the model would be a candidate for future research studies.

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Appendix 4.1: Interview guide

Q-1	Could you please explain why you had an emphasis on intangible assets' investment, and when?
Q-2	Why do you think that intense investment in intangible assets affects the use of the performance measurement system?
Q-3	Why does your bank put more emphasis on investment in intangible assets? Do you have any external pressures to invest in intangible assets (like, market pressures, uncertainty or others)?
Q-4	Please give an example of any likely benefits that you expect from investment in many intangible assets.

Appendix 4.2: List of items for investment in intangible assets

Items	Sources
Human resources development programs (e.g., training and workshop; employees' compensation and benefits)	Lev (2001); Petty & Guthrie (2000); Khan & Ali (2010); Wyatt (2008)
Bank's IT services and networking system	Petty & Guthrie (2000); Kaplan (2010)
Customer and supplier relationship (e.g., customer database and information; customers' and other stakeholders' feedback survey)	Petty & Guthrie (2000); Guthrie (2001), Guthrie & Petty (2000)
Research and development for new services/products (e.g., R&D investment)	Petty & Guthrie (2000); Grasenick & Low (2004); Bontis (1999)
Investment on business relationships (e.g., distribution agreements, contracts and arrangements with other banks and stakeholders; other business collaboration)	Petty & Guthrie (2000); Grasenick & Low (2004); Bontis (1999); Steenkamp & Kashyap (2010)
Investment in brand enhancement (e.g., advertising and other promotional activities)	Ranatunga (2002); Wyatt (2008); Grasenick & Low (2004)
Other intellectual property (e.g., goodwill acquired or internally generated, software and copyright)	Wyatt (2008); Petty & Guthrie (2000); Sveiby (1997)

Appendix 4.3: Cross-loadings of constructs

Variables	Items	1	2	3
1. OP	OP1	**0.792**	0.196	-0.141
	OP2	**0.716**	0.049	0.311
	OP3	**0.909**	0.170	-0.174
	OP4	**0.753**	0.198	0.244
	OP5	**0.835**	0.122	0.211
2. MPM	MPM1	-0.169	**0.815**	-0.171
	MPM2	0.085	**0.671**	0.121
	MPM3	0.116	**0.577**	0.250
	MPM4	0.270	**0.893**	-0.119
	MPM5	0.003	**0.779**	0.315
	MPM6	0.181	**0.845**	-0.269
	MPM7	-0.094	**0.851**	0.119
3. IA	IA1	0.076	-0.021	**0.948**
	IA2	0.102	0.117	**0.602**
	IA3	0.246	0.076	**0.723**
	IA 4	0.089	0.099	**0.797**
	IA 5	0.011	0.030	**0.623**
	IA 6	0.117	0.168	**0.679**

Notes: **OP**=Organisational performance, **IA**=Change in investment in intangible assets, **MPM**=Multi-dimensional performance measures.

Chapter 5 Conclusion

5.1 Introduction

This chapter summarises the findings of the three papers, draws together the overall conclusion and depicts the contribution and the identified limitations of the thesis, and the future research scope.

The thesis examines the factors influencing the use of MPM, and the impact of MPM on organisational performance. As highlighted in Chapter 1, three research projects have been undertaken to achieve the objectives of the thesis through the development of three academic papers. Paper 1 (presented in Chapter 2) reviewed MPM research in the context of developing countries published in accounting and non-accounting journals. As discussed in the introduction chapter (Chapter 1) of the current thesis, there has been little progress in this line of understanding in the PM literature in the specific context of developing countries.

Paper 1 was based on secondary sources of data. As discussed in Chapter 2, the paper also identified future research directions for MPM studies in the context of developing countries. Some of the future research directions identified in Paper 1 have been empirically examined in the following two papers (i.e., in Papers 2 and 3 presented in Chapters 3 and 4 of the current thesis). Specifically, the current thesis has empirically examined the first research direction identified in Paper 1 (i.e., understanding the influence of external factors such as competition, institutional factors, and an internal factor such as top management participation on MPM use). The thesis also empirically examined the second research direction offered in Paper 1 (i.e., understanding the mediating effect of MPM in the relationship between change in investment in intangible assets and organisational performance) in Papers 2 and 3 (presented in Chapters 3 and 4).

Paper 2 examined the influence of institutional factors on the use of MPM. Specifically, it provides empirical evidence on what institutional factors influenced the use of MPM in the context of banks from a developing country. As mentioned in the introduction chapter (Chapter 1) of the current thesis (see also Chapter 2), the influence of external factors (influence of competition and institutional factors) on the use of MPM has been less explored in the specific context of banks in developing countries.

Paper 3 provides empirical evidence on whether change in investment in intangible assets influences the use of MPM and organisational performance and whether the use of MPM mediates the relationship between change in investment in intangible assets and organisational performance. As outlined in the introduction chapter of the current thesis, empirical investigation on these issues has been less advanced in the performance measurement literature and, more specifically, in the context of banks in developing countries (see also Chapters 2 and 4). For Papers 2 and 3, the commercial banks of Bangladesh were chosen as the research setting from where primary data were collected using survey questionnaires and post-questionnaire interviews.

The rest of this chapter is structured as follows. In section 5.2, the findings of the entire thesis are summarised. Section 5.3 provides the overall conclusion of the thesis. This is then followed by a discussion of the contributions of the thesis in section 5.4. In section 5.5, the limitations of the thesis are presented and, in the final section, the future research directions are discussed.

5.2 Findings

The first study (Paper 1) achieves the first objective of the thesis. Specifically, it identifies the factors associated with the use of multi-dimensional performance measures (MPM) by reviewing the MPM literature on developing countries. As outlined in Chapter 2, the aims of this chapter were twofold: a) to review the existing literature on multi-dimensional performance measurement in developing countries; and (b) to identify the factors that influence the use of MPM and MPM tools such as the balanced scorecard (BSC) in developing countries. To achieve these aims, 102 papers published by accounting and management journals between the years 1987 and 2012 were reviewed.

The second study (Paper 2) achieves the second objective of the thesis, namely, to provide empirical evidence of the institutional factors that influenced the use of MPM. The study also examines the mediating effect of top management participation in the relationship between central bank influence and MPM use and the moderating effect of an external factor (i.e., market competition) in understanding the relationship between top management participation and the use of MPM. The third study (Paper 3) achieves the third objective of the thesis, namely, to provide empirical evidence of the effect of change in investment in intangible assets on MPM use and organisational performance. Specifically, this study investigates the

relationships between change in investment in intangible assets, multi-dimensional performance measures and organisational performance. It also examines the mediating role of MPM in the relationship between change in investment in intangible assets and organisational performance. In addition, the third study examines the moderating effects of market competition and banks' size in understanding the relationship between change in investment in intangible assets and organisational performance. The key findings of the thesis, summarised in relation to each paper, are briefly outlined in the following subsections.

5.2.1 Paper 1: 'Multi-dimensional performance measurement systems in developing countries: a literature review'

As mentioned in Chapter 2, the literature review conducted in Paper 1 was organised based on the topics within the reviewed papers, which were classified into four categories, namely: (a) the use of MPM; (b) contextual factors and their role in MPM and organisational performance; (c) comparative studies on MPM; and (d) others. The review found that MPM has been used by firms in developing countries, but the rate of MPM use differs between countries. Moreover, the BSC was found to be a popular MPM tool among firms in developing countries. Furthermore, numerous internal factors (e.g., implementation of total quality management (TQM), business strategy, corporate culture, management commitment, etc.) and external factors (e.g., market competition, national culture, legislative requirements, ownership types, firms' size, etc.) had influence on the use of MPM in developing countries. The findings also revealed that some developing countries have developed their own multi-dimensional performance indicators. Given that there are some unexpected results and given that the rate of use of MPM differs between firms in developing countries, the paper suggests that researchers in developing countries should take into account the local cultural, institutional and operating environment when investigating the theme of MPM.

5.2.2 Paper 2: 'Influences on the use of multi-dimensional performance measures in banks: an institutional perspective'

The study provided evidence that the factors that were influential in MPM use were market competition, regulatory pressures, the success of key peers and top management participation. As the intensity of market competition increased, firms in Bangladesh tended to rely more on broader-based performance indicators such as MPM in order to retain their market share and customers. The findings suggest that it is necessary to consider the wider external environment of organisational life when examining the use of a management control system (the use of

MPM in this case). The findings, in line with previous research, suggest that taking into consideration the institutional aspect of firms' life is relevant for firms such as banks that operate in a highly institutionalised environment (Covaleski & Dirsmith, 1996; Munir et al., 2011). The choice to use MPM by the commercial banks of Bangladesh appears to have been not only motivated by the need to ensure economic efficiency in the face of competition, but also by a need to ensure external legitimacy.

The findings of the study also highlighted that the role of internal agents (top management participation) was also important in the use of MPM. Without active participation of top management, the use of MPM would likely be unsuccessful. Specifically, the commercial banks in Bangladesh used their MPM not only as a result of accommodating to external environments (i.e., as a result of influence by a regulatory body such as the central bank or response to market competition) but through the significant role performed by top management in changing the traditional PMS and use of MPM.

However, the use of MPM was not influenced by socio-economic and political institutions (e.g., the World Bank, IMF and International Financial Corporation [IFC]). Furthermore, professional and trade associations (e.g., professional or bankers' associations and training organised by the Bank Management Institute and local universities) had no influence on the use of MPM. The results of the additional analysis conducted in the current study reported that there was a partial mediation from top management participation in understanding the relationship between central bank influence and the use of MPM. Furthermore, the results of the additional analysis also provided evidence that participation of top management in the banks in Bangladesh in the use of MPM is moderated by the level of competition in the environment. Specifically, when market competition is intense in the industry, top management is more committed to participate in using more multi-dimensional performance measures.

5.2.3 Paper 3: 'Intangible assets, multi-dimensional performance measures and organisational performance: a direct and mediating relationship'

There were four key findings in this paper. Firstly, changes in investment in intangible assets positively affect organisational performance. Secondly, there is a significant relationship between change in investment in intangible assets and MPM use. Thirdly, the use of MPM is positively associated with organisational performance. Fourthly, there is partial mediation from

MPM in the relationship between change in investment in intangible assets and organisational performance. The additional analysis of the current study has also revealed that change in investment in intangible assets and organisational performance is moderated by market competition and banks' size.

The study highlighted that change in investment in intangible assets was important as it improved organisational performance. There was also evidence suggesting that, without the use of MPM by the senior management of the commercial banks in Bangladesh, organisational performance could not be measured and traced. The findings, therefore, provide evidence that the commercial banks of Bangladesh used their MPM not only to measure intangible assets, but the use of MPM was also important for other reasons. For example, MPM assisted in improving organisational performance. The study also highlighted that the relationship between change in investment in intangible assets and organisational performance is moderated by factors such as market competition and the size of banks. Accordingly, based on findings of this study (i.e., the moderating effect of market competition in the relationship between change in investment in intangible assets and organisational performance is negative), it is suggested that decision makers in banks in Bangladesh should be cautious when deciding to change their investment in intangible assets since greater investment in intangible assets will lead to lower organisational performance in the event of intense competition. Nevertheless, the benefits of changing the investment in intangible assets were evidenced with this basically depending on the size of the banks (larger versus smaller banks) operating in Bangladesh.

5.3 Overall conclusions of the thesis

As mentioned earlier, this thesis has examined the factors that influenced MPM use in the banking industry in developing countries (in particular, in the context of banks in Bangladesh) and the impact of MPM on organisational performance. Given the dearth of empirical research on MPM in Bangladesh, the findings of this thesis not only make a theoretical contribution but it has also potential to increase the awareness of researchers and managers of the current state of MPM in the commercial banks of Bangladesh. The findings also provide insights into the role of institutional factors (i.e., the central bank's influence, participation of top-level management) and an internal factor (change in investment in intangible assets) in the use of management accounting techniques such as MPM in the specific context of a developing country such as Bangladesh.

Likewise, the results also provide support for a positive association between change in investment in intangible assets and use of MPM. It follows that when firms commit to invest significantly in intangible resources in a business environment, they face uncertainty in how to measure intangible assets and in determining what benefits they would expect from intangible assets. Therefore, these firms move forward to use an appropriate approach in their performance measurement systems (PMSs). This emphasises that the greater the firm's investment in intangible assets, the greater the firm's need to use an appropriate control system (specifically, the use of MPM) that can offer decision makers high quality and relevant information on intangible assets for improved decision making given that decision makers of commercial banks in Bangladesh experience less competition from the external environment .

5.4 Contributions of the thesis

The contributions of this thesis are in four areas. Specifically, this thesis contributes to the performance measurement (PM) literature; the PM literature in the specific context of developing countries; the PM literature on the banking sector; and the PM literature in the specific context of Bangladesh. These contributions are highlighted in the following subsections.

5.4.1 Contributions to the academic community

Firstly, this thesis contributes to PM literature in the developing countries' setting. As mentioned in Chapter 2, there has been no structured review of the MPM in the specific context of developing countries. By conducting a review of the published literature over the past 25 years, this thesis provides a picture of MPM research in developing countries and outlines an explicit platform for further research avenues for those who are interested in conducting research in the developing countries' setting. Similarly, the thesis contributes to the literature because, by reviewing the MPM literature on developing countries, it identifies factors that are associated with the use of MPM. As previously stated, the first objective of the thesis was the identification of the factors that influence the use of MPM in developing countries.

Secondly, as discussed in Chapter 3, this thesis has revealed that institutional influences are important in understanding PMS and, specifically, in understanding the use of MPM. In the context of a developing country, this thesis has provided further evidence to show that the use

of MPM is significantly influenced by the intensity of market competition and by the influence of many institutional factors (e.g., the central bank's influence, pressures of peer banks' success and the role of top management participation). This study has extended the previous institutional research by empirically confirming that the influence of institutional factors should be considered in the use of MPM. Furthermore, as mentioned in Chapter 3, evidence that context-specific motivational factors (e.g., enjoying a good rating in the management efficiency category under the central bank's annual assessment criteria resulted in the privilege of opening new branches, access to the refinancing scheme and, above all, reduction of the tax burden) prompted commercial banks to use MPM thus offers a new perspective in the PM literature with a specific reference to the banking sector in a developing country (i.e., Bangladesh). Providing empirical evidence on the influence of institutional factors on MPM use has also achieved the second objective of the thesis.

Thirdly, it was found in the previous PM literature (more specifically, the contingency perspective of accounting) that little was known to date about change in investment in intangible assets and its links to MPM use and organisational performance. As discussed in Chapter 4, it has been suggested that there is a possible linkage between change of firms' investment in intangible assets and MPM, and that MPM has a mediating role in the relationship between change in investment in intangible assets and organisational performance. The thesis provides empirical evidence about the relationship (both direct and mediating) between change in investment in intangible assets, MPM and organisational performance. Researchers have previously had little understanding regarding whether changes in investment in intangible assets was a key factor in relation to the choice to use MPM. This study has extended the previous contingency research by empirically confirming that change in investment in intangible assets should be considered as a contingent factor that has an impact on the use of MPM and organisational performance.

Fourthly, to the best of the researcher's knowledge, this study is the first in the MA/PM literature which has not only developed a theoretical model for testing the mediating effect of MPM in the relationship between change in investment in intangible assets and organisational performance, but it has also provided empirical evidence of this effect. In addition, as mentioned in Chapter 4, the study also examines the moderating effects of an external factor (i.e., market competition) and an organisational factor (i.e., banks' size) for understanding the

relationship between change in investment in intangible assets and organisational performance. To the best of the researcher's knowledge, the current study is the first in the PM literature to test moderating effects taking into account both external and organisational factors (i.e., market competition and the size of banks).

Fifthly, this thesis also contributes to MPM research in the banking setting. The literature has provided evidence that MPM research in the financial services industry was rather less than in other industries within the management accounting (MA) discipline (Soin & Scheytt, 2008). As found in the literature review chapter (Chapter 2), there was also a dearth of studies on MPM and on factors influencing the use of MPM in the context of the banking industry in developing countries. As a result, this thesis has extended previous studies on MPM in the specific context of the banking sector by providing evidence on the determinants of MPM use.

Lastly, this thesis has also contributed to the PM literature in the specific context of Bangladesh. Much of the Bangladesh-based management accounting research has been undertaken in different industries or sectors (Hoque & Hopper, 1994; Alam, 1997; Uddin & Hopper, 2001; Morium, 2002; Uddin, 2009; Khan et al., 2011); however, earlier research did not provide evidence on the factors that influenced the use of MPM in the specific context of banks. As discussed in Chapter 1, many studies in Bangladesh have found that the banking sector in Bangladesh provides more non-financial information than any other industry (Azim et al., 2009; Khan & Khan, 2010) and that the sector also uses multi-dimensional performance measures (Morium, 2002; Khan et al., 2011). But the factors that drive banks to focus more on the use of MPM were rather unexplored. This thesis extends previous PM research in Bangladesh by providing evidence on the factors influencing MPM use in the context of commercial banks.

The theoretical contributions of the current thesis in the light of criteria defined by earlier researchers are presented below in Table 5.1.

Table 5.1: Theoretical contributions of the thesis in the light of theoretical criteria outlined by academic scholars

Theoretical criteria	Contribution of the current thesis in the light of these criteria
(i) Re-conceptualis-ation or extension of existing theory (Gregor, 2006)	The current thesis has re-conceptualised the *new institutional sociology (NIS)* theory by developing a theoretical model considering institutional factors (i.e., market competition, central bank's influence, success of key competitors, influences of socio-political institutions, top management participation, etc.) and some context-specific factors such as the choice of family shareholders, and has then examined their individual impact on MPM use in the context of banks in developing countries (see Chapter 3 for details). The thesis has also examined the mediating effects of MPM in understanding the relationship between change in investment in intangible assets and organisational performance under the '*contingency theory*' lens for the very first time in the performance measurement literature (see Chapter 4 for details).
(ii) Filling deficiency in the knowledge gap (Whetten, 1989; Summers, 2001)	As mentioned earlier in Chapter 2, there have been no earlier studies in the context of developing countries that have reviewed the state of knowledge on MPM use, factors influencing MPM use and any obstacles experienced by firms in developing countries to MPM use, although this line of understanding is well-established in the context of developed countries. Consequently, this thesis fills the knowledge gap by reviewing previous studies on MPM in the specific context of developing countries.
(iii) Non trivial research questions (Straub, 2009)	Some important research questions raised in the current thesis have not previously been examined in the literature. One example is identifying the mediating effects of MPM use in the relationship between change in investment in intangible assets and organisational performance even though, globally, there has been increased growth in investment in intangible assets in many countries including developing countries such as Bangladesh (see Chapters 1 and 4 for detailed discussion). Consequently, in the light of firms' increased attention on intangible assets' investment, examining the influence of change in investment in intangible assets on the use of MPM is a significant research question (see Chapters 1 and 4 for detailed discussion).
(iv) An original contribution offering a novel or new	The findings of the current thesis on the moderating effects of market competition in the relationship between top management participation and MPM use is a novel initiative in the performance measurement literature

perspective (Lovitts & Wert, 2009); examining potential moderating and mediating effects (Smith, 2003)	(Chapter 3). Likewise, findings on the mediating effects of top management participation in the relationship between the central bank's influence and MPM use is a new contribution in the PM literature. Furthermore, evidence of context-specific motivational factors that are leading the studied firms to use MPM in the specific context of Bangladesh offers an additional perspective in the PM literature (see Chapter 3 for details). In addition, the current thesis provides new insights on the moderating role of an external factor (i.e., market competition) and an organisational factor (i.e., banks' size) in explaining the relationship between change in investment in intangible assets and organisational performance, which is a novel perspective in the PM literature (see Chapter 4 for details).
(v) Research theme is new and interesting (Straub, 2009; Sutton & Staw, 1995)	The recent literature on performance measurement (Hendricks et al., 2012; Khallaf, 2012; Zéghal & Maaloul, 2011; Kaplan & Norton, 2004) has revealed the increasing interest in changes in investment in intangible assets and their interactions with performance measures and organisational performance. Capitalising on this interest, the current thesis has explored the underlying relationships of change in investment in different intangible assets with MPM and between change in investment in intangible assets and organisational performance which is new and interesting in the literature (see Chapters 1 and 4 for details).

5.4.2 Practical implications

As revealed in Paper 3 (presented in Chapter 4), the findings of the thesis indicated the association between change in investment in intangible assets and organisational performance. Nevertheless, these findings suggest that decision makers have to realise that change in investment in intangible assets is not sufficient to ensure better performance of firms. They must improve their traditional techniques of performance evaluation and use a multi-dimensional approach of performance measures (e.g., MPM) in order to see a holistic picture of the benefits that they can expect from a change in investment in intangible assets. That is, key decision makers of banks in Bangladesh should realise that change in investment in intangible assets does not automatically generate value to the organisation. They should use an appropriate PMS (e.g., use of MPM) so that the value generated from change in investment in intangible assets can be assessed, evaluated, monitored and improved. The study has also highlighted that the use of MPM is important for decision makers of banks in Bangladesh as it positively affects organisational performance.

Likewise, additional analysis undertaken in Paper 3 has provided evidence that the effect of change in investment in intangible assets on banks' performance is dependent upon contextual factors such as market competition and banks' size (as revealed in subsection 4.5.4 of Chapter 4). More importantly, the findings indicate the importance of understanding market competition and banks' size which are relevant factors for modifying commercial banks' performance. Nevertheless, as mentioned earlier (see subsection 4.5.4 of Chapter 4), the interaction effect of market competition and change in investment in intangible assets is negative. Consequently, the study suggests that for banks in Bangladesh operating in a more competitive environment, decision makers should not concentrate only on spending more on investment since greater investment in intangible assets will eventually result in lower organisational performance. Based on this study's findings, decision makers of banks in Bangladesh would gain benefits from greater change in investment in intangible assets when there is less competition in the environment.

The findings of the study also revealed that banks' size moderates the relationship between change in investment in intangible assets and organisational performance. The benefits of changing investment in intangible assets that are expected to flow into firms are contingent on firms' size. Reasonably, achieving such benefits for managers of larger firms is rather easier than for smaller firms since larger firms own more resources and skills to better use intangible assets than is the case for smaller firms.

Lastly, for policy makers of banks in Bangladesh, the study outlines additional insights (as revealed in Chapter 3). That is, the study has reported that the mediating role of top management participation in the relationship between the central bank's influence and MPM use is minor (see section 3.7 in Chapter 3). Based on this finding, regulators of banks are encouraged to continue their influence and evaluate banks' performance from the perspective of both financial performance and other performance dimensions such as community, environment, customers and employees. This influence assists decision makers of commercial banks in Bangladesh to use MPM to produce performance information on various dimensions. Capitalising on the context-specific benefits of engaging in social, environmental, employee and customer-related initiatives, decision makers of commercial banks in Bangladesh have been shown to use MPM to provide information to meet external requirements and they should be continuously stimulated to avail themselves of context-specific benefits by regulators

(specifically, the central bank of Bangladesh). For the regulators to succeed with these initiatives, they are encouraged to continue them as this would assist commercial bank managers to accomplish their external responsibility together with improving their internal management control system by adopting a contemporary approach to performance measurement (specifically, the use of MPM).

5.5 Limitations of the thesis

In spite of the above-mentioned implications for both academics and practitioners, the thesis has some limitations.

The thesis has provided evidence on factors influencing the use of MPM only in the context of Bangladesh. The generalisation of the study's findings to other countries thus must be done with caution. At the same time, although the study has examined all commercial banks in Bangladesh, the total number was only 34. Furthermore, the thesis did not examine other determinants of MPM use such as environmental uncertainty, corporate culture or organisational structure which might have had an impact on the use of MPM. Also, the study did not consider non-banking financial institutions in Bangladesh. Thus, the findings of the thesis cannot be generalised to non-financial institutions and other services settings such as insurance companies.

The thesis did not examine the role and impact of business strategy on the relationship between change in investment in intangible assets and organisational performance. Firms' investment in intangible assets could be guided according to their strategic priorities. Therefore, business strategy may have a moderating effect on the change in investment in intangible assets and organisational performance relationship. This area could be explored in future research.

Lastly, the survey data were collected based on perceptions which may limit the study's findings. Although post-questionnaire interviews were conducted to provide perceptions to assist in a better understanding of the survey findings, the post-questionnaire interview sample was not large.

5.6 Future research directions

The current thesis provides empirical evidence on the factors influencing the use of MPM. Therefore, it develops and validates the model utilising data from the commercial banks of Bangladesh. Further studies investigating and examining other developing countries and comparing the results with the current thesis findings would be welcome. A future large-scale cross-country study would be particularly valuable.

As found in the literature review (presented in Chapter 2), there was evidence of a wide variation in the rate at which MPM was used among different developing nations. Cultural issues from some countries might expedite the use of MPM while, in the case of other countries, they could be an impediment. Empirical data from other settings (preferably from more than one developing country, or even from some developed countries) to examine factors that influence MPM use would be beneficial for the academic community as this line of research has rarely been attempted in the literature. By incorporating respondents from both developed and developing countries, a future study could add more rigour to many of the findings of the current study.

The use of MPM does not necessarily imply that the commercial banks in Bangladesh are BSC users. Organisations in Bangladesh have placed less emphasis on the use of the BSC approach as evidenced by recent research (Khan et al., 2011). However, banks in Bangladesh could use other performance measurement tools which were not investigated in the current thesis. Future research should focus on which MPM tools are preferred by Bangladeshi firms and why these are the preferred tools.

This thesis has only considered the commercial banks in Bangladesh. Opportunities remain for further study which could consider a wider variety of industries in the same context. Future comparative studies in the context of Bangladesh could explore how and what institutional change has taken place in different industries, and the influence of institutional pressures on PMS changes. Foreign commercial banks and non-banking financial institutions (such as leasing companies) would be good candidates for research to compare the study's findings.

In addition, further research could investigate the extent of the use of MPM and factors influencing MPM use among the small micro-credit organisations in Bangladesh. According to

Hopper et al. (2009), the management control systems for not-for-profit organisations and micro-credit organisations have been under-researched in the developing countries' context. (This finding was also evidenced in the current literature review undertaken and reported in Chapter 2). Future research attempts in such areas in the context of Bangladesh would thus be welcome.

Finally, this thesis has identified research avenues on MPM in developing countries' settings (see Chapter 2). Future academic research would benefit to a great extent if studies could undertake new initiatives in this area in the context of Bangladesh.

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Appendix A: Questionnaire

Multi-dimensional performance measurement systems in Bangladeshi commercial banks

SECTION A: Demographic information

l. Specify the approximate number of employees (full-time equivalents) currently working in your bank.

(i) Below 100 ☐ (ii) 100- 199 ☐ (iii) 200- 299 ☐

(iv) 300- 399 ☐ (v) 400 employees or more ☐

2. Specify the approximate annual sales turnover for your bank for the last financial year. Tk. ----------million.

3. Specify the approximate total amount of assets for your bank for the last financial year. Tk. ----------million.

4. Type of business or listing status: (Please tick more than one if applicable)

(a) Private commercial ☐ (b) Government commercial ☐ (c) Listed ☐

(d) Unlisted ☐ (e) Other (please specify) ……..

SECTION B:

(I) Please circle the appropriate response relating to the extent of your banks' market competition.

There is a high degree of.....	**Not at all** **1**	**To a little extent** **2**	**To some extent** **3**	**To a considerable extent** **4**	**To a very great extent** **5**
1. price competition for products/services.	1	2	3	4	5
2. competition in new product /service development.	1	2	3	4	5
3. market competition in marketing and distribution.	1	2	3	4	5
4. market competition in gaining market share.	1	2	3	4	5
5. threat from other behaviours of competing banks.	1	2	3	4	5

(II) Please **s**pecify the level of investment in the following intangible assets made by your bank in the last five (5) years.

	Decreased substantially 1	**Decreased 2**	**No change 3**	**Increased 4**	**Increased substantially 5**
1. Human resources development programs (e.g., training and workshop; employees' compensation and benefits etc.).	1	2	3	4	5
2. Bank's IT services and networking system	1	2	3	4	5
3. Customer and supplier relationship (e.g., customers data base and information; customers and other stakeholders feedback survey).	1	2	3	4	5
4. Research and development for new services/product (e.g., R & D investment).	1	2	3	4	5
5. Investment on business relations (e.g., distribution agreement, contract and arrangement with other banks and stakeholders, and other business collaboration).	1	2	3	4	5
6. Investment in brand enhancement (e.g., advertising and other promotional activities,).	1	2	3	4	5
7. Other intellectual properties (e.g., goodwill, acquired or internally generated software, copyrights).	1	2	3	4	5

SECTION C:

(I) Please indicate the extent to which each of the following performance measures are used in your bank for numerous decisions.

	Not at all 1	**Rarely 2**	**Sometimes 3**	**Very Often 4**	**Always 5**
Financial Measures: (e.g., Net profit margin, Return on Assets, Cost reduction, Return on Investment, EVA, EPS)	1	2	3	4	5
Non- financial Measures: *Customer related* (e.g., market share, customer satisfaction, customer retention etc)	1	2	3	4	5
*Environmental performance (*e.g., Government citation, environmental compliance)	1	2	3	4	5
Employee relations (e.g., employee satisfaction, workforce capabilities, employee stability, employee innovation, number of training)	1	2	3	4	5
Product and service innovation (e.g., number of new service items, process time, transaction efficiency, etc.)	1	2	3	4	5
Operational process and products and service quality (e.g., productivity, cycle time, quality awards)	1	2	3	4	5
Community (e.g., public image, community involvement, amount invested in CSR activities)	1	2	3	4	5

(II) Please specify how well your bank has performed over the last five years on the following dimensions compared to your competitors.

	Well below average 1	**Below average 2**	**Average 3**	**Above average 4**	**Well above average 5**
1. Return on investment (ROI)	1	2	3	4	5
2. Level of profitability (Net margin)	1	2	3	4	5
3. Customer satisfaction	1	2	3	4	5
4. Product and service quality	1	2	3	4	5
5. Productivity of employees	1	2	3	4	5

SECTION D:

(I) Please specify the level of your agreement or disagreement with each of the following statements**.**

	Strongly disagree 1	**Disagree 2**	**Neither agree or disagree 3**	**Agree 4**	**Strongly agree 5**
1. Various industry sources (e.g., professional or bankers' associations, training institutes) influence us to use IPM.	1	2	3	4	5
2. Participation in workshops, management seminars organised by local universities' business schools influence us to use MPM.	1	2	3	4	5
3. Participation in training and educational seminars conducted by industry, trade and professional associations encourages us to use MPM.	1	2	3	4	5

(II) Please indicate the level of your agreement or disagreement with each of the following statements.

	Strongly disagree **1**	**Disagree** **2**	**Neither agree or disagree** **3**	**Agree** **4**	**Strongly agree** **5**
1. Our key competitors that use MPM benefit greatly.	1	2	3	4	5
2. Our key competitors that use MPM are perceived favourably by others in our industry.	1	2	3	4	5

(III) Please specify the level of your agreement or disagreement with each of the following statements**.**

	Strongly disagree **1**	**Disagree** **2**	**Neither agree nor disagree** **3**	**Agree** **4**	**Strongly agree** **5**
1. The central bank requires my bank to use multi-dimensional performance measures (MPM).	1	2	3	4	5
2. My bank must maintain a good relationship with the central bank.	1	2	3	4	5
3. Pressure is placed on my bank to produce MPM by political institutions and international financial institutions (e.g., World Bank, IMF and IFC).	1	2	3	4	5
4. Due to the requirements of political and socio-economic institutions, we use numerous quantitative and qualitative measures in our bank's operations.	1	2	3	4	5
5. MPM practices are designed and used based on the choice of sponsor directors on the board.	1	2	3	4	5

(IV) Please specify the level of your agreement or disagreement with the following statements**.**

	Strongly disagree 1	**Disagree 2**	**Neither agree nor disagree 3**	**Agree 4**	**Strongly agree 5**
1. Top management is very much involved in introducing and monitoring a multi-dimensional performance measurement system (MPM) usage in the bank.	1	2	3	4	5
2. Top management is well informed and support attempts to improve the bank's MPM initiatives.	1	2	3	4	5

SECTION E: General questions

(i) Your job title/position in the organisational structure ……

(ii) Number of years you have been working in the current bank …… years.

(iii) Total number of years of working experience (including experience prior to joining this bank) …… years.

(iv) Would it be possible for a short meeting to be arranged to discuss some of the issues in questionnaire?

Meeting possible ☐ Meeting not possible ☐

(v) Please tick the box if you wish to receive a copy of the aggregated and de-identified results of this study ☐

Thank you

Appendix B: Information and consent form

Department of Accounting and Corporate Governance
Faculty of Business and Economics
MACQUARIE UNIVERSITY NSW 2109,
Phone: (+612) 9850 9176 Fax: (+ 61 2) 9850 8487
Email: md.habib-uz.khan@mq.edu.au

Chief Investigator's / Supervisor's Name: Maria Cadiz Dyball

Chief Investigator's / Supervisor's Title: Associate Professor

Information and Consent Form (for questionnaires)

Name of Project: **Multi-dimensional performance measurement systems in Bangladeshi commercial banks**

You are invited to participate in a study of "Multi-dimensional performance measurement systems in Bangladeshi commercial banks". The purpose of the study is to describe the nature, content and use of integrated performance measures in your bank to accommodate today's changing environment. A major objective of the research is to examine the factors influencing the use of multi-dimensional performance measurement systems in Bangladeshi banking companies.

The study is being conducted by **Md Habib-Uz-Zaman Khan** to meet the requirements of PhD in Accounting and Corporate Governance under the supervision of Associate Professor Maria Cadiz Dyball (telephone number: +612-98509176; email ID: maria.dyball@mq.edu.au) and Dr Nazmi Jarrar (telephone number: +612-98508497; email ID nazmi.jarrar@mq.edu.au) of the Department of Accounting and Corporate Governance.

If you decide to participate, you will be asked to complete the enclosed questionnaire. This will take you approximately 30 minutes. There should be no risk or discomfort arising from your participation in the study. There will be no payment for your participation but as a courtesy a small gift will be given.

Any information or personal details gathered in the course of the study are confidential (*except as required by law)*. No individual will be identified in any publication of the results. A summary of the results of the data can be made available to you on request and will be sent to your email address.

Participation in this study is entirely voluntary: you are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

I, ... have read *(or, where appropriate, have had read to me)* and understand the information above and any questions I have asked have been answered to my satisfaction. I agree to participate in this research, knowing that I can withdraw from further participation in the research at any time without consequence. I have been given a copy of this form to keep.

Participant's Name:_____
(Block letters)

Participant's Signature: _____ Date:_____

Investigator's Name: MD HABIB-UZ-ZAMAN KHAN
(Block letters)

Investigator's Signature: _____ ___ Date:_____

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics (telephone (+612) 9850 7854 or email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

(INVESTIGATOR'S [OR PARTICIPANT'S] COPY)

Appendix C: Ethics approval letter

MACQUARIE UNIVERSITY

Faculty of Business & Economics
Human Research Ethics Sub Committee
Building E4A, Room 707
MACQUARIE UNIVERSITY NSW 2109

Phone +61 (0)2 9850 4826
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Email yanru.ouyang@mq.edu.au

8 April 2011

Associate Professor Maria Dyball
Faculty of Business and Economics
Macquarie University, NSW 2109

Reference: 5201100221(D)

Dear Associate Professor Maria Dyball

FINAL APPROVAL

Title of project: Integrated performance measurement practices of Bangladeshi commercial banks.

Thank you for your recent correspondence. Your response has addressed the issues raised by the Faculty of Business & Economics Human Research Ethics Sub Committee, and you may now commence your research. The following personnel are authorised to conduct this research:

Maria Dyball - Chief Investigator/Supervisor
Md Habib-Uz-Zaman Khan - Co-Investigator
Nazmi Jarrar - Co-Investigator

Please note the following standard requirements of approval:

1. The approval of this project is **conditional** upon your continuing compliance with the *National Statement on Ethical Conduct in Human Research (2007)*.

2. Approval will be for a period of five (5 years) subject to the provision of annual reports. **Your first progress report is due on 8 April 2012.**

   If you complete the work earlier than you had planned you must submit a Final Report as soon as the work is completed. If the project has been discontinued or not commenced for any reason, you are also required to submit a Final Report on the project.

   Progress Reports and Final Reports are available at the following website:
   http://www.research.mq.edu.au/researchers/ethics/human_ethics/forms

3. If the project has run for more than five (5) years you cannot renew approval for the project. You will need to complete and submit a Final Report and submit a new application for the project. (The five year limit on renewal of approvals allows the Committee to fully re-review research in an environment where legislation, guidelines and requirements are continually changing, for example, new child protection and privacy laws).

4. Please notify the Committee of any amendment to the project.

5. Please notify the Committee immediately in the event of any adverse effects on participants or of any unforeseen events that might affect continued ethical acceptability of the project.

6. At all times you are responsible for the ethical conduct of your research in accordance with the guidelines established by the University. This information is available at: http://www.research.mq.edu.au/policy

If you will be applying for or have applied for internal or external funding for the above project it is your responsibility to provide Macquarie University's Research Grants Officer with a copy of this letter as soon as possible. The Research Grants Officer will not inform external funding agencies that you have final approval for your project and funds will not be released until the Research Grants Officer has received a copy of this final approval letter.

Yours sincerely

J a Zetler

Julie Zetler
Chair, Faculty of Business and Economics Ethics Sub-Committee

Appendix D: Email correspondence with PLS experts and their replies

(a) Email response from Dr. Wynne W. Chin, C. T. Bauer Professor Department of Decision and Information Sciences, University of Houston Texas 77204-6021

Chin, Wynne <wchin@uh.edu >

to:	Md Habib-Uz Khan <md.habib-uz.khan@mq.edu.au>
date:	Fri, Jan 31, 2014 at 3:23 PM
subject:	Re: A mail from Habib, a PhD candidate, Macquarie University, Sydney, Australia for seeking advice on PLS modeling if population and sample is same

Hi Habib,

On Jan 30, 2014, at 7:24 PM, Md Habib-Uz Khan <md.habib-uz.khan@mq.edu.au> wrote:

Wynne W. Chin
University of Houston

Dear Professor Chin:
Hope this e-mail finds you well. This is from Habib Zaman Khan, a PhD candidate, Macquarie University, Sydney Australia. I write to you to get a help in regards to my survey data and suitability of PLS path modelling technique **given that sample size and population is equal**.

My PhD study examines factors influencing multi-dimensional performance measurement systems of Bangladeshi owned commercial banks **in where total numbers of banks are 34.** I collected **the data from all 34 banks, it thus represents entire population.** But question is can I use PLS path model for that as a population?

> If you make the case that it is the population you are studying, you can simply use PLS in a descriptive fashion. As in run it and report the numbers in the paths. The issue of statistical power becomes moot.

In my model, my dependent variable is multi-dimensional performance measures, and predictors are in total 10, among others, central bank influence, market competition, investment in intangible assets are few of them. From your very well cited article with others (Chin & Newsted,1999) and other related literature, I am aware that the minimum rule of thumb of sample size for PLS modelling follows '10 times/20 times' rule. However, taking my 34 cases as (total sample= total population) a populational value, I run the model with smart PLS, and incorporated the results for my PhD thesis.

Last month, I have got my thesis examiner comments in where I got comments from 3rd examiner that 34 cases is too small for running PLS based SEM model. The examiner expressed the concern arguing that number of cases is 34, which is a statistical mis-fit of quantitative analysis; although 2nd examiner said that I can argue that I have taken response from all commercial banks (34 in total).

I agree with the 2nd examiner. The only reason you test for significance is to find out whether you would obtain similar results if you landed in a parallel universe where another population of study is also 34 banks - which is unlikely the case.

Dr. Wynne W. Chin
C. T. Bauer Professor
Department of Decision and Information Sciences
C.T. Bauer College of Business
334 Melcher Hall, room 280D
University of Houston
Houston, Texas 77204-6021
email: wchin@uh.edu
fax: 713-743-4940

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(b) Email to Dr. Professor Joseph. F. Hair Kennesaw State University, KSU Center, DBA Program, Kennesaw, GA 30144, USA e-mail jhair3@kennesaw.edu and Prof. Dr. Marko Sarstedt Lehrstuhl für Marketing / Chair of Marketing, Fakultät für Wirtschaftswissenschaft / Faculty of Economics and Management, Otto-von-Guericke-Universität Magdeburg Universitätsplatz 2, D-39106 Magdeburg

Professor Joseph. F. Hair
Kennesaw State University,
KSU Center, DBA Program,
Kennesaw, GA 30144, USA

Dear Professor Hair:

Hope this e-mail finds you well. This is from Habib Zaman Khan, a PhD candidate, Macquarie University, Sydney Australia. I write to you to get a help in regards to my survey data and suitability of PLS path modelling technique **given that sample size and population is equal**.

My PhD study examines factors influencing multi-dimensional performance measurement systems of Bangladeshi owned commercial banks in where total numbers of banks are 34.I collected **the data from all 34 banks, it thus represents entire population.** But question is can I use PLS model for that as a population? In my model, my dependent variable is multi-dimensional performance measures, and predictors are in total 8, among others, central bank influence, market competition, investment in intangible assets are few of them. From your very recent nice article (Hair et al., 2012) and other related

literature, I am aware that the minimum rule of thumb of sample size for PLS modelling follows '10 times/20 times' rule.

However, taking my 34 cases as (total sample=total population) populational value, I use PLS path modelling with smart PLS, and incorporates the results for my PhD thesis.

Last month, I have got my thesis examiner comments in where I got comments from 3rd examiner that 34 cases are too small for running PLS based SEM model. The examiner expressed the concern arguing that number of cases is 34 is representing statistical mis-fit of quantitative analysis, although 2nd examiner said that I can argue that I have taken response from all commercial banks (34 in total).

In such case, I believe that I need suggestions from an international scholar like you. Please advise me about the suitability of use PLS in this regard. **I have gone through many journals and some SEM books, but have not found any related discussion with regards to PLS or any statistical techniques other multi-variate analysis if total sample size is equal to total population.**

I would be highly grateful to you if you please response to me in this regard at you convenience.

Kind Regards:
Habib Zaman Khan, PhD Candidate (re-submission)
Macquarie University, Sydney, Australia

Email reply from Professor Hair:

Joe F. Hair, Jr. <jhair3@kennesaw.edu>	
to:	Md Habib-Uz Khan <md.habib-uz.khan@mq.edu.au>
date:	Fri, Jan 31, 2014 at 3:27 AM
subject:	Re: A mail from Habib, a PhD candidate, Macquarie University, Sydney, Australia for seeking advice on PLS modelling with if population and sample is same

You indicate you collected data from 34 banks. Did you collect data from 34 individuals -- one at each bank, or multiple individuals? . . . or is your data secondary data? Please clarify. But, in general N = 34 should be OK, but of course the power of your statistical findings would be lower. Moreover, I do not believe based on what you have said that your results are statistical miss-fit of quantitative analysis -- whatever that examiner means. That is not a typical way to refer to these kinds of situations.

Sarstedt, Marko
<Marko.Sarstedt@ovgu.de
>

to:	"md.habib-uz.khan@mq.edu.au"<md.habib-uz.khan@mq.edu.au>
cc:	"Joe F. Hair Jr." <joefhair@gmail.com>
date:	Fri, Jan 31, 2014 at 9:11 PM
subject:	WG: A mail from Habib, a PhD candidate, Macquarie University, Sydney, Australia for seeking advice on PLS modeling with if population and sample is same

Dear Habib,

Thanks for your request, which Joe Hair also forwarded to me.

Generally speaking, from a pure sample size perspective, having 34 observations is certainly an issue, particularly when your path model is fairly complex. However, in your specific case, the sample size is not an issue as you have population data.

Most notably, if you have the full population, then there is no meaning to standard errors and test statistics. That is, if one gets a path coefficient of 0.10 and a corresponding t-value less than 1.96, suggesting no significant relationship at 5%, then this conclusion is wrong. The 0.10 is the real relationship here, and the "statistical significance" is irrelevant. Why? All our statistical inference is based on sampling from the population. However, when you have the whole population then any value that you get for a coefficient, no matter how small it is, it will be (statistically speaking) significant as it is the true population value.

There is no reference which clearly states it this way but this line of argumentation follows the very logic of statistical testing in general.

Let me know in case you have any further questions. Good luck!

Best,

Marko

Prof. Dr. Marko Sarstedt
Lehrstuhl für Marketing / Chair of Marketing
Fakultät für Wirtschaftswissenschaft / Faculty of Economics and Management
Otto-von-Guericke-Universität Magdeburg
Universitätsplatz 2, D-39106 Magdeburg Tel.: +49 (0)391 / 67 18 625 begin_of_the_skype_highlighting +49 (0)391 / 67 18 625 FREE end_of_the_skype_highlighting
Fax.: +49 (0)391 / 67 11 163
Web: www.marketing.ovgu.de

Von: Joe F. Hair, Jr. [jhair3@kennesaw.edu]
Gesendet: Donnerstag, 30. Januar 2014 19:32
An: Sarstedt, Marko
Betreff: Fwd: A mail from Habib, a PhD candidate, Macquarie University, Sydney, Australia for seeking advice on PLS modelling with if population and sample is same

Could you please respond to this? I did earlier but am leaving town for next week and will not have time to get back with him.

Begin forwarded message:

From: **Md Habib-Uz Khan** <md.habib-uz.khan@mq.edu.au>
Date: Fri, Jan 31, 2014 at 11:26 PM
To: "Sarstedt, Marko" <Marko.Sarstedt@ovgu.de>
Cc: "Joe F. Hair Jr." <joefhair@gmail.com>

Dear Professor Marko:
Just one more thing I want to know from you? From your e-mail, I understand that test statistic is not relevant for my case. Do you think power analysis suggested by Cohen (1988) is also irrelevant for my case? I know thus far that based on Cohen classification in behavioural science, it is small (if R square = 2%), medium (if R square = 13%), and large effect (if R square = 26%). As power analysis is also relating to sample data, not based on population data, I think it is not applicable.
Please share your thought at your convenience.

Kindest Regards:
Habib

From: **Sarstedt, Marko** <Marko.Sarstedt@ovgu.de>
Date: Fri, Jan 31, 2014 at 11:28 PM
To: Md Habib-Uz Khan <md.habib-uz.khan@mq.edu.au>

Yes, that's true. No need for power analyses in your case.

Best,
Marko

……..

(c) Email response from Professor Ronald L. (Ron) Thompson, Senior Editor, MIS Quarterly, Professor of Management, School of Business, Wake Forest University

From: **Thompson, Ron** <thompsrl@wfu.edu>
Date: Fri, Jan 31, 2014 at 6:17 AM
To: Md Habib-Uz Khan <md.habib-uz.khan@mq.edu.au>
Cc: Ron Thompson <thompsrl@wfu.edu>

Dear Habib,

It sounds like you have a bit of a challenging situation. Let me try to respond to your query.

There are two issues you are dealing with: the use of PLS with small sample size, and issue of your sample being equal to the total population. With respect to the use of PLS with small sample size, the research I did with Dale Goodhue and Will Lewis (Goodhue et al., 2012) basically suggested that you can use PLS with small sample sizes (such as your sample size of 34). There are some potential weaknesses you need to keep in mind, however. First, PLS (like regression) does not have very much statistical power with small sample sizes. If you tested a path (in a research model) and found that the path estimate was statistically significant, our results suggest that you are probably okay (in the sense that we did not see evidence of "false positives"). On the other hand, if you tested a hypothesized path and did not find it to be statistically significant, it is difficult to know whether the path really doesn't exist, or whether PLS (and bootstrapping) just didn't have enough statistical power to detect it. In other words, you wouldn't know whether to interpret this as "there is no relationship" or "I didn't have enough power to detect the relationship." That is probably the biggest weakness of using PLS (or any other technique such as regression) with a small sample size. A second issue is that with small sample sizes, the PLS path estimates may not be very accurate, since PLS tends to produce estimates that vary quite a bit. As the sample size increases, the variance in estimates decreases, and the path estimates tend to converge around the true value (or at least some value closer to the true value).

So I would disagree with Reviewer 3 in the sense that, just because your sample size is 34, it doesn't mean that you can't use PLS. Rather, it means that you need to use some caution in interpreting the results that you obtain. With respect to the second issue (your sample size being equal to the population), I'm not quite sure as to how to advise you. This is not a situation I have personally dealt with. I did some investigation as well (i.e., statistical analysis books), and did not find anything that dealt directly with this issue. I found a couple of online sources that argued that if your sample is the entire population, the variance = zero and therefore the results are accurate, but they were both addressing the issue of determining the proportion of a population (e.g., for polls), so I don't think they were directly on point. However, if anything I believe that since you have the entire sample, your results should be more accurate (you should be able to place more confidence in your results) than if you were drawing a small sample from a population. So I would tend to side with Reviewer 2 on this issue.

I'm not sure if that is any help... if not, please let me know.

Best regards,

Ron
Ronald L. (Ron) Thompson, Senior Editor, MIS Quarterly, Professor of Management,
School of Business, Wake Forest University, P.O. Box 7897,
Winston-Salem, NC 27109 thompsrl@wfu.edu, p 336.758.4998, f 336.758.6133

Fri, Feb 14, 2014 at 3:27 AM, Habib Khan <md.habib-uz.khan@mq.edu.au> wrote:

Dear Professor Ron:
Hope this e-mail finds you well. I have now one point to know from you. As I know that my 34 case is suitable for PLS modelling owing to population value, (like you professor J. Hair, professor Chin also advised me that I can use PLS but in a descriptive way) I should only rely on PLS path coefficient without test statistics or power analysis either.
So my question is for a particular construct (e.g., market competition) if I get path coefficient say 0.10, whereas another one (say Central bank influence) is 0.27 or for another say 'top management participation' (less than0.05), how would I explain these?
Since all these path coefficients are based on population al value, do I need to say some path coefficient has more importance than other to explain my outcome variable (MPM) since some has more magnitude than others? Can you advise me anything in this regard? For example, if anything you know for population value such as weak, moderate and strong relationship based on r value/ path coefficient ranges, it will be great be of great help for me.
I am a bit confused to rewrite my hypothesis result since no matter of what I get either 0.05 or 0.35 as a path coefficient, in both case, both have some relevance in practice.
Now if I could have some rule of thumb for that, it would be easy for me to refer and reinforce my cases. Your advice in this regard is necessary for me.

Kindest Regards:
Habib

From: **Thompson, Ron** <thompsrl@wfu.edu>
Date: Sun, Feb 23, 2014 at 1:41 AM
To: Md Habib-Uz Khan <md.habib-uz.khan@mq.edu.au>

Dear Habib,
My sincere apologies for the delay in responding. We had a winter storm here last week that closed the University for three days and disrupted things quite a bit (with make-up classes, etc.) so I have been scrambling a bit to catch up.
Yes, I believe it is reasonable to interpret different path estimates according to the strengths that you observed. PLS is based on regression, and so you should interpret the path estimates basically the same as you would if they were path estimates from a regression run.
I've attached a copy of a paper I co-authored with Dale Goodhue & Will Lewis, which I believe you have read. If you look at the section starting on pg. 984 ("Testing the efficacy of PLS...") and the Figure 1 and its footnotes on the following page, it discusses the issue of effect size and how it relates to path estimates. We used guidelines from Cohen (1988) to determine what should be called small, medium and large effects.
Take a look at this, and hopefully it will answer your questions. If not, please feel free to contact me again.

Best regards,
Ron