

Limiting factor analysis technique: A literature review

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Abstract

Limiting factor analysis is a technique usually applied in the short term decisions. It is employed by management to curb the effect of shortages in limiting factor such as raw material, skilled labor, machine hours or market that may constraint the company from operating at full capacity. Virtually most organization faces the problem of shortages of factor input in one way or the other. This article analyses how the limiting factor analysis technique will help a firm in maximizing its long term profitability with a view to improving the value of the firm.

Keywords: *Limiting factor, Organizations, Profitability*

I. Introduction

Limiting factor analysis is a managerial strategy employed in management accounting to curb the effect of shortages in limiting factor such as raw material, skilled labor, machine hours or market that may constraint the company from operating at full capacity (Accounting-simplified. Com 2019). Limiting factor may be any factor in short supply which may constraint an organization from expending its activities, such as raw material, skilled labor or machine hour. It is therefore important to understand the relevance of limiting factor so that optimum production mix could be determine when there is a shortage of scares resources, especially in a developing country like Nigeria where power failure constraint firms to operate in full capacity. Limiting factor also known as principal budget factor, key factor or governing factor are factors that may limit the capacity of a firm or constraint it from accomplishing a desired objective such as limiting production or sales volume (Financial accounting.org 2015).

Limiting factor analysis is a technique usually applied in the short term decisions to analyzed the maximization of profit where there are scarce resources (Brown 2019). Limiting factor whether as a result of shortage of raw material, machine hours or skilled labour will have the following effect;

II. Effect of limiting factor

1. **Idle time** – An idle time is the difference between the total time spent by the worker and the actual time spent on work , in other word if the company uses time basis for labor remuneration then the worker will be paid for the idle time even if he didn't perform anything (Agrawal 2019), in this circumstances the idle time as a result of shortage of raw material or shortage of machine hours, is called abnormal idle time and is a controllable idle time whose effect is charge to income statement as a loss.
2. **Buying substitute raw material at an expensive price** - Raw materials are stock component used by a manufacturing outfits whose utilization is central to production activities and management, it is very important to efficient manufacturing operation in that its availability in the right quality, quantity and time will determine the resultant quantity and quality of output and the ability of the

organization to meet up its orders, turnover targets, profit target as well as challenge competition (Akindipe 2014). Where a company is faced with shortage in the supply of raw material it may led to fire brigade approach to procurement of material is never advisable in management decision making as the prices of raw material is an essential risk factor that will drastically increase the cost of production, thereby eroding profit margin or given way to computers (Akindipe 2014).

III. Evaluation of limiting factor technique

Therefore to counter both the risk of idle time and emergency procurement of substitute material limiting factor analysis is recommended as suitable. If the organization produces only one product and is faced with a limiting factor then the best possible alternative is to device an efficient procurement strategy aimed at ensuring a steady supply of raw material so as to guarantee efficient production flow process (Akindipe 2014)

Limiting factor analysis is effective where the company produces multiple product and all the products produced uses the same material which is in short supply, it is aimed at indicating which products to produce that will maximize profit. The analysis is done by determining the contribution per limiting factor per each product, there after the products are ranked based on their contribution margin and the decision rule is to produce the maximum sale projection of the product with the highest contribution until the units of the limiting factor are fully utilized (Brown 2019).

Under ordinary circumstances the company should concentrate on the production of products with the highest contribution to maximize profit, however where the company is faced with shortage of resources that may limit the ability of the company then it is advisable that effort should be geared toward achieving an optimum utilization of that limited resources to the fullest extent to maximize profit. This may be achieved by determining the optimum production mix of products based on the contribution per unit in relation to limiting factor resources used and to produce the maximum units of the product with the highest contribution margin per limiting factor (Financial accounting.org 2015).

A contribution is simply the difference between the selling price and the variable cost, whereas contribution per limiting factor is the quotient of the contribution per unit of a product and the limiting factor resources required per unit of a product. A contribution is used in limiting factor analysis rather than the profit per product because in the short term decision making fixed cost is irrelevant (Accounting .simplified.com 2013). This could be illustrated as follows:

A company manufactures three products A, B and C, all the three product requires the same machine and only 1400 hours of machine time is available in the next period. Cost data in relation to product A, b and C are as follows;

	A	B	C
	₦ per unit	₦ per unit	₦ per unit
Selling price	30.00	17.00	21.00
Variable cost	13.00	6.00	9.00
Fixed production cost	10.00	8.00	6.00
Other fixed cost	<u>2.00</u>	<u>1.00</u>	<u>3.50</u>
Profit	<u>5.00</u>	<u>2.00</u>	<u>2.50</u>
Maximum production	250 unit	140 unit	130 unit

Also fixed production costs are absorbed at ₦2 per machine hour, similarly no inventories are held. Therefore, in order to determine the optimum production plan that will yield the maximum profit to the firm, limiting factor analysis technique will be used (Drury, 2018) and thus;

IV. Determination of Whether Machine Hours is a Limiting Factor

	A	B	C	Total
Fixed production cost/unit @ ₦/machine hour	₦10	₦8	₦6	
Machine hours per unit	5	4	3	
Maximum demand	250	140	130	
Maximum hours required	1250	560	390	2200

Since only 1400 hours are available, machine hours are a limiting factor.

The next step is to calculate the contribution per each product as well as the contribution per machine hour, and thus;

	A	B	C
	₦	₦	₦
Selling price per unit	30	17	21
Variable cost per unit	<u>(13)</u>	<u>(6)</u>	<u>(9)</u>
Contribution per unit	17	11	12
Contribution per machine hour	17/5 = 3.40	11/4 = 2.75	12/3 = 4
Ranking based on contribution per hour	No. 2	No.3	No.1

Therefore, the optimum production plan will be;

	Unit to produce	Hours required	Contribution ₦
Product C	130	390	1560
Product A (Balance of hours 1010/5)	202	<u>1010</u>	<u>3434</u>
Total		<u>1400</u>	<u>4994</u>

From the above analysis it could be observed that while product A has the highest contribution per unit of output of ₦17, it was rank number 2. Product C was rank number 1 with a contribution per unit of output of ₦12 but has the highest contribution per machine hour of ₦4 per machine hour as against product A with a contribution of ₦3.40 per machine hour. Equally if contribution per unit of output will be used to determine the production plan, then 280 units of product A will be produce (1400 hours/5 hours per unit) as it has the highest contribution per unit of output. Furthermore the total contribution from producing 280 unit of product will be ₦4760.00. Therefore, the profitability of the company will increase when limiting factor analysis is used, as it will yield a profit of ₦4994.00, as against ₦4760.00 where limiting factor is not considered.

V. Conclusion and Recommendation

Organizations usually faced shortages of factor input in one way or the other. Limiting factor analysis technique is a short term decision making tool which management may take advantage of in order to counter the effect of shortages in factor input. Such effect may include idle time, emergency procurement of material, meeting up its orders or full utilization of machine time. However in

recommending the suitability of limiting factor analysis to the company demand for the product is not considered based on the premise that all the products have an equal sales opportunity. Otherwise companies can take the advantage of the limiting factor technique to counter the effect of idle time, turnover targets, and profit target as well as challenge competition.

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