

# **A Critical Evaluation of Budget Practices Applied in the Manufacturing Sector for Optimal Production**

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## **Abstract**

This work focused on the assessment of budget practices applied in the manufacturing sector. Two companies in the sector, Company A and Company B were used as the case studies where the budget implications for producing 100 500 pallets of a lager beer and 200 000 pallets of baby cereal respectively. The budget planning process, budget development, types of budget to be used were discussed. The short range type of budget over a monthly period was chosen. From the analysis: the budget implications in the manufacturing sector are highly depended on the direct materials, direct labor and plant overheads budgets.

**Keywords:** Budgeting practices, manufacturing sector, monitoring, planning

## **1. Introduction**

Budgeting is critical for financial planning in the manufacturing sector to ensure that the planned capacity is met without financial problems (Hogaboam and Shook, 2004). The budget is developed through accessing and analyzing historical data in the previous production years. After that there is connection between manufacturing firm's strategic objectives with the daily financial processes. In the manufacturing sector there is need to link the top-down targets with the bottom-up budgets. There is also need to integrate financial statements as manufacturing conditions change regularly such labor costs, overhead costs and materials costs (Hermes et al., 2006). There is therefore need for continuous forecasting during budgeting in manufacturing systems. This study focused on assessment of budgeting practices applied in the manufacturing sector with a focus on the budget planning process, the budget development process and the budget management. Two manufacturing firms, one in the beer production sector: Company A and another one in the cereal production sector: Company B was considered.

## **2. Budget Planning Process**

The budgeting, planning and forecasting process is a three-step strategic planning process for determining and detailing a manufacturing firm's long and short-term financial goals (Graham and Campbell, 2001). The process is usually managed by a manufacturing firm's Finance Department with the Chief Executive Officer's guidance. The three steps involved include: planning outlines the company's financial direction and creates a model of expectations for the next 3-5 years and often the first step in setting up a company. In addition, budgeting documents show how

the overall plan will be executed month to month and typically includes estimates of revenue and expenses and the expected cash flow and debt reduction. Companies often set up their budgets at the beginning of a calendar year and leave room for adjustment as revenue grows or drops. Budgets are compared with actual financial statements to calculate the variances between the two. Lastly, forecasting uses accumulated historical data and market conditions to predict financial outcomes for future budget periods. Forecasting aims at helping management teams anticipate results based on past information, forecasts can be adjusted as new information is available.

### 3. Budget Development

This process involves the planning and budgeting process, which includes defining budget objectives; accessing historical and actual data; developing a base budget; preparing, reviewing and refining a budget; posting and reporting results, monitoring progress and amending the budget (Ryan and Ryan, 2002). The budget development process is shown in Fig. 1.

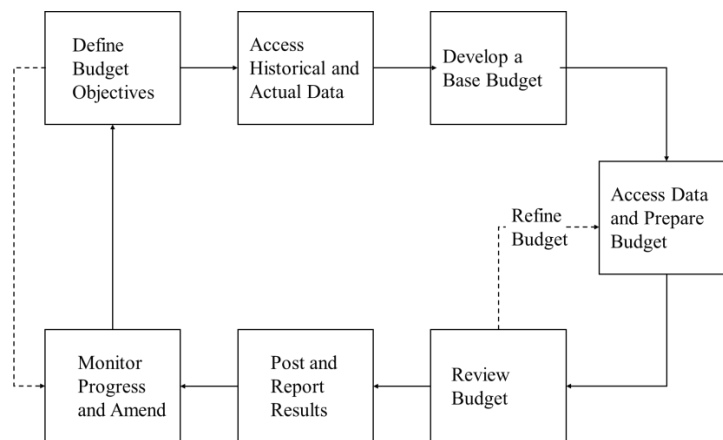


Fig. 1: Budget development process in a manufacturing firm (Ryan and Ryan, 2002)

### 4. Types of Budgets

The various types of budgets applied in the manufacturing sector include cash flow budget, operating budget, financial budget, sales budget, production budget, overheads budget, marketing budget, static budget and the master budget (Akalu, 2002).

#### 4.1 Cash flow budget

This budget is used for predicting when and how the cash will flow in or out of the manufacturing company is called a cash flow budget. The cash flow budget is usually specified for a specific time e.g. a year. Cash flow budget is useful for the manufacturing firm to manage its cash and it also considers factors such as accounts receivable accounts payable to determine whether a company has sufficient cash flow in hands for continuing its operations (Lazaridis, 2004). Cash flow is also important in determining major investment decisions of the company. A manufacturing company such as Company A may use its cash flow budget to predict whether it can start investing in a new product such as a new lager.

#### 4.2 Operating Budget

This is a type of budget which is a forecast of projected income and expenses along with its analysis over the course of a specific period of time are called the operating budget. Operating budget must include factors such as

production and labour cost to provide a clear picture for the manufacturing company (Cooper et al., 2001). The specific time period for operating budget is weekly, monthly, quarterly or yearly depending on the structure of the manufacturing firm.

#### **4.3 Financial budget**

The financial budget contains the company's strategy for managing its assets such as plant and machinery, income and expenses and other financial aspects are present in the financial budget. The financial budget helps to paint the overall picture of the financial health of the company and an overview of it spending in accordance with its revenues from core operations (Chenhall, 2003). A financial budget is a very strong determinant of stability of the company and a positive financial budget means good business whilst a negative one indicates the opposite.

#### **4.4 Sales budget**

The sales budget gives the expected sales revenue and expenses and selling for the specific product for a period of time e.g. the baby cereal from Company B in this case. The sales budget is the backbone of the manufacturing firm since it is the initiation on which are deposits are also based (Chong and Chong, 2002). Sales forecasting plays a very important role and determination of sales budget is both should be proper for further things to fall in place. Forecasting of product sales can be done either in quantity especially in manufacturing companies for a given period. Proper forecasting especially in the amounts to be produced is essential for sales budget since a forecast misses the sales budget might go have which would mean that the operations and availability of materials would be affected.

#### **4.5 Production budget**

Sales budget forms the basis for the preparation of the production budget. Stock levels are also taken into consideration along with the manufacturing program of the manufacturing firm (Drury, 2004). The production budget is very useful in determining the cost of production which in turn will decide the price of the lager in company A or the baby cereal in company B.

#### **4.6 Overheads budget**

The overheads budget is the type of budget which involves all the costs and expenses needed for a specified period of time of production. This includes the indirect labour, direct and indirect plant expenses. A collection of all the overheads of the plant, administration and distribution is included under overheads budget and the budget is prepared department wise for efficient control over the costs. In this case, the overheads budget for producing 100 500 pallets of the lager was USD 176 225.00 whilst the overheads budget for Company B to produce 200 000 pallets of Baby cereal where USD 800 450.00 (see Tables 1-3).

#### **4.7 Marketing budget**

This is the budget allocated to the Marketing Department to market the products after manufacturing such as beers from Company A or baby cereal from Company B. This type of budget takes care of all the marketing and promotional activities of the company for the customers. The ultimate aim of marketing is to assist the sales team to generate more business (Harper, 2004). The marketing budget for the year decides the number of activities to be done in one financial year. The activities involve a combination of events such as promotions and advertising in order to promote the product to the customer.

#### 4.8 Static budget

The static budget is similar to fixed costs budget and is not influenced by sales volume or any other changes in the organisation. These are the expenses which are fixed and remain unchanged over a long period of time e.g. warehouse cost for the pallets and plant maintenance in the manufacturing sector such as heat exchangers.

#### 4.9 Master budget

This budget is a combination of all the individual budgets of the company, which gives a complete picture of the overall financial picture of the manufacturing firm. All the departmental budgets like sales, marketing and overheads budgets are combined to prepare Master Budget (Stephen et al., 2006). The establishment of relations in all the departments is essential and the Master Budget takes care of that. The larger the manufacturing firm, the useful is Master Budget since gives one view over all the departments. A summary of the available types of budgets is shown in Figure 2.

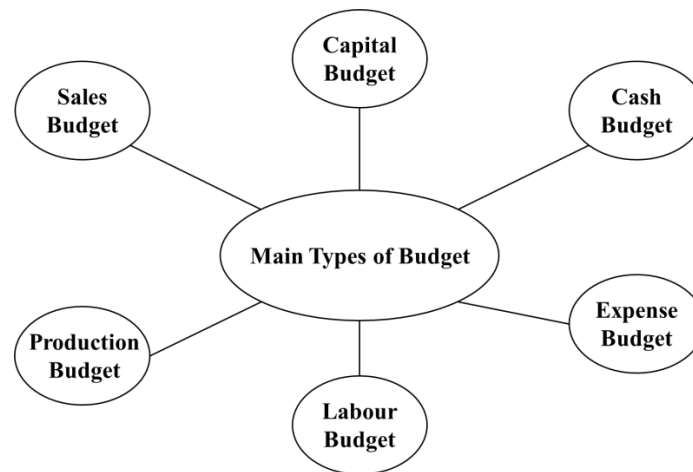


Figure 2: Types of budgets available in Financial Accounting (Stephen et al., 2006)

### 5. Approaches to budgeting

Various budgeting models commonly used are the line-item budgeting, performance budgeting, program and planning budgeting, zero-based budgeting, site-based budgeting and outcome-focused budgeting (Akalu, 2002). Although the underlying preparation process is distinct in each approach, the formats of the prepared budgets may be quite similar.

#### 5.1 Line-Item budgeting

Line-item budgeting is still the most widely used approach in many manufacturing firms because of its simplicity and its control orientation. Line budgeting is referred to as the historical approach because Chief Executives and Administrators often base their expenditure requests on historical expenditure and revenue data (Chenhall., 2003). Line-item budgeting offers flexibility in the amount of control established over the use of resources, depending on the level of expenditure detail. Line budgeting offers simplicity and ease of preparation and is a familiar approach to those involved in the budget development process (Chong and Chong, 2002). This method of budgeting is consistent with the lines of authority and responsibility in manufacturing firm's units hence as a result enhances manufacturing

firm's control and allows the accumulation of expenditure data at each functional level. Finally, line-item budgeting allows the accumulation of expenditure data by manufacturing firm's unit for use in trend analysis (Drury, 2004).

### **5.2 Performance budgeting**

The standard performance of a budget is based on a standard cost of inputs multiplied by the number of units of an activity to be provided in a time period. A manufacturing firm's total budget is the sum of all the standard unit costs multiplied by the number of units expected to be provided. Although this strict approach may be useful for certain types of operations, many manufacturing firms require a more flexible approach (Graham and Harvey, 2001). The performance approach is generally considered superior to the line-item approach because it provides more useful information for legislative consideration and for evaluation by Administrators. Performance budgeting also includes narrative descriptions of each program and it organizes the budget into quantitative estimates of costs and accomplishments and focuses on measuring and evaluating outcomes. Performance budgeting eases legislative budget revisions because program activities and levels of service may be budgeted on the basis of standard cost inputs. The performance approach does not necessarily evaluate the appropriateness of program activities in relation to a manufacturing firm's goals or the quality of its outputs (Harper, 2000). In summary, performance budgeting may offer considerable enhancement to the line-item budget in manufacturing firms.

### **5.3 Program and planning budgeting**

Program budgeting refers to a variety of different budgeting systems that base expenditures primarily on programs of work and secondarily on objects. It is considered a transitional form between traditional line-item and performance approaches, sometimes referred to as modified program budgeting. A full program budget bases expenditures solely on programs of work regardless of manufacturing firm units. Program budgeting is flexible enough to be applied in a variety of ways, depending on manufacturing firm's needs and administrative capabilities (Hermes et al., 2006). Budget requests and reports are summarized in terms of a few broad programs rather than in the great detail of line-item expenditures. This conceptual framework includes the practices of explicitly projecting the long-term costs of programs and evaluating different program alternatives that may be used to reach long-term goals and objectives. The focus on long-range planning is the major advantage of this approach and advocates believe that manufacturing firms are more likely to reach their stated goals and objectives if it is used. However, limitations include changes in long-term goals, a lack of consensus regarding the fundamental objectives of the manufacturing firm, a lack of adequate cost data, and the difficulty of administering programs that involve several manufacturing firm's units. As with performance budgeting, program budgeting information may be used to supplement and support traditional budgets in order to increase their informational value.

### **5.4 Zero-based budgeting**

Zero-Based Budgeting (ZBB) is based on the fact that program activities must be justified annually during the budget development process. The budget is prepared by dividing all of a manufacturing company's operations into decision units at relatively low levels of the manufacturing firm. Individual decision units are then aggregated into decision packages on the basis of program activities, program goals of the manufacturing firm's units. Costs of goods are attached to each decision package on the basis of the level of production to be provided to produce defined outputs. Decision units are then ranked by their importance in reaching manufacturing firm's goals and

objectives. Therefore, when the proposed budget is presented, it contains a series of budget decisions that are tied to the attainment of the manufacturing firm's goals and objectives. The central thrust of ZBB is the elimination of outdated efforts and expenditures and the concentration of resources where they are most effective (Hogaboam and Shook, 2004). This is achieved through an annual review of all program activities and expenditures, which results in improved information for allocation decisions.

### **5.5 Site-based budgeting**

Site-based budgeting emphasizes the decentralization of budgetary decision-making. Site-based budgeting places local managers and other staff at the centre of the budget preparation process, making them responsible for both the preparation and the maintenance of the budget. Resources are allocated to the site, with budget authority for programs and services granted to the production manager in manufacturing companies. The main advantage of site-based budgeting is that those who best understand the needs of a particular manufacturing firm are empowered to make resource allocation decisions. This decentralization of budgetary authority may also increase local accountability (Lazaridis, 2004). Site-based budgeting also allows for increased level of participation of the staff in budget development. Many site-based budgeting systems create committees composed of staff members to determine budgetary allocations. These committees give members a voice from the inception of the budget process, rather than merely when the budget is presented for public review and approval. Site-based budgeting may be difficult to some local managers, may increase conflict between departments or may limit the manufacturing firm's ability to ensure quality and sufficiency in the products it provides. These problems can be avoided through the careful design of site-based budgeting guidelines and training of budget stakeholders.

### **5.6 Outcome-focused budgeting**

The outcome based budgeting is outcome focused. Outcome-focused budgeting is the practice of linking the allocation of resources to the production of outcomes. The objective is to allocate resources to those that use them most effectively. Outcome-focused budgeting is closely linked to the planning process. For a manufacturing entity to focus on outcomes, goals and objectives must be identified and tied to budget allocations for the achievement of those objectives. This premise argues that mission-driven sectors are superior to those that are driven more by rules and regulations than by goals, because they are more efficient, more effective in producing desired results, more innovative, and more flexible, and have higher employee morale. In the context of increased scrutiny of organisational costs, this model may receive more emphasis in the future. The summary of the approaches to budgeting is shown in Fig. 3.

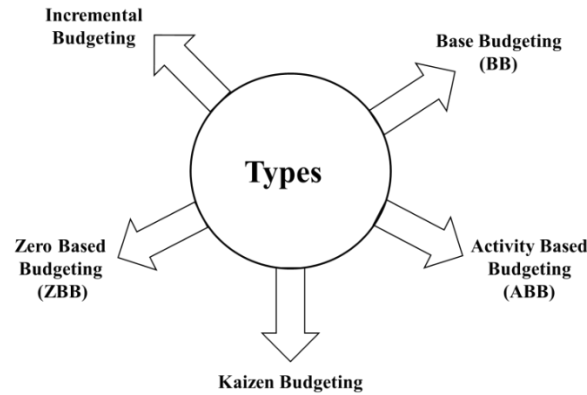


Fig. 3. Various approaches budgeting applied in the manufacturing sector

## 6. Budget periods

The budget period is an important factor in developing a comprehensive budgeting programme in the manufacturing sector. This is the period for which forecasts can reasonably be made and budgets can be formulated. A manufacturing enterprise generally prepares a short-range budget and a long-range budget. In the case study presented in this work, a short range budget for the month of December 2019 was presented.

### 6.1 Short-range budget

Short-range budgets may cover short periods depending upon the nature of the business. Most manufacturing firms such as Company A and Company B use one year as the planning period. In determining the period of the short-range budget, the following factors should be considered. The budget period should be long enough to cover complete production of various products. For business of a seasonal nature, the budget period should cover at least one entire seasonal cycle. The budget period should be long enough to allow for the financing of production well in advance of actual needs. It should provide adequate time to arrange the funds for production and other purposes. The budget period should coincide with the financial accounting period to compare actual results with budget estimates and thus to facilitate better interpretation of the performance.

### 6.2 Long-range budget

A long-range budget is defined as a systematic and formalised process for purposefully directing and controlling future operations toward a desired objective for periods extending beyond one year. Long-range budgets are neither described in precise terms, nor are they expected to be completely coordinated future budgets. They cover specific areas such as future sales, future production, long-term capital expenditures, extensive research and development programmes and financial requirements, profit forecast. They evaluate the future implications associated with present decisions and help management in making present decisions and select the most profitable alternative. Long-range budgeting does not eliminate risk altogether: it only reduces the risk to a level which does not hamper the production and achievement of company objectives. Factors considered when preparing a long-range budget include market trends, growth of population, economic factors, consumption pattern, industrial production, government's economic, national income and industrial policy. Quantitative sales can be budgeted for a 3-5 years period. After forecasting sales, a budgeted profit and loss account can be prepared relating anticipated sales to corresponding cost and thus net operating profit can be forecasted. Likewise, a balance sheet for many years can be prepared to forecast

cash, inventory levels, accounts receivable, accounts payable and liabilities. The forecasted profit and loss account and balance sheet for a long-range is a very useful tool in accomplishing the objectives of the organisation as a whole.

## **7. Budget management**

Budget management is the analysis, manufacturing firm and oversight of costs and expenditures for a manufacturing firm. Managing a budget requires adhering to strict internal protocols on expenditures. A well-managed budget allows for continued smooth operations and growth. In order to have a solid and simple budget variance for the manufacturing firm, there is need to work through these four steps:

### **7.1 Build a forecast and budget for the year**

Before enforcing any budget there is need to set one up, this means figuring out what the costs should look like based on expected revenue. There is need to think about high-level departments that would fall under an executive-level employee's jurisdiction.

### **7.2 Accurate bookkeeping**

The understanding of actual spending is only possible if the transactional data behind the scenes is recorded correctly. Make sure the bookkeeper is on the same page with regard to the transactions and the appropriate account charts they fall into. These can be accounts of costs that were incurred by a specific department. The bookkeeper needs to classify types of transactions differently and consistently e.g. material labour costs, direct labour costs and overheads on their own. If this is not done it will be impossible to accurately track spending per department, resulting in inaccuracies and misinformed decisions.

### **7.3 Track actuals vs. budgeted**

In order to enforce budgets, there is need there is need to have an easy way to track each department's actual spending versus planned spending. There are plenty of robust systems to help with this; however, those systems are usually not necessary for many small or mid-sized companies because they are very process-intensive and expensive. The build-up of a system that is easy to maintain and simple to enforce is critical.

### **7.4 Identify time periods for setting your budgets**

It is always important to complete financials before setting up the budget for any given time period. It will be difficult to hold departments accountable for their budgets when the books are not completed for that time period. If the plan is to close out books every quarter, then asking departments to set a monthly budget is unfair as the financials will not be in place.

## **8. Case studies of manufacturing sector budget system**

A manufacturing budget is a set of three budgets that estimate the cost of direct materials, direct labour, and overhead for the number of units predicted to be produced in the production budget. In other words, the manufacturing budget estimates how much it will cost the company to produce the number of products included the production budget. Company A Corporation Limited is principally an integrated beverage company with a diverse portfolio of local and international brands in lager beer, traditional beer; franchised sparkling and alternative non-alcoholic beverages. In this case study, the manufacturing of lager beer will be considered. A total production of 10 500 pallets was consider for the month of December 2019. Company B is a food processing company. The



baby cereal production line was chosen as for this case study with a production line of 200 000 pallets per month for the month of December 2019.

## 8.1 Manufacturing Budget Analysis

### 8.1.1 Direct materials budget

The direct materials budget will include the raw materials needed for each product to produce beer such as hops, the budgeted beginning and ending inventory, raw material costs, as well as number of units set to be produced. Table 1 shows a summary of the direct material budget required to produce 100 500 pallets of the lager.

Table 1: Direct material labour for Company A and Company B

Company A Pvt Ltd Direct Material Budget December 31, 2019		Company B Pvt Ltd Direct Material Budget December 31, 2019	
<b>Budgeted production units</b>	100,500.00	<b>Budgeted production units</b>	200,000.00
Materials required per unit (USD)	0.30	Materials required per unit (USD)	0.50
Material units needed for production	30,150.00	Material units needed for production	100,000.00
Plus: Budgeted ending inventory	650.00	Plus: Budgeted ending inventory	150.00
<b>Total material units required</b>	<b>30,800.00</b>	<b>Total material units required</b>	<b>100,150.00</b>
Less: Beginning inventory	125.00	Less: Beginning inventory	130.00
Material units to be purchased	30,925.00	Material units to be purchased	100,280.00
<b>Material cost per unit (USD)</b>	<b>25.00</b>	<b>Material cost per unit (USD)</b>	<b>30.00</b>
<b>Total cost of direct materials (USD)</b>	<b>773,125.00</b>	<b>Total cost of direct materials (USD)</b>	<b>3,008,400.00</b>

### 8.1.2 Direct labour budget

The direct labour budget computes the total number of labour hours need by multiplying the number of units set to be produced by the estimated number of hours required to produce each unit. The total number of hours needed can then be multiplied by the estimated hourly cost of labour to arrive at the total budgeted labour cost. A summary of the direct labour budget for Company A and Company B is given in Table 2.

Table 2: A summary of direct labour budget for Company A and Company B

Company A Pvt Ltd Direct Labour Budget December 31, 2019		Company B Pvt Ltd Direct Labour Budget December 31, 2019	
<b>Budgeted production units</b>	100,500.00	<b>Budgeted production units</b>	200,000.00
Labour hours required per unit	0.65	Labour hours required per unit	0.80
<b>Total labour hours for production</b>	<b>65,325.00</b>	<b>Total labour hours for production</b>	<b>160,000.00</b>
<b>Labour rate (USD)</b>	<b>25.00</b>	<b>Labour rate (USD)</b>	<b>30.00</b>
<b>Total cost of direct labour (USD)</b>	<b>1,633,125.00</b>	<b>Total cost of direct labour (USD)</b>	<b>4,800,000.00</b>

#### 8.1.4 Plant Overhead Budget

The overhead budget splits overhead costs into fixed and variable overhead. The variable overhead is multiplied by the number of units produced and then added to the fixed overhead. This total estimated overhead can be used to project the future costs of production. Table 3 shows the various plant overhead costs for both Company A and Company B.

Table 3: Factory overhead budget for Company A and Company B

Company A Pvt Ltd Factory Overhead Budget December 31, 2019		Company B Pvt Ltd Factory Overhead Budget December 31, 2019	
Budgeted production units	100,500.00	Budgeted production units	200,000.00
Estimated variable overhead rate (USD)	1.75	Estimated variable overhead rate (USD)	4.00
Budgeted variable overhead	175,875.00	Budgeted variable overhead	800,000.00
Budgeted fixed overhead	350.00	Budgeted fixed overhead	450.00
<b>Budgeted total overhead (USD)</b>	<b>176,225.00</b>	<b>Budgeted total overhead (USD)</b>	<b>800,450.00</b>

## 9. Conclusion

Budgeting is key in the manufacturing sector for its optimal operation. For the sector to continually thrive, the budget planning process, the development process and the nature of the budget required must be identified. In addition, approaches to the budgeting must be done in order to cater for direct material labor, direct labor and plant overheads must be accounted for. Lastly, the budget period must be identified the budget managed throughout for successful operation.

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