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Management Accounting Practices for Decision-Making of the Listed Manufacturing Organizations in Bangladesh

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ABSTRACT

This paper investigates the relationship between management accounting practices (MAPs) and decision-making processes (DMPs) within manufacturing organisations in Bangladesh and examines the extent of use of various MAPs, including costing systems, budgeting systems, performance evaluation systems, decision support systems, and strategic management accounting analyses for decision-making (DM). By utilising descriptive statistics, multiple regression, and Pearson correlation tests, the study examines the relationship between these practices and decision-making. This is achieved through the administration of a structured questionnaire to 70 respondents representing 35 DSE-listed manufacturing enterprises in Bangladesh. SPSS version 25 is used to test these results. The findings reveal significant positive relationships, indicating that specific MAPs significantly influence DMPs. Notably, process costing, budgeting for planning and controlling costs, a variety of financial performance evaluation systems, cost volume profit analysis, and shareholder value analysis. This study provides empirical evidence that highlights the information generated by various types of MAPs that are important for decision-making in manufacturing organizations in Bangladesh. The study suggests implications for practice, highlighting the importance for manufacturing organisations to carefully consider their use of MAPs to enhance decision-making effectiveness. The study's limitation lies in its exclusive focus on the MAPs of manufacturing companies in Bangladesh, underscoring the need for further research that encompasses both the manufacturing and service sectors.

1. Introduction

In the dynamic landscape of the global economy, manufacturing organizations, particularly those listed on stock exchanges, play a pivotal role in driving economic growth and development. Bangladesh, with its burgeoning industrial sector, stands as a prime example of a nation witnessing rapid industrialization and consequent expansion of its manufacturing base. However, amidst the opportunities and challenges inherent in this environment, effective decision-making remains paramount for the sustained success and competitiveness of these organizations.

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Management accounting (MA) is an area of accounting that provides information about organizational performance based on data derived from cost and financial accounting. Data from the past and data from the future, derived from actual [1]. Assisting management with strategy development and execution, MA include collaborating with management in decision-making (DM), developing planning and performance management systems, and offering knowledge in financial reporting and control [2].

Many organizations decision-making processes (DMP) have undergone an enormous shift throughout the last thirty years. It has become clear to managers that long-established practices are no longer productive and that significant modifications are required to the management of organizations and the execution of tasks. Due to various shifts in information and consumer preferences, businesses are increasingly focusing on product quality, operational rating in relation to various activities, and more accurate cost product data [3]. The business climate is changing at a rapid rate, requiring more accurate information for managers to make decisions [4].

Rapid technological advancements and more competitive business settings have resulted in substantial modifications in management accounting practices (MAPs) in manufacturing firms. To deal with these developments, a variety of management accounting tools have been created to assist managers in making operational and strategic decisions. The use of such techniques led to successful decision-making in developed countries but in least developed countries like Bangladesh; the implementation of such contemporary management accounting tools for decision making for the organizations has not yet given significant priority [5].

Manufacturing organizations employ MAPs in order to evaluate their operations. Budgeting, variance analysis, and breakeven analysis are examples of such techniques. These approaches aid businesses in organizing, directing, and controlling their operating costs in order to generate profits. There has been debate regarding the impact of the "new" techniques on management accounting and the subsequent shift in its emphasis; nevertheless, further empirical investigation is warranted [6]. Few empirical studies have examined MAPs within the framework of Bangladeshi listed manufacturing organizations. What little research there is also highlights how successful these methods are at assisting decision-making [7].

In the dynamic landscape of Bangladesh's manufacturing sector, listed organizations face intricate challenge in utilizing MAPs effectively for decision- making. Despite the growing importance of these practices, there remains a notable gap in understanding the specific strategies and approached employed by such companies, this study aims to address this gap by investigating the current MAPs utilized by listed manufacturing organizations in Bangladesh and identifying potential areas for improvement. By delving into this area, the study seeks to enhance the DMP within these organizations, thereby contributing to their sustainable growth and competitiveness in both local and global market.

This article aims to delve into the realm of MAPs adopted by listed manufacturing organizations in Bangladesh, focusing specifically on their role in DMP. The study seeks to identify the most influential management accounting procedures utilised by manufacturing enterprises in Bangladesh during managerial decision-making. Through a comprehensive analysis of MAPs in listed manufacturing organizations in Bangladesh, this article aims to contribute to the existing body of knowledge on strategic decision-making, organizational performance, and management accounting in emerging market contexts. By elucidating the intricate interplay between MAPs and DMP, this study endeavours to offer valuable insights for practitioners, policymakers, and researchers alike, thereby fostering informed discussions and driving positive change within the Bangladeshi manufacturing landscape.

2. Literature Review

This literature review focuses on the role of MA in organizational decision-making. Azadina *et al.,* [8] highlight the importance of decision-making abilities in businesses, emphasizing time as a crucial factor in the process. Otley [9] links MA to improved decision-making, stating that it aids in maintaining a competitive edge and aligning organizational actions with cultural values.

2.1 Costing System - Decision Making of the Organization

Various costing systems, such as standard costing and activity-based costing (ABC), are essential for informed decision-making, as shown by Freedman [10] and Woodruff [11]. In light of the above debate, the following hypothesis has been formulated for examination:

H1: There is a significant relationship among the costing systems and DM of the organization.
H1-1: There is a positive relationship among the process costing and DM of the organization.
H1-2: There is a positive relationship among the target costing and DM of the organization.
H1-3: There is a positive relationship among the separation costing and DM of the organization.
H1-4: There is a positive relationship among the batch costing and DM of the organization.
H1-5: There is a positive relationship among the activity based costing and DM of the organization.

2.2 Budgeting System - Decision Making of the Organization

The role of budgeting in decision-making is also critical, with Garrison *et al.,* [12] defining budgets as tools for planning and regulating revenues and expenses. Rahman and Hassan [13] emphasize how budgetary participation and variance analysis influence managerial satisfaction. The findings revealed that budgetary participation and budgetary variance analysis greatly increased managerial satisfaction. Budgeting has a vital part in the communication of goals, formulation of strategy and in performance evaluation. Consistent with the above arguments, this study proposed the following hypothesis for examination:

H2: There is a significant relationship among the budgeting systems and DM of the organization.
H2-1: There is a positive relationship among the budgeting for planning and DM of the organization.
H2-2: There is a positive relationship among the budgeting for controlling cost and DM of the organization.
H2-3: There is a positive relationship among the activity based budgeting and DM of the organization.
H2-4: There is a positive relationship among the budgeting what if analysis and DM of the organization.
H2-5: There is a positive relationship among the flexible budgeting and DM of the organization.
H2-6: There is a positive relationship among the zero based budgeting and DM of the organization.

2.3 Performance Evaluation System - Decision Making of the Organization

Performance evaluation is crucial in business management as it provides information necessary to assess various aspects of the organization Performance evaluation systems, such as the balanced scorecard, play a vital role in assessing organizational performance, combining both financial and non-financial measures [14,15]. Performance evaluation serves as a framework for managers to measure against future times and aids in the decision-making process. In order to identify that the using different types of performance evaluation systems affects the decision making of the manufacturing organizations in Bangladesh the following hypothesis is formed as:

H3: There is a significant relationship among performance evaluation systems and DM of the organization.
H3-1: There is a positive relationship among the using different types of financial measure and DM of the organization.
H3-2: There is a positive relationship among using balance scorecard and DM of the organization.
H3-3: There is a positive relationship among the non- financial measure related to customer and DM of the organization.
H3-4: There is a positive relationship among the non- financial measure related to operation what if analysis and DM of the organization.
H3-5: There is a positive relationship among the non- financial measure related to employees and DM of the organization.

2.4 Decision Support System - Decision Making of the Organization

The rapidly aggressive competitive business environment necessitates that organizations make informed decisions for both the short term and long term to ensure their survival. Decision support systems, including cost-volume-profit analysis and product profitability analysis, provide valuable insights for decision-making, as explored by Maelah *et al.,* [16]. To confirm a similar relationships this study also formed the following hypothesis for investigation:

H4: There is a significant relationship among the decision support system and DM of the organization.
H4-1: There is a positive relationship among the using cost volume profit analysis and DM of the organization.
H4-2: There is a positive relationship among using product profitability analysis and DM of the organization.
H4-3: There is a positive relationship among the customer profitability analysis and DM of the organization.
H4-4: There is a positive relationship among evaluation of major capital investment based on discounted cashflow method and DM of the organization.
H4-5: There is a positive relationship among evaluation of major capital investment based on payback period and DM of the organization.
H4-6: There is a positive relationship among calculation and use of cost of capital in discounting cashflow for major capital investment evaluation and DM of the organization.
H4-7: There is a positive relationship among the evaluation of major capital investments non-financial aspects are documented and reported and DM of the organization.

2.5 Strategic Management Accounting - Decision Making of the Organization

Strategic Management Accounting (SMA) involves the oversight of an organization's and its competitors' strategy via the analysis of financial and economic data. SMA, which focuses on tools like long-range forecasting and competitive analysis, informs high-level business decisions [7,17].

H5: There is a significant relationship among strategic analysis MAPs and DM of the organization.
H5-1: There is a positive relationship among the long range forecasting and DM of the organization.
H5-2: There is a positive relationship among the shareholder value analysis and DM of the organization.
H5-3: There is a positive relationship among the industry analysis and DM of the organization.
H5-4: There is a positive relationship among the analysis of competitive position and DM of organization.
H5-5: There is a positive relationship among the value chain analysis and DM of the organization.
H5-6: There is a positive relationship among the product life cycle analysis and DM of the organization.
H5-7: There is a positive relationship among the divisional analysis and DM of the organization.

In summary, the literature suggests that various MAPs, including costing, budgeting, performance evaluation, decision support systems, and strategic management accounting, significantly contribute to informed and effective decision-making within organizations.

3. Research Framework

In light of the main focus of the study, the constructs examined and the relationship analyses conducted, a conceptual framework for the study is outlined below:

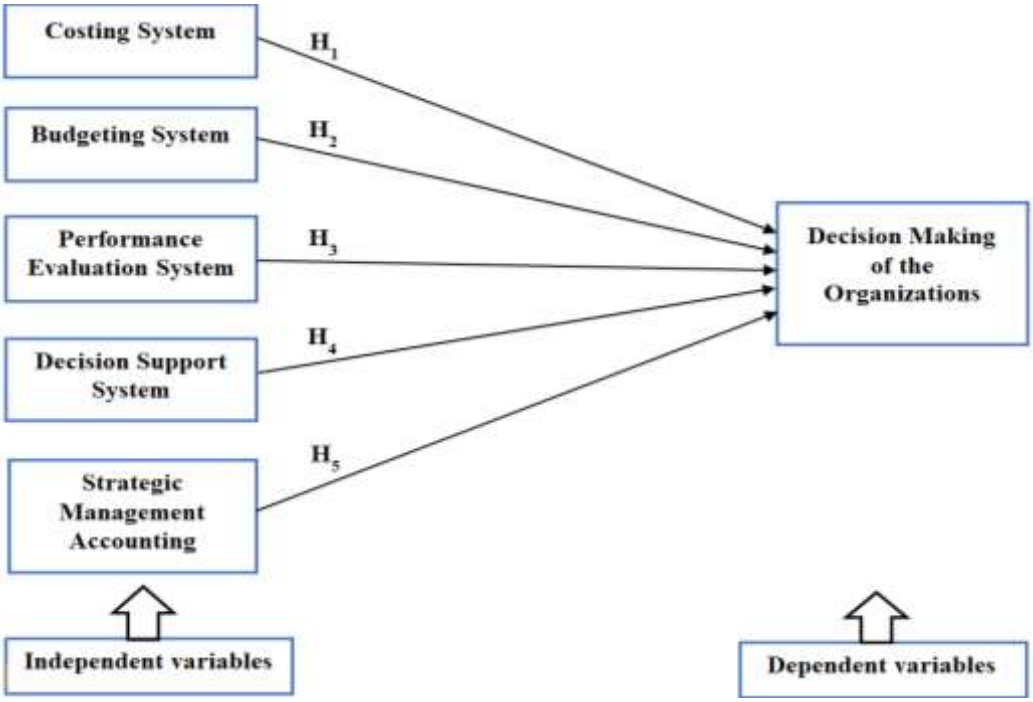

Fig. 1. Research framework

4. Methodology

The data for this study were gathered via a structured questionnaire survey with 45 items for quantitative analysis. Section A collect general information on the organization, whereas Section B focused on MAPs and decision-making, which included 37 variables. The questions in Section B were based on a 5-point Likert scale (1 = not at all, 2 = low extent, 3 = moderate extent, 4 = high extent, 5 = very high extent) [6,18,19]. The survey targeted top and mid-level employees in the accounts and finance departments of listed manufacturing companies on the Dhaka Stock Exchange (DSE), specifically within the Cement, Ceramics, Pharmaceuticals, Foods, and Allied sectors. Out of 95 questionnaires sent between November 2023 and February 2024, 74 responses were received, of which 70 were usable. Respondent contact details were obtained from the Institute of Cost and Management Accountants of Bangladesh (ICMAB) and the Institute of Chartered Accountants of Bangladesh (ICAB). Descriptive analysis was used for demographic data, while correlation and multiple regression analyses tested the relationship between MAPs usage and organizational decision-making. Data analysis was performed using SPSS.

5. Results and Discussion

5.1 Reliability Analysis

The survey questionnaire's reliability was evaluated through the use of Cronbach's alpha. The fact that the Cronbach's alpha (α=0.944) values for 37 variables exceeded the significance threshold of 0.70 provided evidence for the variables' internal consistency according to Nunnally [20] and Abdel-Kader & Luther [18]. A multicollinearity test was run as part of the research. All tests had a VIF value below 10 and tolerance values over 0.1, indicating that the study's independent variables were not affected by multicollinearity.

5.2 Demographic Details

The participant consisted mostly of males (94.6%), while females accounted for 5.4%. In terms of age, 59.5% were in the 36–45 age range, and 32.4% were 46 years of age or older. In terms of education, 5.4% had a post-doctoral degree, while 86.5% had a master's degree or above. Furthermore, 83.8% possessed professional degrees such as Cost Management Accountant (CMA) and Chartered Accountant (CA). Concerning work experience, 32.4% possessed 11-15 years, while 51.4% had more than 16 years (Table 1).

Table 1
Demographical status

Measure	Items	Percentage %
Gender	Male	94.6%
	Female	5.4%
Age	25-35 Years	8.1%
	36-45 years	59.5%
	Over 46 years	32.4%
Education	Graduation	8.1%
	Masters	86.5%
	Post Doctorate	5.4%
Educational qualification	CA (Intermediate)	2.7%
	CA	18.9%
	FCA	13.5%
	ACMA	21.6%
	CMA	16.2%
	FCMA	8.1%
	Qualified Chartered Secretary and Fellow member of ICSB	2.7%
	Not Applicable	16.2%
Rank	Top level	54.1%
	Mid-level	45.9%
Experience	Less than 5 years	2.7%
	6-10 years	13.5%
	11-15 years	32.4%
	Over 16 years	51.4%

5.3 Descriptive Statistics

Table 2 provides insights into the usage levels of various MAPs and techniques across surveyed companies, based on a five-point scale ranging from “Not at all” to “Very High Extent”.

Table 2
Management accounting practices and techniques practices or techniques related to decision making of the organization

	Usage of MAPs in Respondents' Companies (n=70) in percentage (%)					Rank (%)
	S1	S2	S3	S4	S5	
A. Costing System						
Separation costing	0	7.1	24.3	32.9	35.7	100
Process costing	5.7	5.7	18.6	48.6	21.4	100
Target costing	0	15.7	32.9	37.1	14.3	100
Batch costing	8.6	5.7	12.9	38.6	34.3	100
Activity costing	5.7	18.6	30.0	32.9	12.9	100
B. Budgeting System						
Budgeting for Planning	0	2.9	14.3	40.0	42.9	100
Budgeting for Controlling	0	2.9	8.6	57.1	31.4	100
Activity Based Budgeting	0	17.1	28.6	38.6	15.7	100
Budgeting with “What if analysis”	11.4	12.9	35.7	31.4	8.6	100
Flexible Budgeting	0	22.9	34.3	28.6	14.3	100
Zero based budgeting	17.1	34.3	21.4	12.9	14.3	100
Budgeting for long term	5.7	4.3	30.0	40.0	20.0	100
C. Performance Evaluation System						
Different types of financial measure	0	0	21.4	34.3	44.3	100
Balance Scorecard	27	11.4	31.4	24.3	5.7	100
Economic Value Added	14.3	15.7	35.7	31.4	2.9	100
Non -financial measure related to customer	2.9	10.0	35.7	37.1	14.3	100
Non-financial measure related to operation	5.7	12.9	31.4	41.4	8.6	100
Non-financial measure related	0	7.1	50	37.1	5.7	100
D. Decision Support System						
Cost volume profit analysis	1.4	0	18.6	37.1	42.9	100
Product Profitability analysis	12.9	7.1	20.0	31.4	28.6	100
Customer Profitability analysis	8.6	15.7	30.0	30.0	15.7	100
Capital investment evaluation on discounted cash flow (DCF)	1.4	8.6	37.1	34.3	18.6	100
Capital investment evaluation based on payback period	2.9	12.9	28.6	35.7	20.0	100
Cost of Capital in DCF for Capital Investment	1.4	10.0	41.4	37.1	10.0	100
Non-Financial Aspects in Capital Investment Evaluation	5.7	8.6	45.7	28.6	11.4	100
E. Strategic Management Accounting Practices						
Long range forecasting	5.7	2.9	24.6	47.1	20.0	100
Shareholder value analysis	2.9	20.0	28.6	38.6	10.0	100
Industry Analysis	5.7	5.7	15.7	60.0	12.9	100
Analysis of competitive position	5.7	4.3	11.4	61.4	17.1	100
Value chain analysis	7.1	17.1	20.0	38.6	17.1	100
Product life cycle analysis	7.1	14.3	40.0	25.7	12.9	100
Divisional analysis	7.1	12.9	35.7	27.1	17.1	100

Based on five-point scale (S1: Not at all; S2: Low extent; S3: Moderate extent; S4: High Extent; S5: Very high extent)

5.4 Costing System

The separation costing method is implemented to a high extent (S4: 32.9%) and very high extent (S5: 35.7%). Process costing is predominantly used to a high extent (S3-S4: 69.9%). The utilization of target costing ranges from moderate to high (S3-S5: 85.8%). ABC is ultimately to a moderate to high extent (S3-S4: 63.2%).

5.5 Budgeting System

Budgeting for planning is mainly used at a high to very high extent (S4-S5: 82.9%), while budgeting for controlling is used predominantly at a high extent (S4: 57.1%). Activity-Based Budgeting (ABB) (S3-S4: 67.2%) and "What if analysis" (S3-S4: 67.1%) are used moderately to high. Flexible Budgeting (S3-S4: 63.0%) and Zero-based Budgeting (S3-S4: 67.2%) are employed to a moderate to high extent. Long-term budgeting is predominantly utilized at a moderate to very high extent (S3-S5: 90.0%).

5.6 Performance evaluation System

Different types of financial measures are predominantly utilized at a high to very high extent (S4-S5: 78.6%). The Balanced Scorecard (BSC) is predominantly utilized at a moderate to a high extent (S3-S4: 55.7%). Economic Value Added is also predominantly utilized at a moderate to a very high extent (S3-S5: 67.1%). Lastly Non-financial measures related to customers, operations, and others are predominantly utilized at a moderate to a very high extent.

5.7 Decision Support System

Cost-volume-profit analysis is predominantly utilized at a high to a very high extent (S4-S5: 80.0%). Product profitability analysis, customer profitability analysis, and evaluation of major capital investments are utilized across moderate to high extent.

5.8 Strategic Management Accounting Practices

Long-range forecasting, shareholder value analysis, industry analysis, analysis of competitive position, value chain analysis, product life cycle analysis, and divisional analysis are utilized across moderate to a very high extent.

5.9 Correlation, Regression Analyses and Hypothesis Testing
5.9.1 Correlation analysis (costing system)

The first hypothesis (H1) tests the correlation between the manufacturing organization's decision-making and the use of costing systems. Table 3 shows that all the costing systems, except activity-based costing, had a positive correlation with decision-making.

Table 3
Spearman correlation coefficients test results for the relationship between decision making and the extent of use of different types of costing systems

	Costing system for decision making	Separation costing	Process costing	Target costing	Batch costing	Activity based costing
Costing system for decision making	1					
Separation costing	.675**	1				
Process costing	.552**	.633**	1			
Target costing	.424**	.433**	.486**	1		
Batch costing	.485**	.516**	.408*	.329*	1	
Activity Based costing	.152	.228	.340*	.056	.378*	1

** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level.

5.9.2 Regression analysis (costing system)

The R-squared value of 0.431 indicates that 43% of the variability in decision-making is explained by the independent variables (Table 4). While coefficients are needed to assess the relative advantages of the costing systems, statistics show that ABC, process-based costing, batch-based costing, separation-based costing, and target-based costing are important for manufacturing organizations' decision-making.

Table 4
Co-efficient of determination (R2)

Regression Statistics	
Multiple R	.657[a]
R Square	.431

a. Predictors: (constant), ABC, target costing, separation costing, batch costing, process costing.

The regression results in Table 5 show that separation costing, process costing, target costing, and batch costing positively and significantly impact organizational decision-making, while ABC has no significant effect. Therefore, we adopt the sub-hypotheses (H1-H4). In Bangladesh, 79% of cement companies use batch costing and 87% use process costing, aligning with Rahman *et al.,* [19] and Alleyne and Marshall [21], who found that common costing methods involve separating fixed and variable costs and using plant-wide overhead rates. However, the relationship between ABC and decision-making is less pronounced, leading to the rejection of hypothesis H1-5, consistent with previous research [21-23].

Table 5
Regression and hypothesis test table

Variables	Beta	Significance	Collinearity Statistics	
			Tolerance	VIF
(Constant)	3.030	.000		
Separation Costing	.315	.002	.632	1.583
Process Costing	.410	.000	.557	1.797
Target Costing	.380	.001	.696	1.436
Batch Costing	.298	.013	.671	1.490
Activity Based Costing	-.102	.345	.776	1.288

Dependent variable: Extent of use of different types of costing system for decision making.

5.9.3 Correlation analysis (budgeting system)

Correlation coefficients test results for the relationship between decision-making and the extent of use of different types of budgeting systems presented in Table 6. Second hypothesis (H2) examines the relationship between the extent of use of the budgeting system and the decision-making of the manufacturing organization. Table 6 shows that each correlation coefficient represents the strength and direction of the relationship between a specific budgeting system and the use of budgeting system information for decision-making. Because the correlation coefficient of all the independent variables in the budgeting system is close to 1, it indicates a strong positive relationship, and the significance value is 0.000.

Table 6
Spearman correlation coefficients test results for the relationship between decision making and the extent of use of different types of budgeting systems

	Budgeting for DM	Budgeting for planning	Budgeting for controlling	ABB	Budgeting what if analysis	Flexible budgeting	Zero based budgeting	Budgeting for long-term
Budgeting for DM	1							
Budgeting for planning	.579**	1						
Budgeting for controlling	.456**	.812**	1					
ABB	.653**	.586**	.463**	1				
Budgeting what if analysis	.474**	.528**	.431**	.633**	1			
Flexible budgeting	.429**	.151*	0.76**	.292**	.113*	1		
Zero based budgeting	.704**	.420**	.244	.483**	.358*	.477**	1	
Budgeting for long-term	.599**	.451**	.292*	.574**	.504**	.462**	.756**	1

** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level

5.9.4 Regression analysis (budgeting system)

With an R-squared value of 0.659 (Table 7), these independent variables seem to account for around 65% of the variation in decision-making. Budgeting using "What if analysis," ABB, budgeting for long-term planning, budgeting for controlling costs, flexible budgeting, zero-based budgeting, and budgeting for controlling costs cannot be described in full without coefficients. Statistics suggest that these budgeting methods do affect the worth of the organizations.

Table 7
Co-efficient of determination (R2)

Regression Statistics	
Multiple R	.811[a]
R Square	.659

a. Predictors: (constant), Budgeting for long term, Budgeting for controlling cost, Flexible budgeting, Budgeting with What if analysis. ABB, Zero based budgeting, budgeting for planning

According to the regression results in Table 8, the various types of budgeting system have a positive and significant effect on decision-making (p, 0.05). Results indicate that all budgeting methods have statistically significant relationships with the extent of use of budgeting system for decision-making. So, all the sub-hypotheses is accepted. The findings highlight budgetary availability as a key factor in successful product development and resource acquisition. Budgets help manage expectations and provide data for cost-benefit analysis. The widespread use of various budgeting systems aligns with previous studies [19,21,24], which identified budgeting for planning, control costs, “what-if analysis,” zero-based budgeting, and long-term strategic plans as the most common practices among selected companies.

Table 8
Regression and hypothesis test table

Variables	Beta	Significance (p)	Collinearity Statistics	
			Tolerance	VIF
(Constant)	2.090	.000		
Budgeting for planning	.499	.000	.243	4.113
Budgeting for controlling cost	.280	.009	.294	3.396
Activity-based budgeting	.252	.005	.454	2.204
Budgeting with “what if analysis”	.250	.002	.523	1.912
Flexible Budgeting	.244	.013	.722	1.384
Zero based budgeting	.232	.014	.376	2.657
Budgeting for long term(strategic)	.309	.001	.336	2.975

Dependent variable: Extent of use of different types of budgeting system for decision making.

5.9.5 Correlation analysis (performance evaluation system)

The third hypothesis (H3) examines at how the organization's decision-making is influenced by the data provided by various performance evaluation systems and how widely used these systems are. Results for a number of independent variables that may have an effect on the dependent variable are shown in Table 9. The usage of information from performance evaluation systems for decision-making is strongly correlated with the independent variable, as indicated by a high positive correlation coefficient (near to 1).

Table 9
Spearman correlation coefficients test results for the relationship between decision making and the extent of use of different types of performance evaluation systems

	Using performance evaluation system for DM	Financial measure (s)	Balance scorecard	Economic value added or residual income	Non-financial measure(s) related to customers	Non-financial measure(s) related to operations and innov.	Non-financial measure(s) related to employees
Performance Evaluation system for DM	1						
Financial measure(s)	.710**	1					
Balance scorecard	.685**	.588**	1				
Economic value added or residual income	.769**	.685*	.538**	1			
Non-financial measure(s) related to customers	.631**	.453**	.412**	.418**	1		
Non-financial measure(s) related to operations and innovation	.587**	.367**	.253*	.390**	.794**	1	
Non-financial measure(s) related to employees	.637*	.391**	.522**	.476*	.545**	.402**	1

** Correlation is significant at the 0.01 level;* Correlation is significant at the 0.05 level.

5.9.6 Regression analysis (performance evaluation system)

Different kinds of financial measures, the Balanced Scorecard, Economic Value Added, and other performance evaluation systems i.e. various types of non-financial measurements such as customer-related, operational, and employee-related explain 82.8% of the variation in decision making, the dependent variable, according to the R squared value of 0.828 shows in Table 10.

Table 10
Co-efficient of determination (R2)

Regression Statistics	
Multiple R	.910[a]
R Square	.828

a. Predictors: (constant), Different types of financial measure, Balance scorecard, Economic value added, Non-financial measure related to customer, Non-financial measure related to operation, Non-financial measure related to employees.

Table 11 (ANOVA) reveals the overall significance of the regression model. With an F-statistic of 50.479 and a p-value of 0.000, the model is statistically significant. The results demonstrate that variables such as financial measures, balanced scorecards, economic value added, and non-financial measures (customers, operations, employees) meaningfully contribute to explaining decision-making, rather than being random.

Table 11
F test result

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	34.011	6	5.669	50.479	.000[b]
Residual	7.075	63	.112		
Total	41.086	69			

Dependent variable: Extent of use of different types of performance evaluation systems for DM.
b. Predictors: (constant), Different types of financial measure, BSC, Economic value added, Non- financial measure related to customer, Non-financial measure related to operation, Non-financial measure related to employees.

Based on the result of the regression that has been done (Table 12) shows that that various types of performance evaluation systems significantly and positively influence manufacturing companies' decision-making.

Table 12
Regression and hypothesis test table

Variables	Beta	Significance	Collinearity Statistics	
			Tolerance	VIF
(Constant)	1.144	.000		
Different types of financial measure	.328	.000	.449	2.226
Balance Scorecard	.197	.036	.541	1.849
Economic Value added	.186	.020	.452	2.212
Non-financial measure related to customer	.252	.001	.280	3.570
Non-financial measure related to operation	.260	.005	.345	2.898
Non- financial measure related to employees	.163	.021	.575	1.738

Dependent Variable: Extent of use of different types of performance evaluation systems for decision making.

Consequently, we accept all of the null hypotheses that form part of Hypothesis 3. In line with previous research by Alleyne and Weekes-Marshall [21], Ittner and Larcker [25], and Rahman et al., [19], this finding is positive and confirms that the selected companies generally utilised practically all practices of performance evaluation systems when obtaining information for decision-making. Among the performance evaluation systems, different types of financial measures, such as operating income, cash flow measure, returning investment, product profitability analysis, sales growth measure, etc., as well as non-financial measures related to customers, have a strong and significant effect on the organisation's decision-making.

5.9.7 Correlation analysis (decision support system)

Hypothesis four (H4) examines the relationship between decision support systems' utilization and organizational decision-making. Table 13 shows positive correlation coefficients between all independent and dependent variables.

Table 13
Spearman correlation coefficients test results for the relationship between decision making and the extent of use of different types of decision support system

	Decision support system for DM	Cost-volume-profit analysis for major products	Product profitability analysis	Customer profitability analysis	Evaluation of major capital investments based on DCF method	Major capital investment payback period/ accounting ROR evaluation	Cost of capital calculation & cash flow discounting for major capital investment evaluation	Non-financial factors major capital investment
Decision support system for DM	1							
Cost-volume-profit analysis for major products	.621**	1						
Product profitability analysis	.597**	.528**	1					
Customer profitability analysis	.552**	.468**	.654**	1				
Evaluation of major capital investments based on DCF method	.539**	.461**	.596**	.440**	1			
Evaluation of major capital investments based on payback period and/or accounting ROR	.668**	.484**	.624**	.410*	.682**	1		
Calculation and use of cost of capital in discounting cash flow for major capital investment evaluation	.700**	.470**	.499**	.484**	.578**	.663**	1	
Non-financial factors major capital investments	.593**	.292*	.318**	.251	.441	.557**	.678*	1

**Correlation is significant at the 0.01 level; *Correlation is significant at the 0.05 level.

The multiple correlation coefficient (R = 0.849), as seen in Table 14, indicates a strong positive linear relationship. The R^2 value of 0.721 suggests that 72.1% of the variation in decision-making can be explained by the independent variables. Table 15's ANOVA results, with an F-statistic of 22.915 and a p-value of 0.000, confirm the regression model's statistical significance.

Table 14
Co-efficient of determination (R2)

Regression Statistics	
Multiple R	.849[a]
R Square	.721

a. Predictors:(constant), Cost-volume-profit analysis, product and customer profitability analysis, capital investment assessment using DCF, payback period appraisal, accounting rate of return analysis, cost of capital calculation for investments, and evaluation of non-financial aspects.

Table 15
F test result

Model	Sum of	df	Mean Square	F	Sig.
Regression	24.944	7	3.563	22.915	.000[b]
Residual	9.642	62	.156		
Total	34.586	69			

a. Dependent Variable: Extent of use of different types of Decision Support system for decision making.
b. Predictors: (constant), Cost-volume-profit, product and customer profitability analysis, capital investment assessment using DCF, payback period appraisal, accounting rate of return analysis, cost of capital calculation, and evaluation of non-financial factors in investments.

5.9.8 Regression analysis (decision support system)

The regression analysis in Table 16 indicates that cost-volume-profit analysis, product profitability analysis, customer profitability analysis, and capital investment evaluation using methods like discounted cash flow, payback period, and accounting rate of return positively impact decision-making. The use of capital cost calculations and non-financial factors in investment appraisal also significantly influence decisions. The findings validated all the sub-hypothesis associated with Hypothesis H4. Research by Rahman *et al.,* [19] and Alleyne & Marshall [21], Pavlatos & Paggios [23] and Chenhall & Lang Field-Smith [26] supports the widespread use of these techniques in manufacturing firms. Similar results were also reported by Abdel kader and Luther [24] for industrial enterprises.

Table 16
Regression and hypothesis test

Variables	Beta	Significance	Collinearity Statistics	
			Tolerance	VIF
(Constant)	2.318	.000		
Cost volume profit analysis	.279	.001	.655	1.527
Product profitability analysis	.260	.003	.596	1.678
Customer profitability analysis	.202	.006	.504	1.986
Capital investment evaluation based on discounted cash flow method	.234	.005	.402	2.489
Capital investment evaluation using payback period and accounting rate of return	.182	.038	.389	2.570
Cost of capital calculation for DCF in capital investment evaluation	.196	.036	.531	1.882
Non-financial aspects in capital investment evaluation are documented and reported	.186	.04	.650	1.538

a. Dependent Variable: Extent of use of different types of Decision Support system for decision making.

5.9.9 Correlation analysis (strategic management accounting analyses)

Hypothesis five (H5) explore the impact of strategic management accounting on decision-making. Table 17 shows a statistically significant positive association between the use of various strategic management accounting techniques and decision-making. The R-squared value of 0.844 in Table 18 indicates that independent variables such as Long Range Forecasting, Shareholder Value Analysis, Industry Analysis, Competitive Position Analysis, Value Chain Analysis, Product Life Cycle Analysis, and Divisional Analysis explain approximately 84% of the variability in decision-making.

Table 17
Spearman correlation coefficients test results for the relationship between decision making and the extent of use of different types of strategic management accounting analyses

	SMA analysis for DM	Long-range forecas-ting	Shareh-older value	Industry analysis	Analysis of competitive position	Value chain analysis	Product Life cycle analysis	Product life cycle analysis
Using SMA analysis for DM	1							
Long-range forecasting	.729**	1						
Shareholder value	.763**	.544**	1					
Industry analysis	.821**	.754**	.709**	1				
Analysis of competitive position	726**	.644**	.566**	.739**	1			
Value chain analysis	.694**	.444**	.421**	.608**	.629**	1		
Product life cycle analysis	.756**	.687**	.528**	.709**	.534**	.675**	1	
Product life cycle analysis	.624**	.511**	.411*	.605**	.703**	607**	.601**	1

**Correlation is significant at the 0.01 level; *Correlation is significant at the 0.05 level.

Table 18
Co-efficient of determination (R2)

Regression Statistics	
Multiple R	.919[a]
R Square	.844

a. Predictors: (constant), long range forecasting, shareholder value analysis, industry analysis, analysis of competitive position, value chain analysis, product life cycle analysis and divisional analysis

5.9.10 Regression analysis (strategic management accounting analyses)

The ANOVA in Table 19 shows the regression model's significance, with an F-statistic of 47.988 and a p-value of 0.000. This indicates that the model, which includes variables like long-range forecasting, shareholder value analysis, industry analysis, competitive position analysis, value chain analysis, product life cycle analysis, and divisional analysis, is statistically significant and effectively explains the rationale behind different DMP.

Table 19
F test result

Model	Sum of	df	Mean Square	F	Sig.
Regression	42.945	7	6.135	47.988	.000[b]
Residual	7.926	62	.128		
Total	50.871	69			

a. Dependent variable: Extent of use of different types of SMA analyses for decision making.
b. Predictors: (Constant), Long range forecasting, Shareholder value analysis, Industry analysis, Analysis of competitive position, Value chain analysis, Product life cycle analysis and Divisional analysis.

The regression results in Table 20 show that all the sub-hypotheses (H5-1 to H5-7) under SMA significantly and positively influence decision-making in manufacturing companies in Bangladesh ($p<0.05$). Management should focus on factors like debt collection, control, organization, record-keeping, and planning. To enhance strategic management accounting, all process phases should be considered. Research [6,21,24] suggests manufacturing firms prioritize long-term planning and external environment analysis. Strategic analysis is vital for decision-making, providing insights into opportunities and threats [27].

Table 20
Regression and hypothesis test

Variables	Beta	Significance	Collinearity Statistics	
			Tolerance	VIF
(Constant)	1.318	.000		
Long range forecasting	.188	.005	.316	3.162
Shareholder value analysis	.346	.000	.493	2.029
Industry analysis	.234	.002	.215	4.656
Analysis of Competitive position	.202	.013	.253	3.957
Value chain analysis	.198	.014	.408	2.454
Product life cycle analysis	.289	.001	.302	3.312
Divisional analysis	.182	.036	.443	2.255

a. Dependent variable: Extent of use of different types of strategic management accounting analyses for decision making.

6. Conclusions

This study concludes that MAPs play a significant role in improving decision-making within manufacturing businesses, enhancing performance and competitiveness. The survey questionnaire showed high reliability, with respondents primarily from high- and mid-level staff with strong academic and professional backgrounds. A wide range of MAPs, including process costing, budgeting, financial performance evaluation, cost-volume-profit analysis, and shareholder value analysis, were identified as influential in decision-making. Correlation and regression tests confirmed strong positive links between the use of various MAPs and DMP. The findings strongly support the proposed hypotheses, showing that specific MAPs significantly influence decision-making in manufacturing firms.

7. Implication for Practice

Based on the findings, it is prudent for manufacturing organizations to thoroughly evaluate the extent to which they employ different MAPS, given the substantial influence that such practices have on the DMP. Specifically, the implementation of performance evaluation systems, budgeting for planning, and strategic management accounting analyses can significantly improve the efficacy of decision-making.

8. Limitation and Future Research

It is critical to recognize the study's constraints, including possible predispositions in the selection of respondents and the restricted scope of the survey questionnaire. Further investigation

is warranted to examine the implementation challenges associated with particular MAPs or to conduct industry-specific analyses.

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