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COST BEHAVIORAL ANALYSIS AND FINANCIAL PERFORMANCE OF MANUFACTURING INDUSTRIES IN RWANDA

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Abstract:

The study aims to investigate the effect of cost behavior analysis on financial performance of manufacturing industries in Rwanda: case study of Bralirwa Plc in the period of 2017-2020. The specific objectives of this study were to examine the effect of material cost analysis on the financial performance of manufacturing industries in Rwanda; to analyse the effect of labor cost analysis on the financial performance of manufacturing industries in Rwanda; to evaluate the effect of overheads cost analysis on the financial performance of manufacturing industries in Rwanda; and to identify relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda. This study applied the cross-sectional survey design such as quantitative approach. Target population is 201 employees in management team in charge of cost behavior analysis and financial performance of Bralirwa Plc, Kigali Rwanda. The stratified and simple random sampling techniques were used to select 67 respondents from Bralirwa Plc. Descriptive statistics and inferential statistical were used in this study. Findings displayed that there is a positive and very strong correlation between material cost analysis in cost behavior analysis and financial performance of manufacturing industries as a Pearson correlation is 0.895** with the p-value of 0.000, which is less than standard significance level of 0.01. There is positive and very strong correlation between labor cost analysis and the financial performance of Bralirwa Plc as Pearson correlation is 0.885** with a p-value of 0.000, which is less than standard significance level of 0.01. Findings showed that there is a positive and strong correlation between overheads cost analysis and financial performance of Bralirwa Plc, Rwanda as Pearson correlation is 0.556** with p-value is 0.000, which is less than the standard significance level of 0.01.

Key Words: Cost Behavioral Analysis, Financial Performance, Manufacturing Industries

Introduction:

According to Anderson, M & Janakiraman, S (2004) cost behavior analysis refers to management's attempt to understand how operating costs change in relation to a change in an organization's level of activity. These costs may include direct materials, direct labor, and overhead costs that are incurred from developing a product. Cost management is one of the most significant issues for any company in worldwide and at any stage of its development. Now, every company tries to reduce its costs across the whole firm, from administration to production (Maher M.W. et al., 2008).

Cost management is a process that should lead to better use of costs and higher production volumes and revenues. Without exaggeration, they can say that cost management could be considered as one of the core activities in economic practice of industrial companies (Shim, & Siegel, 2009). Costing methods, techniques and systems represent the key instruments for measuring business performance especially in developed industries like USA and European companies (Pichetkun, & Panmanee, 2012). Cost should be used to generate the profit. Cost can be mentioned also as the total expenses of the company that have to be paid to make the production or provide the services (Drury, 2012).

In Rwanda's case, accounting profession has grown tremendously with the adoption of International Financial Reporting Standards (IFRS) and International Accounting Standards (IAS) as accounting and auditing standards. Over the years, the challenge to keep costs down in order to keep better performance has been predominant in most companies and especially those listed on the Rwanda Development Boards (RDB) given the pressure from the shareholders for firms to post better performance. With the overall economic situation in Rwanda, investors are looking for companies that can create wealth for them hence companies which perform poorly do not attract investors. Management accounting offers the best opportunity for firms to compete in the market in order to offer best quality products and services at affordable prices to consumers.

Most of the existing research literature on accounting in Rwanda manufacturing companies tends to be more biased toward the arm of financial accounting, information technology adoption as well as research in credit accessibility for manufacturing companies, more so only remote exists in regard to effects of management accounting practices on financial performance of manufacturing companies in Rwanda (Alleyne, 2010). Despite the cost behavior analysis being vital to companies, lack of management accounting practices for decision making and lack of technical skills for cost behavior analysis are as much obstacles to developing manufacturing companies as is the inability to access credit (Adler, 2012). There is also an increase of problems of ineffective management costs practices, products delayed,

distorted, or too highly aggregated information that can easily undermine the efforts of companies with excellent research and development, production, and marketing activities (Adler, 2012).

Rwanda industries are not achieving properly their objectives and goals, where many reasons are considered to threatening industries' objectives: some of them are winding up due to ignoring cost behavior analysis practices in financial performance process, lack of better knowledge about management accounting and many industries are in trouble. Some of manufacturing industries' product grow slowly and others grow negatively and managers have a big challenge of developing management costs practices on financial performance (Jonhson, 2015).

Scope of the Study:

The present study is clearly an eye opener for the researchers in the field of education economy, social work, accounting and other related fields where Cost behavior analysis refers to management's attempt to understand how operating costs change in relation to a change in an organization's level of activity. These costs may include direct materials, direct labor, and overhead costs that are incurred from developing a product. Management typically performs cost behavior analysis through mathematical cost functions. Cost functions are descriptions of how a cost (e.g., material, labor, or overhead) changes with changes in the level of activity relating to that cost. For example, total variable costs will change in relation to increased activity, while fixed costs will remain the same. Cost functions may come in various forms. Knowing and having this allows the manager to determine beforehand if any cost will decline or rise with the change in the business activity. For example, if a company is operating at the full production capacity, then to fulfill more demand, the company will have to invest more in the production line.

Importance of the Study:

This study is very useful to individual, social, scientists and academicians where it will help decision makers and cost managers of different business companies like BRALIRWA Plc to find real position through knowing their weaknesses in costs analysis and the way to correct them referring to the recommendations and suggestions would be provided in this study. Scientifically, this study will be a future reference document to the next generation of different Universities all over the world; and it adds valuable knowledge to existing studies related to the cost behavior analysis and financial performance of manufacturing companies by completing the scarcity of studies in area of Rwanda.

Method of the Study:

This study was non-experimental research where the study applied the cross-sectional survey design where quantitative approach was focused on this study. Quantitatively the study described the effect of material cost analysis on the financial performance of manufacturing industries in Rwanda. The correlative approach was used to show the relationship between two variables, this means the relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda.

Sample of the Study:

The target population is 201 employees in management team in charge of Cost Behavior Analysis and Financial Performance of Bralirwa Plc, Kigali Rwanda. The study used stratified and simple random sampling technique to select 67 respondents as sample size of the study.

Objectives of the Study:

- To examine the effect of material cost analysis on the financial performance of manufacturing industries in Rwanda
- To analyze the effect of labor cost analysis on the financial performance of manufacturing industries in Rwanda
- To evaluate the effect of overheads cost analysis on the financial performance of manufacturing industries in Rwanda
- To identify relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda

Hypotheses of the Study:

The study verified the following alternative hypotheses.

- H_1: There are positive and significant effects of material cost analysis on the financial performance of manufacturing industries in Rwanda.
- H_2: There are positive and significant effects of labor cost analysis on the financial performance of manufacturing industries in Rwanda.
- H_3: There are positive and significant effects of overheads cost analysis on the financial performance of manufacturing industries in Rwanda.
- H_4: There is positive and significant relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda.

Operational Definition of Key Terms:

Cost behavior analysis refers to management's attempt to understand how operating costs change in relation to a change in an organization's level of activity. These costs may include direct materials, direct labor, and overhead costs that are incurred from developing a product. Fixed costs remain constant over a certain time interval and are unaffected by changes in the volume of output. Variable costs change more or less in direct proportion with changes in the level of output. Semi-variable costs include partly fixed and partly variable elements. Financial performance is a subjective measure of how well a firm can

use assets from its primary mode of business and generate revenues. The term is also used as a general measure of a firm's overall financial health over a given period. Manufacturing is the production of goods through the use of labor, machinery, tools and biological or chemical processing or formulation. Raw materials are transformed into finished products through manufacturing engineering or the manufacturing process. This process begins with product design and materials selection. The materials are modified during various manufacturing processes to create the finished product. Modern advanced manufacturing often includes several intermediate processes to create the various components for a finished item, with some manufacturers using the term fabrication.

Tool Used in the Present Study:

The data were collected using questionnaire, and documentary review. Data were analysed by using SPSS (Statistical Package for Social Sciences).

Scoring procedure of the Tool:

The questionnaire was distributed to 67 respondents of BRALIRWA Plc. The questionnaire was composed by close end questions; and expectation of 100% of participation rate for responding to the questions. To design questionnaire, a researcher was used five Likert scales to assess the perceptions of respondents. Likert scales of perceptions of respondents on Questionnaire Design with Strongly Agree (SA) scoring on 5; Agree (A) scores on 4; Neutral (N) scoring on 3; Disagree (D) scores 2 while Strongly Disagree (SD) was on score 1.

Statistical Techniques Used:

The data thus obtained on a sample of 67 respondents were analysed using descriptive statistical method; correlation coefficient matrix analysis that show the relationship between the variables. The study used linear regression test for analysing cost behavior analysis in terms of material cost analysis; labor cost analysis; overheads cost analysis as independent variables, within financial performance of Manufacturing Industries in terms of "profitability ratios; liquidity ratios; solvability ratios" as dependent variables. Based on these variables, the following functions had been set where Y= f(X); therefore, y= f (x1, x2, x3,) function. Based on this functional relationship the following econometric models has been formulated using multiple regression or polynomial models: $y= \beta 0 + \beta 1x1 + \beta 2x2 + \beta 3x3+\varepsilon$; $\beta 0$= Constant, $\beta 1$- $\beta 3$ are coefficients

Interpretation of Data:

The profile of respondents; descriptive statistics from perceptions of respondents; inferential analysis included by correlation coefficient analysis and linear regression analysis and lastly, financial analysis ratios from Bralirwa Plc reports. Cost is an expenditure or outlay of cash, other property, capital stock, or services or the incurring of a liability therefor, identified with goods or services acquired or with any loss incurred and measured by the amount of cash paid or payable or the market value of other property, capital stock, or services rendered in exchange or in other situations, any commonly accepted basis of valuation. The costs are classified as follows (i) variable costs; (ii) fixed costs, and (iii) mixed costs: (a) semi-variable costs and (b) semi-fixed costs/step-costs/step variable costs. During this study at Bralirwa Plc, the types of cost used by Bralirwa Plc are labor costs on the rate of 37.3%; material costs have rate of 29.9% and overhead costs was 32.8% of the use in Bralirwa Plc.

Correlation Coefficient Matrix:

The measure is best used in variables that demonstrate a linear relationship between each other. A correlation matrix consists of rows and columns that show the variables. Each cell in a table contains the correlation coefficient. Table 1 illustrated findings on correlation matrix as follows.

Table 1: Correlation coefficient matrix between Variables

		Material Cost Analysis	Labor Cost Analysis	Overheads Cost Analysis	Financial Performance of Manufacturing Industries
Material Cost analysis	Pearson Correlation	1			
	Sig. (2-tailed)				
	Sum of Squares and Cross-products	1557.075			
	Covariance	23.592			
	N	67			
Labor Cost analysis	Pearson Correlation	.871**	1		
	Sig. (2-tailed)	.000			
	Sum of Squares and Cross-products	1493.179	1888.030		
	Covariance	22.624	28.607		
	N	67	67		
Overheads Cost analysis	Pearson Correlation	.596**	.571**	1	
	Sig. (2-tailed)	.000	.000		
	Sum of Squares and Cross-products	628.522	663.254	714.657	
	Covariance	9.523	10.049	10.828	
	N	67	67	67	
Financial performance of manufacturing industries	Pearson Correlation	.895**	.885**	.556**	1
	Sig. (2-tailed)	.000	.000	.000	
	Sum of Squares and Cross-products	1729.761	1882.627	728.328	2397.164
	Covariance	26.209	28.525	11.035	36.321
	N	67	67	67	67

** Correlation is significant at the 0.01 level (2-tailed)

Findings in Table No1 present results from correlations coefficient matrix analysis, where results confirmed that there is a positive and very strong correlation between material cost analysis in cost behavior analysis and financial performance of manufacturing industries as Pearson correlation is 0.895** with the p-value of 0.000, which is less than standard significance level of 0.01. This indicates that, out of the considered other factors affecting financial performance, only material Cost analysis in cost behavior analysis has significant effect of 89.5% of all financial performance of Bralirwa Plc, Rwanda. The results also stated that there is positive and very strong correlation between labor cost analysis and the financial performance of Bralirwa Plc as Pearson correlation is 0.885** with p-value of 0.000, which is less than standard significance level of 0.01, and this indicates that, out of the considered other factors of cost behavior analysis, labor cost analysis has significant relationship of 88.5% on the financial performance of Bralirwa Plc, Rwanda. The findings show that there is positive and strong correlation between overheads cost analysis and financial performance of Bralirwa Plc, Rwanda as Pearson correlation is 0.556** with p-value is 0.000, which is less than standard significance level of 0.01. This indicates that, out of the considered other factors affect financial performance of Bralirwa Plc, Rwanda, only Overheads Cost analysis in cost behavior analysis has significant relationship of 55.6% on the financial performance of Bralirwa Plc, Rwanda.

Table 2: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2031.455	3	677.152	116.652	0.000[b]
	Residual	365.709	63	5.805		
	Total	2397.164	66			
a. Dependent Variable: Financial performance of manufacturing industries b. Predictors: (Constant), Overheads Cost analysis, Labor Cost analysis, Material Cost analysis						

Findings in the ANOVA Table No2 present level fit mode of 116.652 with p-value of 0.000b which is less than 0.01, set as standard significance level. This means that null hypotheses donated by Ho1 stated that There are no significant effects of material cost analysis on the financial performance of manufacturing industries in Rwanda; Ho2 said that there are no significant effects of labor cost analysis on the financial performance of manufacturing industries in Rwanda; Ho3 stated that there are no significant effects of overheads cost analysis on the financial performance of manufacturing industries in Rwanda; and Ho4 said that there is no significant relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda" were all rejected; and the study retained alternative hypotheses confirmed that independent variable indicated by cost behavior analysis represented by overheads cost analysis, labor cost analysis, material cost analysis have affected positively and significantly the financial performance of Bralirwa Plc.

Table 3: Regression Coefficients

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.624	1.702		.167	.005
	Material Cost analysis	.640	.128	.516	4.996	.000
	Labor Cost analysis	.491	.114	.435	4.311	.000
	Overheads Cost analysis	.001	.113	.000	.068	.004
a. Dependent Variable: Financial performance of manufacturing industries						

The models were X which is independent variable indicated by cost behavior analysis had four indicators including x1= material cost analysis; x2= labor cost analysis; x3= overheads cost analysis; with y which is dependent variable indicated by financial performance. Based on these variables, the functions have been set as Y= f(X), Y= $\beta_0+\beta_1x1+\beta_2x2+\beta_3x3+\varepsilon$. Y= 0.624 +0.640 *x1+0.*491*x2*+.001*x3*+1.702. Findings in the linear regression equation showed that financial performance of Bralirwa Plc will always depend on a constant factor of 0.624 regardless of the presence of other factors. The other variables explain that; every unit change in x1= Material Cost analysis; x2= Labor Cost analysis; x3= Overheads Cost analysis in cost behavior analysis will significantly change financial performance of Bralirwa Plc.

Major Findings of the Study:

Findings on Effect of Material Cost Analysis on the Financial Performance of Bralirwa PLC:

According to the findings from perception of respondents on the effect of material cost analysis has presented higher influence on financial performance of Bralirwa PLC; this means there is reasonably mean and evidence of presence of the fact and heterogeneity of responses. After planning and implementing material cost analysis, people in manufacturing company is responsible for the single production process that should start with the analysis of data and develop the necessary actions to improve the process. Some changes in the process can be made without much coordination; the improvement measures were executed directly after the material cost analysis and this influenced the manufacturing performance.

Findings on the Effect of Labor Cost Analysis on Financial Performance of Bralirwa PLC:

According the results in interpretation of mean and standard deviation on the perceptions of respondents about effect of labor cost analysis has presented strong influence on financial performance of Bralirwa Plc; this means that there is realistic mean and the evidence of existing fact and heterogeneity of responses. While increasing labor is associated with an increase in service quality, in this setting there is no significant relationship between service quality and profitability.

Findings on the Effect of Overheads Cost Analysis on the Financial Performance of Manufacturing Industries in Rwanda:

According to the results in interpretation of mean and standard deviation on Perceptions of respondents on effect of overheads cost analysis has presented strong effect on financial performance of manufacturing industries in Rwanda; this means that there is realistic mean and the evidence of existing fact and heterogeneity of responses stated that manufacturing overheads like electricity and other utilities required to run equipment in the factory augment profitability of Bralirwa Plc; overheads cost analysis like depreciation of manufacturing equipment strengthen liquidity of manufacturing company; analysis of factory supplies for manufacturing processes increases performance of company; administrative overheads analysis in product quality inspectors, and managers for the factory increase financial performance of company; overheads cost analysis in maintenance workers and repair parts for the equipment increase performance; material handlers, such as forklift operators is overheads cost analysis of Bralirwa Plc; and property taxes and insurance on the facilities and equipment are among overheads cost analysis encourage Bralirwa Plc.

Findings on Relationship between Cost Behavior Analysis and Financial Performance of Manufacturing Industries:

According to the results in interpretation of mean and standard deviation on relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda has presented higher evidence of influence; that means, there is accurate mean and the evidence of existing fact and heterogeneity of responses stated that cost behavior analysis in management help to understand how operating costs change in relation to a change in the level of activity; analysis of direct materials, direct labor, and overhead costs are incurred from developing a product to boost the financial performance of the manufacturing industry; variations in the cost driver of cost behavior analysis explain the variations in the related total costs that affect financial performance; cost behavior is summarized into a linear cost function within a relevant range facilitate the financial performance of Bralirwa Plc; material cost analysis of Bralirwa helped to strengthen profitability in Rwanda; labor cost analysis enhanced the financial performance of Bralirwa Plc; and overheads cost analysis helps to reduce useless waste and enhance the performance of Bralirwa Plc.

The findings obtained in ANOVA presents level mode fit of 116.652 with p-value of 0.000b which is less than 0.01, set as standard significance level. This means that null hypotheses included by Ho1 stated that there is no significant effects of material cost analysis on the financial performance of manufacturing industries in Rwanda; Ho2 said that There is no significant effects of labor cost analysis on the financial performance of manufacturing industries in Rwanda; Ho3 stated that there are no significant effects of overheads cost analysis on the financial performance of manufacturing industries in Rwanda; and Ho4 said that There is no significant relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda" were all rejected; and the study retained alternative hypotheses confirmed that independent variable indicated by cost behavior analysis represented by overheads cost analysis, labor cost analysis, material cost analysis have affected positively and significantly the financial performance of Bralirwa Plc.

Educational Implications:

In order to exercise this control, management also needs a solid understanding of the nature of cost behavior. The usefulness of fixed and variable cost data depends on the validity of these assumptions. In order to avoid poor operating results and faulty decision making that is likely to occur when false cost assumptions are made, the ability to recognize and measure cost behavior is essential. Management accounting contains a number of decisions making tools that require the conversion of all operating costs and expenses into fixed and variable components. The responsibility for providing this cost behavior information falls squarely upon the shoulders of the management accountant.

Limitations and Suggestions:

Following limitation and related suggestions of the present investigation are;

- First challenge faced was a delay of the study caused by unplanned pandemic of COVID-19 that causes the closure of schools at least the worldwide, and in country, Rwanda. To obtain secondary data could be also difficult because it was required to call CEO to allow for collecting financial statements at end of year 2017-2020.
- Availability of respondents as expected could be also difficult because of pandemic of COVID-19 limited the movement during the period of data gatherings. The researcher, to overcome those constraints the researcher took permission to accomplish her research where she spent two weeks to collect data related research topic from BRALIRWA Plc, and researcher used different reports, for the questionnaires delay in hands of respondents, she used to call them and ask for an assistance.

- Even if this study found that BRALIRWA used different tools in terms of cost control, it focused only on the comparison of its performance in consecutive period rather than performance with other companies in the same industry. BRALIRWA should use comparative analysis using comparison with other companies in the industry. Basing on the findings related to the challenges as well as the theoretical aspects presented in the literature review this research recommends manufacturing companies of Rwanda to speed up the sensitization campaign to focus on financial report and ratio analysis as among the best tool to the profitability of manufacturing companies. The employees are considered as a very important requirement to the operation and the procedures in every report, BRALIRWA Plc have to improve the skills of the employees working in the cost analysis. The researcher recommended the manufacturing companies that, cost behavior analysis must have interdependent relationships that management needs to perform its activities. Since manufacturing companies contribute the highest cost among the related elements in cost of raw material, the improvement of profitability efficiency could change the overall profitability.

Suggestions for the Further Research:

- Further study should be conducted to determine other factors influencing the financial performance of manufacturing companies in Rwanda.
- Future researchers should also focus on the analysis of cost in a broad sense that might help to integrate the advantages from different application cases to overcome their current disadvantage. They should also verify if the review of financial performance systems provides a clearer notion on profitability applications in cost behavior activities. The development of manufacturing companies is still vigorous in the following decades and the cost behavior concepts might be applied in more fields.
- The other researchers should also analyse the different factors concerning the policies that should affect the financial performance of manufacturing companies.
- The given study topics are follows: assessment of tools used by manufacturing companies to control overall cost of their products; assessment of challenges faced by the profitability of manufacturing companies in Rwanda.

Conclusion:

According to the findings, the study findings on 1st objective confirmed that there is a positive and very strong correlation between Material Cost analysis in cost behavior analysis and financial performance of manufacturing industries as a Pearson correlation is 0.895** categorized as very high relationship between material cost analysis in cost behavior analysis and financial performance of Bralirwa PLC. Findings on 2nd objective stated that there is positive and very strong correlation between labor cost analysis and the financial performance of Bralirwa PLC as a Pearson correlation is 0.885** categorized as very high relationship between labor cost analysis and the financial performance of Bralirwa PLC of Bralirwa PLC. The findings on 3rd objective argued that there is positive and strong correlation between overheads cost analysis and financial performance as Pearson correlation is 0.556** categorized as strong correlation overheads cost analysis and financial performance of Bralirwa PLC, Rwanda. As conclusion, findings helped us to confirm that the problem of the study was solved, the research objectives were achieved, and research hypotheses were verified where all null hypotheses were rejected, and alternative hypothesis were retained by saying that there is significance and very high relationship between cost behavior analysis and financial performance of manufacturing industries in Rwanda.

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