

Researching the level of diffusion of selective management accounting techniques by Bangladeshi firms

Nikhil Chandra Shil^{a1}, Mahfuzul Hoque^b and Mahmuda Akter^b

^a East West University, Bangladesh

^b University of Dhaka, Bangladesh

Abstract: Application of different management accounting techniques in corporate management sets the tune of the respective corporate in terms of its level of competition, needs for critical decision making, complexity of operations, and stages of different life cycles. This paper applies a quantitative research methodology based on structured questionnaire survey to highlight the diffusion status of different management accounting techniques in selective manufacturing companies operating in Bangladesh. As the manufacturing sector in Bangladesh is getting stronger day by day in terms of generating employment, contributing to GDP, mobilizing resources, and improving other economic factors; a sound management accounting practices via application of different management accounting techniques receive increased attention. The outcome of the paper will definitely help the management accounting practitioners, educators and researchers for policy implications. International community will also be benefited from the research outcome demonstrated by Bangladeshi firms due to the perceived importance of Bangladesh in newly defined economic zone led by India and China.

Keywords: Diffusion, management accounting techniques, management accounting practices, Bangladesh

JEL codes: M41

¹ Corresponding authors: Nikhil Chandra Shil, Department of Business Administration, email addresses: nikhilacc@yahoo.com, mhoque71@gmail.com

1. Introduction

The development of management accounting practices is interestingly converged within the industrialized areas of the world (Granlund & Lukka, 1998). However, this relationship is applicable to mostly new and innovative ideas in management accounting. The relevance lost debate, initiated by a set of articles (e.g. Kaplan, 1983, 1984) and the best-selling book by Johnson and Kaplan (1987), that management accounting research, practice and teaching had failed to keep up with changes in the business environment and that as a result management accounting had lost its relevance for planning, decision making and control, has ushered a new dimension in management accounting research. Such critical observation has solid empirical foundation that this development had weakened the competitive position of US corporations. Thus the debate requested management accounting practitioners to involve into more research on management accounting practice, including survey and field studies, and for academia and researchers to act as communication channels for the diffusion of management accounting innovations (MAIs). This call brought extra momentum to develop innovative management accounting techniques followed by the study of diffusion of such techniques.

Based on the concern as raised above, this paper deploys a motivated effort of studying the diffusion of selective management accounting techniques in Bangladesh which is characterized as late adopter of innovative tools due to weak demand side of innovation diffusion. Bangladesh economy was initially explained as an economy led by agricultural sector. However, from 90s an economic transformation has been witnessed due to the wide scale privatization effort undertaken by the then government encouraging private investment. It takes couple of years after its independence which is the capital formation regime followed by the exercise of entrepreneurial role when the country has advanced significantly in its industrialization initiative.

Now Bangladesh is observing a steady growth in major economic parameters, struggling successfully to have a strong manufacturing sector to ensure a balanced economic growth and confirms some notable achievements which upgrade the country to lower middle income country status from least developed country status. It is in line with the millennium development goals (MDGs) which are properly manifested in 2021 vision of becoming a middle income country within that time. Recently Bangladesh has also signed Sustainable Development Goals of United Nations which exert extra strain on improving its economic status. Thus it has been observed huge investment in education sector; enrichment of professional accounting education; opening the border for easy flow of man, machine and resources; all of which shows the high commitment of the regulators to confirm a highly productive manufacturing sector. Due to these

reasons, Bangladesh has successfully attracted the international community in its research and practices. Lot of professional accountants from countries other than Bangladesh is working in Bangladeshi manufacturing firms. Still most of the manufacturing firms in Bangladesh are first generation firms enjoying some policy support from the local regulators. It is really interesting to survey the competitiveness of these firms via the application of different innovative management accounting techniques. This is the main motivating factor of the study.

The word 'diffusion' becomes colloquial in management accounting research since the seminal work of Drury and Tayles (2000). It is the process whereby an innovation is spread or disseminated (Björnenak, 1997). Rogers (1995) has provided an operational definition saying that diffusion is a process whereby an innovation is communicated through certain channels over time among the members of a social system. The speed and range of a diffusion process can be understood through three important social phenomena (Björnenak, 1997). First of such phenomena is resistance in the form of unwillingness to make organizational changes or of theoretical objections from academics. Barriers to diffusion is the second one which is driven by lack of resources or cultural/linguistic obstacles. Barriers are also related to the third and final factor, namely the information field of potential adopters. It may be evident that the extent of contacts a potential adopter has made, that person's information field, are insufficient to convince the individual to adopt the innovation. The rate of diffusion is seriously affected by underlying information field.

A strong foundation of management accounting practices comes from high level of integration between the supply side and the demand side. A targeted focus on the information field brought the supply side of the diffusion process into consideration. Traditionally, diffusion studies have focused on organization's demand for innovations and put special emphasize on the role of potential adopters of innovations in expediting the communication process. The supply side (information field) was considered as a passive factor in the diffusion process. However, recent studies (Abrahamson, 1991, 1996; Abrahamson & Fairchild, 1999) have revised the judgment putting more emphasis on the supply side. With this, studies on the diffusion of management accounting innovation receive extra attention (Björnenak, 1997; Gosselin, 1997; Malmi, 1999). For example, a study revealed that the contacts of the potential adopters with the propagators of ABC results the rate of adoption better than efficient-choice variables (Björnenak, 1997). Another study (Malmi, 1999) showed that fashion-setting organizations exert considerable influence in the take-off stage, i.e., during the period with high rates of adoption, of the diffusion process. A similar study explains the reasons of low adoption rates of ABC due to weak supply side as demonstrated by the absence of compulsory further professional education in management accounting, the lack of practitioner journals devoted specifically to

management accounting, and the absence of executive MBA programmes (Clarke *et al.*, 1999).

Even though studies have shown that the adoption of ABC benefits the organization, its level of adoption is still considered low. It establishes the requirement of strong integration between adopters and the information field from academia or practitioners. Bangladesh enjoys a strong supply side, however, demonstrates a weak demand side which is properly demonstrated in this paper showing a very poor relationship between level of diffusion and different firm specific factors. It is expected that the paper will explore the level of diffusion along with the causal factors for providing policy support to the researchers, practitioners, academia and regulators for corrective actions.

For successful diffusion, researchers stress the importance of making innovations compatible with the societies to which they are transmitted (Alvarez, 1998; Mazza & Alvarez, 2000). Studies also argue that whether the innovations will receive attention on part of the adopters largely depends on cultural discourses and legitimization of the respective society. The supply side (innovators) can easily popularize an innovation in a specific location by matching the design characteristics and rhetorical elements of the innovation (i.e. the bundling) to the preferences and knowledge of the potential adopters which requires an understanding on adopters' requirements and capacities. A certain degree of ambiguity about the content of fashionable concepts which opens the concepts to different interpretations and uses, will potentially increase the supply side effect in the diffusion process, for example by including elements in the bundling process that reduce barriers and resistance to change. The degree of ambiguity regarding its content endows the innovation with its interpretative viability. Thus, the innovation can be made more compatible with new social settings if a high level of interpretative viability can be ensured (Benders & van Veen, 2001). Innovators can go for a mechanism of publicity among the targeted adopters to increase the level of acceptability and to reduce the level of ambiguity (Figure 1). Thus, the role of innovators (early fashion-setting adopters, consulting firms, researchers, academics and others) who can be treated as supply side drivers is very important in the whole diffusion process (Abrahamson, 1991).

This paper particularly focuses on the level of diffusion of different management accounting innovations. At the same time, it focuses on the drivers of such diffusion. A presumption of weak diffusion really exists which brings new research agenda in the form of studying the impact of different demand side and supply side factors. In a society offering strong supply side, weak diffusion is being caused by poor demand side which has been uncovered in this paper considering different factors like accuracy, profitability, turnover, net assets as proxy to demand side factors. The analysis is based on a structured questionnaire

survey where the data is analyzed through different descriptive and inferential statistics. This study will bring some insights regarding the applicability of different management accounting techniques and play certain role to converse in academia so that the strong reciprocity between practitioners and academia may be established.

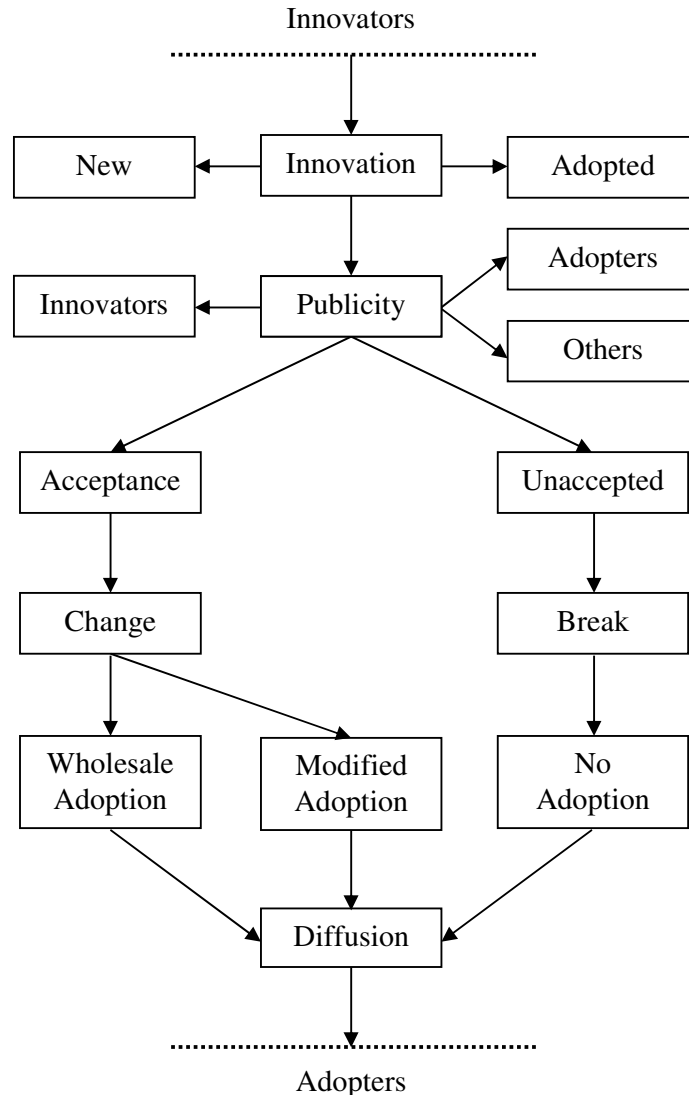


Figure 1. Innovators vs. adopters in a diffusion process

The paper has been divided into five sections. Section one has introduced the paper followed by a detail literature review in section two. Section three presents the research methodology which is followed by findings and analysis in section four. Finally the paper concludes the discussion in section five.

2. Literature review

2.1 Diffusion

New beliefs, ideas, knowledge, programs, practices and technologies can be communicated between members of a social system over time through a process known as diffusion (Rogers, 2003). Diffusion theory fits well with the practical exigencies of moving research to practice as evidenced by its use in quite diverse disciplines including sociology, medicine, psychotherapy, education, communication, and public health. As such this theory assists in outlining and offers explanations for patterns of innovation promulgation that take place among different and distinct communities of practice (Green *et al.*, 2009). As described by Brownson *et al.* (2006), the diffusion of research to a practice context involves negotiating four potential barriers that may prevent academic research from more effectively engaging with practice. These barriers; discovery, translation, dissemination and change, are depicted in Figure 2.

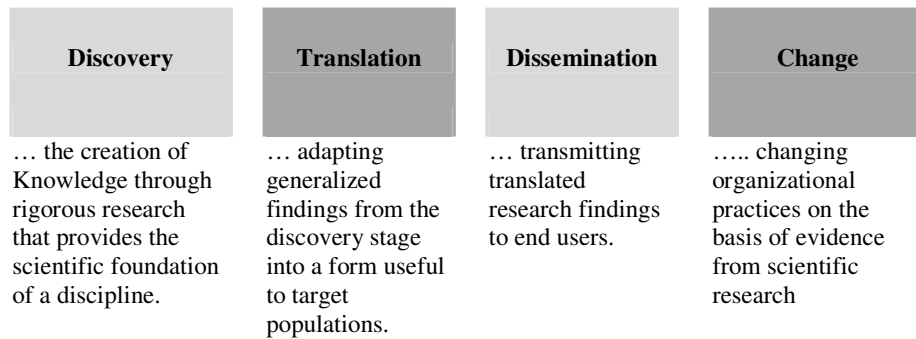


Figure 2. Barriers to research diffusion

(Source: Gautam, 2008)

Figure 2 maintains that diffusion is not an instantaneous act, but rather, is dependent upon successfully addressing four mutually related, yet independent potential barriers to harvesting knowledge generated by academic research for application to practice. Discovery, “the creation of knowledge through rigorous research that provides the scientific foundation of a

discipline” (Gautam, 2008), can represent an important impediment to the closer integration of research and practice. Often represented as a “knowledge production” problem (Van de Ven & Johnson, 2006), the discovery barrier often manifests as a failure to pose questions of interest to management (Rynes *et al.*, 2001; Vermeulen, 2005), ignoring basic questions about the purpose of scholarly work (Pettigrew, 2005), or knowledge “lost before translation” (Shapiro *et al.*, 2007). An underlying explanation offered for this knowledge production problem is that a research-practice divide transpires due to practitioners facing daily pressures that are disconnected from research questions posed by academics. The need for management accounting researchers to therefore, “ask the right questions” in the first place, is a fundamental prerequisite if our research efforts are not to become isolated from practice.

Overcoming the translation barrier requires academic research be presented in a form that is coherent and digestible for practitioners. In the management accounting literature, academic research has been regularly cited as a major obstacle to bridging the research-practice gap. Mautz (1978) concluded that researchers are incompetent in communicating research matters to practitioners, and in another paper, Werner (1978) argued that practitioners will only give research a ‘Fair Chance’ if it is offered to them as interesting, readable and understandable way. Failure in translation has been attributed as being a primary cause of the increasing and contended, irreversible gap between research and practice (Baxter, 1988). This observation has been repeated consistently in subsequent decades, for example being raised by van Helden and Northcott (2010), who argue that the understandability of research findings are often hindered by poor presentation, such as excessive attention to methodology and theory, or by ignoring any research implications of potential relevance and interest to practitioners.

Dissemination involves exposing practitioners to research findings via appropriate media, distribution or communication channels (Gautam, 2008). Concern that management accounting research does not engage with practice often focus on this barrier. A number of causes have been attributed. They include, a focus upon communicating with academic colleagues, in preference to practitioners (Malmi & Granlund, 2009); the time lags involved in academic publishing versus the practitioners short-term decision requirements (Inanga & Schneider, 2005); the general reluctance of practitioners to attempt reading management accounting research journals (Scapens, 2008; Inanga & Schneider, 2005) and, their disinterest in research outputs employing other presentation modes (Mitchell, 2002).

Change, is the goal of applied academic research. Management accounting change in organizations has to be seen as an evolutionary, path dependent process in which existing ways of thinking (institutions), circuits of power and trust in

accountants can all have an impact on the way in which the actors within the organization respond to external institutional and economic pressures (Dumitru *et al.*, 2011). It involves implementing practices triggered by research based evidence (Gautam, 2008). This particular barrier is arguably independent of the diffusion process (Green *et al.*, 2009), being largely related to the management of change. The area of change management has been extensively researched in the organizational, strategic and general management literatures, and a summary of these findings is far beyond the scope of this paper. Nevertheless, as Brownson *et al.* (2006) observe, common to much of this literature is the recognition that parties to the change need to be “ready, willing, and able” to embrace new ways of operating if the adoption of the change is to be successful and sustainable. If meaning is, to a large extent, derived from context (Laughlin, 2011), consequential and convincing connection of research with specific organizational settings is important. Thus, this barrier to the diffusion of academic research to practice is in effect, about contextualizing research to demonstrate to practitioners, its amenability to adoption.

2.2 Innovation

While diffusion has consistently been defined as the process whereby the innovation is spread or disseminated (Bjornenak, 1997), the definition of innovation is not straight forward. On its own, the word innovation may be understood to be an idea, practice, or object that is perceived to be new to its adopters (Zaltman *et al.*, 1973; Rogers, 1995; 2003). Likewise, organizational innovation is consistently defined as the adoption of an idea or behavior that is perceived as new by an organization (Hage & Aiken, 1970; Zaltman *et al.*, 1973; Daft & Becker, 1978; Hage, 1980; Damanpour, 1988, 1991; Zammuto & O’Connor, 1992). The innovation can be a new product, a new service, a new technology, or a new administrative practice. The common criterion accepted for the idea to be considered as an innovation is perceived newness. According to Rogers (1995, 2003), newness might be determined in terms of new knowledge regarding the idea, and decision of adopting the idea by any social unit. There is no requirement that the innovation must always be new in its kind rather it could be either old or new ideas adopted in new settings (Evan & Black, 1967; Van de Ven, 1986). Firth (1996) also echoed the same observation stating that the adoption of an old idea in a new context where this idea is regarded as new may be viewed as an innovation. Ax and Bjornenak (2005) also confirmed that innovation may be old ideas applied to new settings or even old ideas being reintroduced into the same setting at a later point in time. Thus the idea of newness in innovation study needs careful consideration.

A number of metaphors like translation, imitation, fashion and editing have also been used to describe the processes of travelling new ideas among the members

of a social system (Røvik, 1996). Newness of an idea or practice should not be analyzed based on the idea only; it should also be analyzed in terms of its adoption unit such as organization (Zaltman *et al.*, 1973; Pierce & Delbecq, 1977). It doesn't matter whether the idea or object is new to the world, to other different environments, or to the organizational populations, rather the perception of newness by the adoption unit matters as adoption of new ideas in an organization is expected to affect organizational performance regardless of the time of its adoption by other organizations in the population (Damanpour & Evan, 1984; Slappendel, 1996). Newness relating to an innovation is also important to differentiate innovation from change. In support, Zaltman *et al.* (1973) argued that not all change involves innovation while all innovation implies change as everything that an organization adopts is not perceived to be new.

Sulaiman and Mitchell (2005) distinguish between various types of changes in the context of management accounting innovation as follows:

- Addition: It is related to introducing new techniques which may be an extension to an existing management accounting system, such as the introduction of activity based costing.
- Replacement: It is related to the replacement of an existing part of a management accounting system such as the replacement of job order costing with a hybrid costing system.
- Output modification: It is related to modifying output of the management accounting system such as the preparation of daily collection report as opposed to weekly reports or the re-presentation of numerical information in a trend analysis of time series form.
- Operational modification: It is the modification of the technical operation of the management accounting system such as the use of a standard as opposed to an actual overhead rate in an existing costing system or the use of regression analysis as opposed to high-low method for separating fixed and variable costs.
- Reduction: It is the removal of a management accounting technique with no replacement such as the abandonment of traditional costing system or the cessation activity based costing.

Thus, changes in the form of addition, replacement, output modification, and operational modification can be regarded as innovation so far they are perceived to be new by the organizations. Literature also presents another important distinction between process, technical and administrative types of innovation (e.g. Damanpour, 1991; Utterback, 1994). Process innovation is achieved through the creation of a new means of producing, selling, and/or distributing an existing product or service such as online Banking, e-commerce etc. Technical innovation is simply the creation of a new product or service, such as a new line of automobiles or the introduction of cellular telephones. Administrative innovation

is the creation of a new organization design which better supports the creation, production and delivery of services or products such as an introduction of a new management accounting technique (Daft, 1978; Damanpour & Evan, 1984).

2.3 Management accounting techniques

For many years there has been a concern that accounting research is separate from and largely irrelevant to, practice. The divergences between academia and practice need a careful attention to increase the relevance of academic research. Only a common understanding of the problems of academia and practice may lead to an increasing use of the results of research in practice, though academia is recognized as a provider of real life education. An increasing support of research by firms and professional bodies would allow accounting research to fulfill its utilitarian role in society (Albu & Toader, 2012). Baxter (1988) summarizes this concern well when he says 'I fear that a great gap separates much research from practice'. This concern about a 'gap' has echoes in much of the recent literature on this important topic (see, for example, Tilt, 2010; Parker *et al.*, 2011; Tucker, 2011) even though this literature has recognized that there is not a simple solution to such a complex problem. A literature on researches conducted so far on management accounting practices in Bangladesh has been presented below which clearly identified the adoption status of different management accounting techniques with some detailing on purposes.

In a study, Sarkar and Yeshmin (2005) have focused on the application of responsibility accounting in 30 organizations. The authors have focused on all the four categories responsibility centers such as cost center, revenue center, profit center and investment center to identify the accountability of the organization. The study revealed budget, one of the most common techniques, is being used widely to evaluate the performance. However, the study puts a selective focus on responsibility accounting in few organizations which needs to be extended.

Sharkar *et al.* (2006) have explored the applicability of different management accounting practices in listed manufacturing companies of Bangladesh. The study has revealed that all sectors concentrate on traditional tools and fail to practice some newly developed techniques. They have suggested improving and fastening the management accounting practices. This study itself calls for new research. Considering only listed company has narrowed the focus of the study as listed companies are primarily concerned with financial accounting, not with management accounting.

Mazumder (2007) has also examined the diffusion status of different management accounting techniques in the manufacturing enterprises of Bangladesh. It has been discovered that a few Multinational Corporations (MNC) are using some of

modern techniques like JIT and TQM; however, techniques like Activity-Based Costing, Target Costing, Just-in-Time (JIT), Total Quality Management (TQM), Process Reengineering, the Theory of Constraints (TOC) etc. were not used in public and private sector manufacturing enterprises. Traditional techniques like financial statement Analysis, Cash Flow Analysis, budgetary control, management reporting was found widely used followed by CVP Analysis, Marginal Costing, and Fund Flow Analysis etc. This study mainly focuses on the level of application of different management accounting techniques but doesn't cover the reasons of such choice which may be driven by different firm specific factors.

A study to reveal the level of management accounting techniques in financial institutions in Bangladesh has been conducted by Yeshmin and Das (2009). It revealed that to measure their performance among the fourteen identified management accounting techniques, managers of the financial institutions are very much satisfied with budgetary control and variance analysis. At the same time managers were very much dissatisfied with segment reporting. This study considers only financial institutions as a representative of service sector for studying the level of application of different management accounting techniques and thus highly innovative techniques like Activity Based Costing, Target Costing, Lean Manufacturing etc. remains outside the scope of the study.

A recent study, Yeshmin and Fowzia (2010) includes both manufacturing and service industries of Bangladesh to examine the use of the management accounting techniques for discharging different managerial functions. A total of 151 organizations from both manufacturing and service industries had been surveyed for the purpose. Three factors had been identified through factor analysis using 14 management accounting techniques to determine the variability's of the usage level in managerial functions. The findings revealed some management accounting techniques such as financial statement analysis, budgetary control, CVP analysis, variance analysis and fund flow analysis which were common in both the industries and were used frequently in managerial functions. This study considers both service and manufacturing sectors together which evoked some analytical problems.

Another study conducted by Yeshmin and Hossan (2011) has explored the usage level of twenty-three management accounting techniques by different manufacturing organizations in Bangladesh in making effective decisions. This study helps to evaluate the influence of different management accounting techniques in decision-making by manufacturing organizations of Bangladesh and would be of particular relevance to Bangladesh. Table 1 below identifies different management accounting techniques used in different researches conducted in Bangladesh from time to time.

Table 1. Management Accounting Tools used by Bangladeshi firms

SL	Management Accounting Tools	2011	2010	2007
1	Cash flow Statement Analysis	√		√
2	Ratio Analysis	√	√	√
3	Budgetary Control	√	√	√
4	Cost Volume Profit (CVP) Analysis	√	√	√
5	Variance Analysis	√	√	
6	Fund Flow Analysis	√	√	√
7	Standard costing	√		√
8	Variable Costing	√	√	√
9	Target Costing	√	√	√
10	Absorption Costing	√		√
11	Inter-firm Comparison	√		√
12	Activity Based Costing (ABC)	√	√	√
13	Differential costing	√		√
14	Just in Time (JIT)	√		√
15	Opportunity Costing	√		√
16	Responsibility Accounting	√	√	
17	Segment Reporting	√	√	
18	Total Quality Management (TQM)	√	√	√
19	Theory of Constraint (TOC)	√	√	√
20	Management by Exception (MBE)	√	√	
21	Process Reengineering	√		√
22	Kaizen Costing	√		
23	Balance Scorecard	√	√	
24	Management Reporting			√

Yeshmin and Hossan (2011) reveals that cash flow statement analysis, ratio analysis, budgetary control, CVP analysis, variance analysis, fund flow analysis, TQM, and TOC are widely used management accounting techniques. The study also applies factor analysis to identify any hidden relationship resulting five factors considering the variability of the responses given by the respondents. Finally, the authors have tried to find out the level of significance of different managerial accounting techniques in decision making. Out of 23 techniques, only eight techniques namely, budgetary control, fund flow analysis, absorption costing, balanced scorecard, TOC, ABC, segment reporting and inter firm comparison become statistically significant.

Shil and Pramanik (2012) conduct a survey across 25 manufacturing companies to comment on the adoption and implementation status of Activity Based Costing. The study reveals that a good number of companies surveyed (64%) apply ABC for product costing and other purposes, however, the quality of ABC is not up to standard, even costing system with only one cost driver is also referred to as ABC. Thus the diffusion rate is not satisfactory. At the same time,

the sample size was so small and it may not reflect the actual scenario of the market. In another study, Kabir *et al.* (2013) considers only listed pharmaceutical companies in Bangladesh to explore the level of application of different management accounting techniques in making different managerial decisions. The study revealed that the pharmaceutical companies use a good number of management accounting tools, on average 35, across a wide range of operational, managerial and strategic functions which reflects a strong level of commitment in organizational management.

Based on the above literature, a total of 21 management accounting tools have been identified to study the level of diffusion of different management accounting techniques in sample firms. The analysis has tried to maintain proper alignment of three keywords (diffusion, innovation and management accounting techniques) with their respective gravity. Some of the 21 management accounting techniques as used in this survey may seem to be traditional; however, as per the definition of 'innovation', they are new in the context of Bangladesh and Bangladeshi firms. Most of the studies conducted so far lack to bring innovation and diffusion in studying management accounting techniques. These studies mainly analyze the level of application of different management accounting techniques on a structured questionnaire designed on the basis of Likert's 5 point scale. This paper widens the analysis by extending the sample size considering both listed and unlisted manufacturing firms. It has also searched the reason of diffusions of different management accounting techniques by collating the level of application with different factors like size, profitability, net assets etc.

3. Research methodology

The paper is based on the result of a questionnaire survey. A questionnaire to study the diffusion of different management accounting techniques in Bangladesh was constructed covering all the 21 management accounting techniques. The respondents are requested to choose the respective values in a 5-point Likert scale referring to the degree of adoption of different management accounting techniques in their firms. As already mentioned, these techniques are identified from different researches conducted so far in Bangladesh on management accounting practices. These questionnaires are sent to the respondents, and then collected once filled up through proper communications.

3.1 Population and sample

In this type of Study, identification of population and sample is always critical. And in Bangladesh, it is challenging as well due to non-availability of required data. Considering the nature of the study, only manufacturing companies in

Dhaka¹ region are considered as the population of the study. Management accounting techniques are mainly applied in manufacturing industries. And in Bangladesh, either factories or headquarters of different firms are concentrated in Dhaka region due to availing the location advantage. It is easy to collect required data from manufacturing firms in Dhaka region. However, during the research phase, the researchers were failed to collect a dedicated list of manufacturing companies operating in Dhaka region. To bring more objectivity in research methodology, a sample frame is thought of the manufacturing companies where professional management accountants are working. This is done through the scrutiny of membership directory of ICMAB² for the year 2014. Such scrutiny results around 200 companies. The study doesn't consider any service industry and companies operating outside Dhaka. Out of the 200 companies, 47 companies expressed their reluctance to participate in the survey. Other 153 companies are considered as the sample for the study. However, questionnaires are not received from 28 companies though they have been given remainder in time and 12 received questionnaires are rejected due to the missing data. Finally a total of 113 questionnaires are used to reach to the conclusion.

3.2 Statistical tools

Different descriptive and inferential statistical tools are used in line with the objectives of the study. Descriptive tools like mean, standard deviations are applied to identify the highly used techniques. Exploratory factor analysis (EFA) is used as a data reduction tool to identify any hidden relationship among the techniques. Regression analysis is used to identify any potential causal relationship between the level of diffusion and different parameters like level of accuracy, profitability, turnover, net assets etc.

4. Analysis and findings

This section presents the analysis and major findings of the study. It starts with the descriptive output of respondents and corporate profiles who participated in the study followed by different management accounting techniques. Next section presents regression analysis in two different modules. In first module, exploratory factor analysis identified major groupings among the management accounting techniques which have been regressed with other variables to identify and relationship. And in next module, the grouping is done based on the average score out of 5 which is regressed again with other variables to identify any possible relationship. The respective findings are embedded with the analysis.

4.1 Respondents' profile

The study was conducted based on a very rich respondents' profile due to the gravity of the subject itself. Respondents' demographic biography is presented below:

Table 2. Demographic data

Demographic Profile of Respondents	Frequency	Percentage
a) Educational Background		
Professional Degrees	46	35
Graduated	66	51
Undergraduate	11	9
Others	6	5
	129	
b) Years of Experience		
Less than 5 years	25	22
5 – 10 Years	44	39
More than 10 years	44	39
	113	100
c) Intention to Switch		
Yes	20	18
No	93	82
	113	100
d) Number of Jobs		
Less than 3	56	50
3-5	50	44
More than 5	7	6
	113	100
e) Organizational Designation		
i) Top Level Management		
Managing Director	2	
Director	7	
Chief Financial Officer	5	
Country Manager	2	
Group CFO	3	
Finance Controller	6	
VP Finance and Company Secretary	3	
Total	28	25
ii) Mid Level Management		
Production Supervisor	2	
General Manager	7	
Manager	25	
Assistant Manager	11	
Chief Accountant	3	
Assistant General Manager	2	
Deputy General Manager	2	

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Demographic Profile of Respondents	Frequency	Percentage
Assistant Finance Controller	3	
Head of Accounts	5	
Total	60	53
iii) Lower Level Management		
Executive	18	
Accounts Officer	7	
Total	25	22
Total	113	100

As already mentioned, mostly all the respondents are affiliated with different professional accounting institutes, most of them are already qualified members and few others are student members. In terms of years of experience, a good percentage of respondents (78%) are having more than 5 years of experience. It reflects the required maturity of the respondents to address a questionnaire related to accounting system design and its application. In another case, it reveals that only 18% of the respondents have an intention to switch current job. It signifies that the accounting practitioners are not severely job hopper which is a good prerequisite for ensuring a sound management accounting practice. Satisfaction with the job is a very important criterion for innovation and adoption of different management accounting techniques.

In terms of managerial hierarchy, only 22% respondents are holding lower level management position. And these respondents come from highly decentralized organization where there are independent departments taking care of cost and management accounting related issues. Due to the structured questionnaire, these executives are referred by top level management and thus it is expected that there will be no asymmetry of feedback given by them. It is also nice to observe that in most of the firms, top level and mid level management plays role as management accountant which is supportive for applying different management accounting techniques.

4.2 Corporate profile

This section presents the profiles of companies participated in the survey in terms of different size and profitability related parameters. These parameters are important to find out any potential impact of firm related variables on the ultimate outcome.

Like respondents' profile, corporate profile of the responding firms is also very rich. More than 80% of the firms are in operation for more than 10 years. More than 40% of the firms are having more than 1,000 employees. Around 40% of the firms have annual turnover of more than 1,000 million.

Table 3. Corporate profile

Corporate Profile	Frequency	Percentage
a) Years in Operation		
0-10	20	18
11-20	56	50
21-30	11	10
31-40	13	12
41-50	4	3
More than 50	9	7
	113	100
b) Number of Employees		
0-1000	65	58
1001-2000	18	16
2001-3000	14	12
3001-4000	7	6
4001-5000	2	2
More than 5000	7	6
	113	100
c) Annual Turnover		
Less than 100 million	36	32
101 – 1000 million	31	27
1001-10,000 million	34	30
More than 10,000 million	12	11
	113	100
d) Net Assets		
Less than 100 million	25	22
101 – 1000 million	47	42
1001-10,000 million	30	27
More than 10,000 million	11	9
	113	100

4.3 Management accounting techniques

This study caters to provide diffusion status of different management accounting techniques in practice. For that purpose, a total of 21 techniques have been identified and a survey was conducted to identify the level of application of those techniques to understand the market of management accounting in Bangladesh. Based on the feedback of the respondents in 5 point Likert scale, a descriptive statistics may be presented with mean, standard deviation, maximum and minimum data values as in table 4.

Out of 21 techniques, 2 have average values more than 4, 9 have average values more than 3 but less than 4 and other 10 have values less than 3. The analysis highlights that out of 21 management accounting techniques, cash flow statement analysis and budgetary control are highly used followed by ratio analysis,

variable costing and other tools. In a separate section, the author has tried to identify whether this level of diffusion is being driven by any firm specific factors like profitability, turnover, net assets etc.

Table 4. The diffusion of management accounting techniques

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Cash Flow Statement Analysis	113	.00	5.00	4.1947	1.17912
Budgetary Control	113	.00	5.00	4.0619	1.31124
Ratio Analysis	113	.00	5.00	3.8496	1.24801
Variable Costing	113	.00	5.00	3.6726	1.30550
Total Quality Management	113	.00	5.00	3.6195	1.45356
Fund Flow Analysis	113	.00	5.00	3.5044	1.37011
Variance Analysis	112	.00	5.00	3.3482	1.46865
Standard Costing	113	.00	5.00	3.2920	1.44964
Absorption Costing	111	.00	5.00	3.2793	1.47815
Segment Reporting	113	.00	5.00	3.1681	1.44483
Responsibility Accounting	113	.00	5.00	3.0973	1.44522
Balanced Scorecard	113	.00	5.00	2.9912	1.52066
Target Costing	113	.00	5.00	2.9646	1.58638
Activity Based Costing	113	.00	5.00	2.9558	1.53756
Process Re-engineering	113	.00	5.00	2.9115	1.37294
CVP Analysis	113	.00	5.00	2.9027	1.48784
Inter-firm Comparison	113	.00	5.00	2.8584	1.41968
Lean Manufacturing	113	.00	5.00	2.4956	1.52435
Theory of Constraints	113	.00	5.00	2.4071	1.41823
Kaizen Costing	113	.00	5.00	2.1593	1.42407
Back-flush Costing	113	.00	5.00	2.1327	1.27828

4.4 Exploratory factor analysis

As already mentioned, this study uses 21 management accounting techniques to understand the level of diffusion of different management accounting techniques. However, using these 21 techniques separately for inferential analysis is operationally difficult and will not bring any merit in analysis. Thus, categorizing these techniques into smaller groups is important for making the analysis worthy

and manageable. Exploratory factor analysis is done as a data reduction technique to identify whether any grouping among them is possible or not. A summary of the factor analysis is presented below:

Table 5. Factor analysis results

	Measures	Values
1.	Measure of Sampling Adequacy	.817
2.	Level of Significance	.000
3.	Number of Factors Extracted	6
4.	Cumulative Percentage	67.985
6.	Reliability – Cronbach’s Alpha	.863

Interpretive adjectives for the Kaiser-Meyer-Olkin Measure of Sampling Adequacy are: in the 0.90 as marvelous, in the 0.80's as meritorious, in the 0.70's as middling, in the 0.60's as mediocre, in the 0.50's as miserable, and below 0.50 as unacceptable. The value of the KMO Measure of Sampling Adequacy for this set of variables is .817, which would be labeled as 'meritorious'. Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix; i.e. all diagonal elements are 1 and all off-diagonal elements are 0, implying that all of the variables are uncorrelated. If the Sig value for this test is less than our alpha level, we reject the null hypothesis that the population matrix is an identity matrix. The Sig. value for this analysis leads us to reject the null hypothesis and conclude that there are correlations in the data set that are appropriate for factor analysis. This analysis meets this requirement. A total of 6 factors have been extracted having more than 1 eigenvalues with a cumulative percentage of about 68 which is within the accepted range. Finally alpha value of .863 ensures the reliability ($\alpha=.863>.70$). The six factors as per the rotated component matrix are presented below with different management accounting techniques in each factor:

Table 6. Factor analysis and associated techniques

Factors	Management Accounting Techniques
1- Controlling Tools	Standard Costing, Responsibility Accounting, Segment Reporting, Theory of Constraints, Activity Based Costing
2 - Costing Tools	Back-flush Costing, Target Costing, Lean Manufacturing
3 - Reporting Tools	CVP Analysis, Variable Costing, Absorption Costing, Total Quality Management
4 - Analytical Tools	Variance Analysis, Fund Flow Analysis, Inter-firm Comparison
5 - Performance Measurement Tools	Cash Flow Statement Analysis, Ratio Analysis, Budgetary Control, Balanced Scorecard
6 - Quality Management Tools	Process Re-engineering, Kaizen Costing

4.5 Regression analysis

This section presents the result of regression analysis. The purpose of this analysis is to identify any relationship between diffusion of management accounting techniques and other variables like accuracy, profitability, turnover and net assets. In two different modules (two ways of grouping management accounting techniques), four models are run considering four different variables.

Module 1: In this module, 6 factors as identified by exploratory factor analysis are considered as independent variables where accuracy, profitability, turnover and net assets are considered as dependent variables in four different models. Based on the grouping, the dataset is manipulated to bring average value of all the 21 techniques into six categories. The regression runs result the following summary:

Table 7. Regression models

Dependent Variables	Model 1: Accuracy		Model 2: Profitability		Model 3: Turnover		Model 4: Net Assets	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Controlling Tools	.244	.074	.061	.668	-.081	.577	-.190	.195
Costing Tools	.006	.959	.014	.912	-.090	.484	-.074	.563
Reporting Tools	.256	.038	-.293	.024	.038	.770	.213	.119
Analytical Tools	.028	.813	.047	.696	.239	.066	.298	.018
Performance Measurement Tools	-.100	.368	.021	.859	.035	.765	-.061	.601
Quality Management Tools	-.233	.048	-.059	.631	.046	.706	.142	.255
ANOVA								
F	2.463		1.188		1.109		2.650	
Sig.	.029		.319		.363		.020	
Model Summary								
R	.353		.256		.250		.382	
R Square	.124		.065		.062		.146	

Values of R^2 in all the four models are poor in terms of the explanatory power of the variables. However, model 1 (with accuracy as dependent variable) and model 4 (with net assets as dependent variable) become significant at $p < .050$. From this, an inference could be drawn that the level of diffusion has some connectivity with the level of accuracy and net assets. It is highly established in management accounting literature that the very purpose of management accounting is to supplement accurate decision making process. And the research puts a very important conclusion that the level of application of different management accounting techniques will be guided by the size variable which is the value of net assets. It has confirmed a very important purpose of management accounting which is resource utilization. Thus, when a company invests significantly in its fixed assets base, it is more concerned on the efficient utilization of the recourses

which exerts a form of compulsion of implementing different management accounting techniques to achieve the target.

A close look at the beta value in different models also result some interesting findings. Out of six groups, only four groups become significant at different level which can be reproduced as under:

Table 8. Variables in the regression model

Groups	Dependent Variables	Significance	Relationship
Controlling Tools	Accuracy	P<.100	Positive
Reporting Tools	Accuracy	P<.050	Positive
	Profitability	P<.050	Negative
Analytical Tools	Turnover	P<.100	Positive
	Net Assets	P<.050	Positive
Quality Management Tools	Accuracy	P<.050	Negative

Controlling and reporting tools show a positive significant relationship with accuracy whereas quality management tools become significant but negative. It may mean that high level of diffusion in quality management tools results low level of accuracy as prevalent in current study. Reporting tools show a negative relationship with profitability which may be due to the disparity of financial accounting and management accounting. And finally both turnover and net assets (size variable) show a positive relationship with analytical tools.

Module 2: In this module, management accounting techniques are grouped by following different criteria. To bring further merit to diffusion study, 21 management accounting tools have been regrouped into three based on their average score out of 5. The following rules are applied for such grouping:

Table 9. Groupings based on diffusion

Groups	Rules	Tools
Highly Diffused Tools	Average score above 4.00	Cash Flow Statement Analysis, Budgetary Control
Moderately Diffused Tools	Average score above 3.00 but less than 4.00	Ratio Analysis, Variable Costing, Total Quality Management, Fund Flow Analysis, Variance Analysis, Standard Costing, Absorption Costing, Segment Reporting, Responsibility Accounting
Lowly Diffused Tools	Average score less than 3.00	Balanced Scorecard, Target Costing, Activity Based Costing, Process Re-engineering, CVP Analysis, Inter-firm Comparison, Lean Manufacturing, Theory of Constraints, Kaizen Costing, Back-flush Costing

Based on these 3 revised groupings, four different models are formulated again considering the four variables (accuracy, profitability, turnover and net assets) as dependent in each model with the following summary results.

Table 10. Regression models for techniques based on the level of diffusion

Dependent Variables	Model 1: Accuracy		Model 2: Profitability		Model 3: Turnover		Model 4: Net Assets	
	Beta	Sig.	Beta	Sig.	Beta	Sig.	Beta	Sig.
Highly Diffused Tools	-.270	.020	-.065	.595	.078	.524	-.065	.609
Moderately Diffused Tools	.567	.000	-.170	.299	.155	.329	.191	.266
Lowly Diffused Tools	-.162	.193	.043	.756	-.069	.610	.088	.544
ANOVA								
F	5.724		1.328		1.078		1.813	
Sig.	.001		.269		.362		.150	
Model Summary								
R	.372		.191		.174		.232	
R Square	.138		.037		.030		.054	

It is very interesting to note that, as per this analysis, only model 1 (with accuracy as dependent variable) becomes significant where around 14% of variation in accuracy is explained by different management accounting tools. Highly diffused tools become significant individually ($p < .050$) though it shows a negative relationship with accuracy. However, moderately diffused tools become significant ($p < .010$) and shows positive relationship. Lowly diffused tools are not significant.

5. Conclusions

Application of different management accounting techniques largely depends on the demand on such techniques by the practitioners for their decision making needs. At the same time, the reciprocity of knowledge between the academia and the practitioners also play an important role in smooth diffusion process. Finally the characteristics of the markets in terms of competition, maturity, life cycle, customer base etc are also active parameters for the diffusion process. Considering all the prerequisites, Bangladeshi firms are exposed to less risk and criticality in terms of doing business which results a low diffusion of different management accounting techniques. Other countries with a similar economic status may observe the research findings for their own policy interventions.

Out of twenty one techniques used in the study, cash flow statement analysis and budgetary control techniques received the highest score (more than four out of five) which are traditional management accounting techniques in a global set up. Innovative techniques like balanced scorecard, activity based costing, target

costing, lean manufacturing, theory of constraints, process reengineering etc. received a very low status in terms of diffusion. It echoes the definition as given by Firth (1996) that using a new idea or even the adoption of an old idea in a new context, where this idea is regarded as new, may be viewed as an innovation. Thus, Bangladeshi firms are very slow in accommodating globally diffused innovative tools in a similar pace rather there is a tendency of absorbing old tools in new settings. This status is not an exception from a global perspective where most of the countries demonstrate the choice of using traditional techniques over advanced techniques.

To give a different dimension in the study of diffusion, the paper has tried to identify any causal relationship between management accounting techniques with some other variables. The interesting finding is that management accounting techniques has some relationship with accuracy and one size variable, net assets. This justifies some major roles that management accounting plays to ensure accuracy in decision making and to support the top level management in taking investment decisions. However, other variables considered in the study like profitability, turnover doesn't show any notable relationship with the diffusion which may be further researched.

This study only considers manufacturing firms which may also be extended by covering service sectors for wider perspectives. Further studies may also be conducted on the significance of management accounting curriculum in different universities. It may be a very strong reason for weak diffusion of management accounting techniques. Report on Observance of Standards and Codes (ROSC) of World Bank (2003) echoes the same observation where the World Bank team expressed their concern that most of the Universities in Bangladesh are not offering majoring in accounting degree and professional accounting courses are being taught by non-professionals. However, this paper brings a new dimension in studying level of diffusion of different management accounting techniques with different classifications through factor analysis and based on the scores like highly, moderately and lowly diffused tools which is absent in prior researches. At the same time it has collated the level of diffusion with different factors to bring some policy issues which is the contribution of this paper.

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