

## An Intelligent Decision Support System to Aid Profit Planning in Manufacturing Companies

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**Abstract:** In order to assure accuracy in profit planning and decision-making, this study uses an intelligent decision support system to investigate an appropriate approach for calculating the "Break-Even" point in multi-product segments while taking into account the implications for contribution margin, demand, and capacity. The research's methodology and findings may be used to propose new projects, grow businesses, and make decisions in processes that focus on many products. Data are used to illustrate the advanced level of break-even analysis and application, and a description of the convenient and system-generated method of computation is given. A mathematical approach has been used based on actual data to show how to determine the break-even point without sacrificing the influencing aspects such as contribution margin, capacity, product mix, and demand for each. The researchers have created a good system application-oriented platform to make it simple to calculate the break-even point, which will be crucial for decision-making and profit planning even with more than 500 SKU (Stock Keeping Unit). This research evaluated the data and created formulas for actual data structure-based analysis. The study's conclusions have a significant influence on those companies that need to determine the true break-even threshold. The challenge area of concern might be the applicability of this activity for other sectors and other countries as this research was centred on the plastic bag industry in Malaysia. Future research can also analyse other important factors like start-up and semi-variable costs as they are not included in the current study. The identified break-even threshold can still be used effectively given the current market demand and the product's capacity.

**Keywords:** Management Accounting; Break-Even Analysis; Multi-product Break Even Point; Market Demand; Profit Planning.

### 1. Introduction

It goes without saying that "Best Management Accounting Practices are developed to provide an entity's best performance." It is a crucial area of concern for expanding businesses, particularly small and medium-sized ones. The idea and methods covered by the management accounting discipline aid in preventing organisations from making poor decisions, incurring losses, and delaying development (Martin, 2014). The lack of best management accounting techniques and ignorance of financial data management might be the underlying causes of any business failure (Alleyne & Marshall, 2011). This history of failure also includes businesses that have been affected by economic downturns, unfavourable competition, poor management, an unstructured approach to problem-solving, inappropriate data and financial number upkeep, and a failure to adhere to best management accounting practises (Soto, 2009).

One of the main factors in determining the best break-even point and performance evaluation is "Break-Even Analysis," which is also a crucial tool for keeping track of costs and profits. The break-even point is the point at which costs are equal to revenues, leaving no room for profit or loss. 2014: Sharma Any firm that wants to reach the profit line must first reach the break-even threshold. This research will be particularly helpful for planning profits, new product proposals, multi-product segment-oriented production, and business expansion.

In-depth analysis of the variables influencing the break-even point is done in this study, along with explanations of their implications and the significance of the break-even point in profit planning and decision-making. This study also investigates the potential for calculating the break-even point utilising the best and simplest way possible while taking into account a variety of variables and system application-based utilities. This research also illustrates the movement of the break-even point by identifying elements such product mix connected to contribution margin, market demand, and capacity. This is done by integrating the system application-based utilities. It has also been discussed how crucial Break-Even Analysis is to profit forecasting and company decision-making. Even when a company is non-profit and runs a service-oriented business, break-even analysis still

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plays a crucial role in determining how much income is needed to cover costs (Tsorakidis, Papadoulos & Zerres, 2008). In order for a company to stay sustainable, matching income to service expenses is a crucial component of good financial management.

### 1.1 Problem Statement

A simple break-even calculation's break-even point indicates the higher production level if the company is losing money at a certain output level, resulting in the "No profit-No loss" scenario. This isn't necessarily true when it comes to reality. In the context of managing a multi-product mix and concentrating on demand and capacity planning, the theoretical method for estimating break-even points employed in various studies and in the corporate world today is not actually applicable.

As has been shown in several studies, the conventional method of figuring out the break-even point is inappropriate when there is a multi-product handling with variable demand and capacity. Lazzari and Morinigo calculated the break-even point in the context of multi-product handling using fuzzy linear programming and Duran Herrera's crisp approach in their 2003 study, "Analysis of Multi-product Break-even with Uncertain Information."

The business "should not have the idea that break-even theory simply identifies a point when the company earns profit," say Ndaliman and Bala (2007). Therefore, it is less likely that more profit can be made the higher the break-even point. The break-even approach is primarily appropriate for businesses that manufacture or trade in a single product. According to Ndaliman and Bala (2007), a

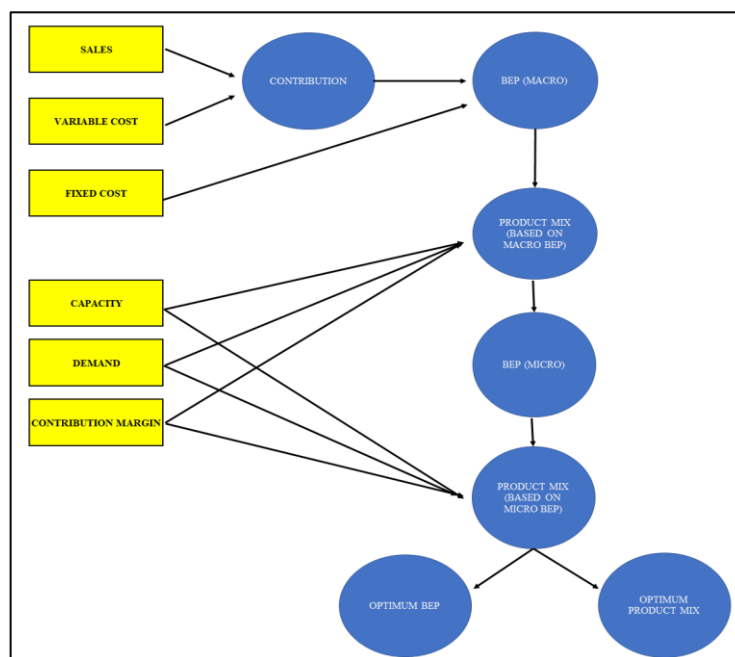
corporation may have two or more break-even points depending on a number of variables, the most important of which are the contribution level of a product, demand, and capacity. These three variables have an effect on the BEP and show what the real objectives are. Many businesses struggle to determine the precise break-even point, which results in improper pricing strategies, ineffective cost-cutting measures, and inaccurate driving measurements.

This will ultimately have an influence on a company's profitability and prevent management from making wise choices on product price and efficient production scheduling. The decision-makers will find this research to be enlightening as they determine their break-even point without sacrificing the impact due to product mix, demand, and capacity. This will make it easier to go through the current challenges with figuring out the Break-Even Point and ensuring that the goal is accomplished through the effective and efficient use of system application utilities.

### 1.2 Objectives of the Study

1. Establishing a system-oriented application in order to discover the optimal 'Break-Even' point in multi-product segments.
2. Identify several obstacles in 'Break-Even' point computation and analyse the feasibility of addressing these issues within the scope of the research.
3. Standardize the application-driven platform for calculating the "Break-Even" point, taking into consideration the influence of Contribution margin, Product mix, Market demand, and Capacity

## 2. Review of Literature



(Fig. 1) Research Outline

By taking into account the contribution margin of each product, market demand, product mix, and manufacturing or trading capacity, this study has determined the ideal break-even threshold. The study examines the consequences of various factors affecting the break-even point using a mathematical technique and system application utilities in order to use the discovered break-even point as a tool for profit planning and decision-making strategy.

## 2.1 Breakeven Evaluation

Calculating the amount, value, and profit at break-even is done using the break-even analysis technique or procedure. The Break-Even Point is defined as the volume at which all costs and revenues are equal and there is no profit (Anderson et al., 2018). The margin that can cover all fixed costs and variable costs is known as the break-even point in the business world. In their work titled "An Economic Model for Break-even Analysis," Ndaliman and Suleiman (2011) claim that the break-even point is when an enterprise experiences neither a loss nor a profit.

Break-Even Analysis, according to Homa (2018), calibrates uncertainty and improves comprehension of situational economics, but it is not a replacement for making decisions. The Break-Even Point study is crucial for calculating the project investment's payback duration during the examination of project feasibility requirements. When we embark on brand-new initiatives involving fixed assets, such as modernization or industry automation, the Break-Even Analysis is computed. The authors of this paper's researchers concur with this idea. Break-Even Analysis is a crucial technique for calculating the ideal volume, ideal price, and ideal profit margin that will improve the manufacturing of a better product mix and the industry's financial indicators (Crncan, et al., 2018). However, the competition and market trends mostly drive decision-making processes like setting product prices, whereas installed capacity and product mix primarily determine the optimal production volume.

Break-Even Study unearths hidden financial facts and data, which are then retrieved for further in-depth examination utilising the result to advance it in the context of a growing organisation. According to Ionescu and Dumitru (2015), while describing the benefits of management accounting, it "opens the Black Box" and explains the procedures in the conversion of inputs to outputs. Break-Even Analysis contains limitations, yet it contributes to our business knowledge. Specific indicators in break-even analysis, break-even in multi-product segments, the dynamic safety coefficient, and the multiple coverage factor applications in break-even analysis are a few of the major themes discussed by the writers. According to the paper, the multiproduct break-even threshold was calculated using a simple product

combination (Zagursky, 2017). This method for estimating the break-even point may vary based on market demand and available capacity. The subsequent events may be entirely unpredictable. In addition, the product and market mix scopes are not adequately addressed by the coefficient factor and coverage factor calculations. In terms of the break-even point and its affecting factors, such as coefficient variance, the impacts on product mix and market demand would be extremely important (Alvis, 2002). If this criticality is not taken into consideration, the break-even threshold may be a theoretical value that cannot be recognised as the real value to comply with in production mix.

## 2.2 Costs Associated with Break-Even Analysis (Fixed, Variable and Semi-Variable)

The degree of output or services from the operational activities will have an impact on the variable cost, according to marginal costing language. However, throughout all sets of production, the variable cost per unit of output will stay the same (Correia et al., 2014). Similar to variable costs, semi-variable costs will change depending on output. However, the variation is less than the variation in variable costs. Since fixed costs are included in semi-variable costs as well, they won't change depending on the volume of production. The correct illustration of a semi-variable cost is the minimum energy consumption and load factor out of the total power bill and the minimum or basic pay of workers out of the total compensation including overtime and incentives.

Fixed cost is the opposite of variable cost, which fluctuates in accordance with changes in production volume or service output (Zimmerer et al., 2005). However, when there is a higher consumption of fixed-in-nature expenses, the fixed cost likewise increases for a certain production level. Since the fixed cost for the computation period is constant, each unit of production fluctuates to absorb the cost per unit of output. Many cost components at the micro level of accounting may be ascribed to the semi-variable cost sector, followed by the variable and fixed sectors, since each cost element contains some particles that are fixed in nature. The fixed and variable costs are one of the independent elements in this investigation, and the literature will be considered in that manner when this study is analysed. Homa (2018) claims that the fixed cost frequently shifts in "chunks" of capacity that cause non-linear "steps" in the fixed cost to rise. Therefore, it is believed that the fixed cost would remain constant throughout a range of production and sales volumes. The main takeaway from his study is that breakeven analysis is a valuable approach, particularly when the demand projections are very unpredictable. In his presentation, he examined several unknown

characteristics and complexity in the break-even point calculation.

### 2.3 Break Even Analysis Technique

According to Tracy (2004), determining the exact Break-Even Point relies on how the break-even analysis is structured or used. He goes on to say that in order to calculate the Break-Even Point, we must first make a list of the various product types and hierarchies that are produced, arrange them in accordance with the number of sellers, and then figure out the average selling price and the total cost of each type and hierarchy. The selling price and total cost of each unit are used to calculate net profit. The cost of manufacturing and selling each product is also calculated. Numerous studies have been conducted to determine if break-even analysis is applicable. When doing the Break-Even Analysis, it's crucial to consider how much background research has been done on the issue and how much data has been gathered from scratch (DeBare, 2010). When figuring up break-even, be careful to include all expenses. While creating a business module, we shouldn't estimate the costs using a best-guess approach. Instead, we should contact an insurance broker for a firm-specific estimate, ask the utility company for last year's bills, speak with a trade association, or search online for data on average pricing in the particular industry.

### 2.4 Mix of Products

Product mix refers to the industry-wide variety of products (Pine, 1993). It offers customers a variety of options and promotes industry sustainability by enabling producers to create goods that meet the needs and desires of the present market (Felipe Scavarda, Reichhart, Hamacher, Holweg, 2010). Instead of concentrating on a single product, the sector may always benefit from a product mix.

Product mix is developing as a trend across several sectors worldwide. By doing this, the danger to corporate profitability is decreased. Product mix is an effective method for constructing a slice of the pie since it enables the business to service multiple customer segments and satisfy client needs (Tang, 2006). This covers various product attributes, delivery methods, or packaging. One of the marketing tactics and methods that will improve sales, satisfy consumer demand, and boost profits is product mix. According to Kim and Chhajed (2000), the availability of a wide range of items is what draws in customers from numerous and distinct consumer categories.

It is still debatable how accurately product mix is used to identify and segregate earnings, and it is far simpler to identify the profit margin or break-even point for a single product than it is for product mix. When making a profit

planning or commercial choice, a same conflict applies. There is literature that demonstrates how a company's product mix impacts its break-even point. Reichhart, Hamacher, Holweg, and Felipe Scavarda, (2010). Choosing the combination with which the firm will reach its break-even point will be complicated. A firm that produces fewer than five categories of products can still be controlled, but once it produces more than 500 SKUs (Stock Keeping Units) and ten categories of products, cost allocation becomes more complicated.

The literature has demonstrated the value and relevance of a product mix for a certain industry. There haven't been enough studies done to determine the break even point utilising real-world cases or scenarios involving more than ten different product mix types. The break even in product mix is emphasised in this study along with a few other factors that have an impact on the break even depending on market demand and a company's capacity.

### 2.5 Market Demand

For all businesses, the market demand is a crucial instrument for assessing the product's potential and sales forecasts. Market demand, for the whole industry in a given market during a specified time period, is the greatest probable total sales of a particular good or service under perfect circumstances. The production and proportion of sales potential that a certain business can ideally aspire to accomplish are determined (Dubas, Hershey, Nijhawan & Mehta, 2011). A sales projection is what a certain company really intends to accomplish as opposed to sales potential. Since the sales projection can only be accomplished under perfect circumstances, the sales potential is often larger since a company's financial resources or changes to its external environment may prevent it from realising its full sales potential (Piana, 2006). The literature on sales and marketing lists a variety of techniques for estimating market demand, sales potential, and sales forecasts and notes that the degree of difficulty in producing an exact sales prediction varies depending on the circumstance. Obtaining sales predictions for completely new items will be more challenging than for well-established products with consistent sales. In other circumstances, predicting sales and managing demand would entail taking capacity restrictions and product quality into account.

Ndaliman and Suleiman (2011) assert that economic factors including market demand, interest rates, and salvage values are affected by the breakeven analysis. They acknowledge that changes in the economy can have an impact on the breakeven point's outcome, but they did not explain how these changes affected the breakeven analysis because they focused mostly on fixed costs. The technical and economic indicator is an essential component of the break-even analysis since it may have

an impact on a product's market demand. For determining break even, the majority of writers only take into account internal factors like fixed and variable costs.

By integrating market demand for the product in their analysis, the researchers plan to fill the gap in this study. The tested firms will provide the information about market demand. This will enable us to determine the greatest output possible in order to meet market demand, which will then enable us to develop a variety of possibilities for the product mix.

## 2.6 Utilization of Capacity

The most useful financial indicators are shown by capacity utilisation, such as prospective yield, capacity utilisation, real yields, budget estimation, and company expansion. The company's capacity utilisation discusses the circumstances of product demand (Hemantha, 2012). The assembly execution metric "Level of Capacity Utilization" and the assembling efficiency metric "Capacity Utilization Development Rate" (Varalakshmi, 2016). In order to maintain sustainable contemporary growth, efficiency development is essentially assessed and balanced with capacity utilisation. Lessening the use of unreliable information sources and increasing output are indicators of efficiency advancement (Shahidul and Syed Shazali, 2011). The justification is that the limit was not fully utilised, creating a limit hole. Limit hole functions as extra additional input, which reduces efficiency. Finding out how much capacity is being used also aids in decision-making and locating a break-even point that is somewhat precise.

Utilizing capacity effectively enables us to coordinate the product mix. By keeping track of these factors, we can determine an appropriate break even, giving us opportunities to increase the amount of profitable output (Potkany & Krajcirova, 2015). The break-even point is reached when capacity utilisation is at its highest for things that are lucrative and in demand.

## 2.7 Planning for Profit

Breakeven point is important for profit planning since it affects target sales, budgeting, and pricing strategy. Fixing the proper pricing for the ideal product might help define the industry's profit (Gawade, 2016). Break-Even Analysis aids in choosing the appropriate price. When determining pricing, according to Nagle and Muller (2018), administrative expertise and judgement are important. In order to determine the best rates, he examined the entire structure of the pricing strategy in this book, including price policy, competitive pricing, and financial analysis (Break Even Analysis). Their conclusion in the book is straightforward. In today's contemporary, dynamic, and open marketplaces, the traditional methods of cost-driven and customer-driven

pricing can no longer support a sustainable firm. Therefore, it is crucial to have a reliable method in place to determine the Break-Even Point and Margin of Safety in order for us to set an affordable and competitive pricing for our product, ensuring the viability of the company.

The Break-Even Analysis is a crucial and incredibly straightforward method for figuring out the specified level of output, cost, volume, and pricing in a market that is competitive. The industry determines how the Break-Even Point is used and fixed. Each manufacturing industry has its own cost structure, and every product type has unique cost characteristics. Therefore, the major factors to be taken into account while calculating the Break-Even Point are the type of the manufacturing operation, industry structure, and product profile. Tracy (2004) urges businesses to have fixed expenses that must be paid each month regardless of whether any sales are made, as well as variable costs that are incurred when a product is created and sold. Along with that, he makes it abundantly evident that "doing an accurate break-even analysis involves a detailed inspection and research of costs and pricing in your organisation." Before beginning the break-even analysis, it is important to understand the nature of the complete product being produced as well as the competitive landscape and industry structure. If used properly, the breakeven point is a very useful and the greatest analytical tool for a corporation.

## 2.8 Making Decisions

Determine output, pricing strategy, profit/costing, and make or buy, shut down, or continue company decisions using the break-even analysis idea. Any corporate organization's management often faces challenges when choosing whether to add or remove a product line from its lineup. Determine whether to add or remove a product line with the use of the break-even analysis. As it provides a clear comparison of the contribution of the product mix and the market demand and capacity of a product, this study will serve as a guide to help make the decision. It is a crucial instrument for decision-making in order to accomplish targeted industrial goals (Swayamsree, 1968). According to Bansal et al. (2014), using the breakeven analysis correctly will lead to better decision-making. The cost factors can be used to choose whether to make or buy.

According to Bansal et al. (2014), contribution is negative if a product's variable cost exceeds its purchase price. The corporation can decide whether to enhance or decrease production capacity with the use of break-even analysis. But it relies on the capacity that is available, the market demand, and the sales strategy. In order to select the ideal product mix and promotion mix, break-even analysis is appropriate. A company may use a variety of incentives to encourage the purchase of its goods. They stated that "the promotion mix that provides the highest contribution may

be used." A change in the product mix is the management choice for which break even analysis can project the outcomes.

Break even analysis is one of the management accounting strategies. According to universal agreement, management accounting provides useful information for decision-making, whether it be internal, external, long-term, or short-term. Numerous techniques, such as cost volume profit (CVP) analysis, break-even analysis, and customer profitability analysis, are available for making short-term decisions. According to Janjic, Todorovic, and Jovanovic, a strategy or tool for analysing potential changes in a company's revenues, costs, and prices is called cost volume profit and break-even analysis (2010). CVP analysis is used by manufacturing companies to calculate the quantity of a certain product that must be sold in order to break even. The application of this principle is rather straightforward; the variable cost per unit is subtracted from the unit selling price to get the contribution margin. The required number of breakeven units is then determined by multiplying the contribution margin by the total fixed cost. As a consequence, managers may use this to monitor the behaviour of the cost before choosing to commit or make a certain order. Break even analysis is another tool that managers may use to estimate each product's production level.

As a result of their review of the literature, the researchers have developed a computation based on examples and an agreed concept of break even. As was previously said, several scholars in this field have simply conducted a cursory examination of the evidence. In their study, none of the authors have considered all the factors that may be crucial in figuring out the break-even point, such as the combination and interpretation of the product mix, market segmentation, and capacity. Since this gap is taken into account in this study, the researchers will analyse the application of break-even point by taking into consideration the major perspective of all the essential expenses, product mix, and market demand. This study also shows multidimensional product associated Break-Even Point for maximum number of SKU in manufacturing as well as trading-oriented sectors in diversified organisations for the aim of optimum profit planning and decision-making.

### **3. Research Methodology**

The goal of this chapter is to provide a detailed explanation of the research strategy and methodologies used in this study. The chapter then discusses the sample size, sampling process used, and data analysis techniques utilised by the authors.

### **3.1 Research Methodology**

This research is quantitative in nature, as it examines the established method for calculating the Break-Even Point and its application to a broader scope of coverage, including product contribution, market segments, and capacity, by implementing predetermined factors such as fixed cost, profit, and statistical data gathered from a limited number of sources. To test the established tools for rapidly and simply computing the Break-Even Point, manufacturing and trade statistics have been used.

### **3.2 Research Methods and Instruments**

This study is based mostly on calculating techniques. The primary instrument consists of system application utilities, which are present in all computations and utilised to derive outputs. Various strategies based on accessible system application utilities and expanded formulae-driven outputs as well as multiphase exploitation of the Office programme have been employed to examine the possibilities of constructing a bespoke software to expand the application's reach.

### **3.3 Collection of Data**

This research utilises secondary data. Various reports from the selected manufacturing and commercial sectors were used to compile the statistics. The Data sources were company management reports and quantitative statistics. The data is based on the actual performance during the last three (3) months. The researchers used genuine data to guarantee that the findings may be applied to other industries and serve as a viable solution. Additionally, the programme may assist businesses in efficiently identifying their break even point. The data were gathered to provide an effective comparison. Quarterly data allows for a more accurate examination than data from a shorter time.

## **4. Analysis and Discussion**

### **4.1 Case 1- Manufacturing Industry**

#### **Calculation Evaluation**

##### **I. Data Origin:**

The secondary data were gathered from the financial data supplied to management. January 2019 through March 2019 is the time frame covered by the analysis, during which the corporate entity incurred a loss or made no profit. The company's primary unit of measurement is "m/t" (Metric Ton), and its currency is "MYR" (Ringgit Malaysia). The manufacturing of a product is measured by the output's size and thickness. The firm manufactures 18 varieties of plastic bags for retail and wholesale distribution. This study describes each kind as a "hierarchy," and the capacity, demand, and contributions differ for each type. Actual sales information was obtained

from the period's sales report, whilst capacity and shared market demand were assumed to determine the BEP. The total capacity is projected to be 4,000 m/t per month, and it has been assigned in accordance with the hierarchy. Similarly, the overall

## 4.2 Case 2- Trading Sector Calculation Analysis

### I. Data Origin:

The secondary data have been compiled from the financial data supplied to management. The period covered by the study is from January to March of 2019, during which the company incurred a loss. The company's primary unit of measurement is "m/t" (Metric Ton), and its currency is "MYR" (Ringgit Malaysia). The traded product is measured by the output's size and thickness. The firm trades retail and wholesale plastic bags via five different sales channels. This study describes each kind as a "hierarchy," and the capacity, demand, and contributions differ for each type. Actual sales data from the sales report for the period of January 2019 to March 2019 were used to determine the BEP, while warehouse capacity and shared market demand were assumed. The total capacity is expected to be 3,300 m/t per month, and it has been assigned in accordance with the hierarchy. Similarly, the total Shared Market Demand of 3,200 m/t is assigned based on the pattern of the previous three years

## 5. Discussion

In order to promote sound decision-making and better profit planning, this study seeks to ensure effectiveness and efficiency in the usage of the break-even point and to calculate it as rapidly as feasible. Based on the research mentioned above, a few important contributions are noted below.

The study presented here is the first to place a heavy emphasis on product mix, market demand, and capacity. This will benefit industries in a variety of ways, including price policy, cost effectiveness, and competitiveness in the current markets (Campbell, 2018; & Dubas, Hershey, Nijhawan & Mehta, 2011). This study examines how product mix breakeven points are used in the manufacturing and service sectors.

The analysis also helps businesses identify the break-even threshold for each product. Consequently, this will help the firm plan its output (Ionescu and Dumitru, 2015). Because breakeven analysis has a narrow scope in earlier research, this study offers more value to the field of management strategy by correcting this shortcoming and broadening the breakeven analysis's reach.

All potential omissions in determining the exact Break-even point, including market demand, capacity, and product margin for each SKU, have been fully investigated in this research. A company's collapse or

bankruptcy is caused by poor management decisions and profit planning, which are caused by the wrong break-even point. Additionally, the company is destined to collapse since financial management practises were not implemented properly (Enyi Patrick Enyi, 2005).

Additionally, real data from sectors that were focused on many different items were analysed in order to clearly illustrate the ramifications of these elements. The importance of a product's contribution ranking in relation to its demand and capacity has been shown using a chart and table-based portrayal. It is mentioned clearly that adopting the exact degree of influencing factors will always change the point at which an organisation is neither making a loss nor a profit (Gutierrez & Dalsted, 2004). This study is backed by the fact that, assuming adherence to the prescribed product mix, the Break-even point is much lower than the company's actual sales performance. Following this product mix, the entity may set the absolute minimum break-even point, such that sales over this level will result in a sizable profit for the company.

In this research, the break-even point and how it fluctuates depending on the volume level assessed with product mix are both shown graphically to show the relationship between fixed and variable costs. One of the main advantages of classifying cost, volume, and returns is this (Gutierrez & Dalsted, 2004). It may also be used to calculate the investment's break-even point. The frequency with which an investment might result in a profit will depend on this aspect.

Additionally, this research's conceptual foundation is sound, and other studies may relate to it. The combined findings, according to the experts, should motivate the manufacturing and trade industries in the future. The parts that follow go through numerous practical implications based on the study's results. In addition, all theoretical and macro-level Break-Even Point calculations will be stopped for this investigation.

There hasn't been much study on management accounting, especially about breakeven. In order to fill this gap in the research, this article will show how business might benefit from context-aware analysis. By identifying the best and most appropriate breakeven point, where total earnings can easily offset total costs and losses (Enyi Patrick Enyi, 2005), this work adds to the literature on the use of breakeven analysis in the manufacturing and trading sectors. Various factors are taken into account to determine the practical implications.

As a result, given what is known and understood by the researchers at this time, the parameters used in the current study identify and implement the recommended Break-Even point in any business, particularly those in

manufacturing and services-oriented industries, to account for the hidden influence (Berryman and Nobe,1999). Researchers may identify a wide range of influencing factors, such as the cost of capital and the present value of the cost, which may affect the Break-even point, based on the results of this support study. By including the cost of capital into his study, Gary Simpson (1984) looked at how the break-even point is affected by the cost of capital. In addition, the examination of the break-even point would be unbiased if the research took into account the mix, demand, and capacity.

Together with the enhanced formulation and application utilities, they have been constructed as the basis for this study. This study might be a resource for future analysis and development in the field of management accounting, which is a kind of managerial tool used to evaluate the impact of organisational, technical, and economic choices (Morano, Tajani) (2013).

## 6. Implication

The Manufacturing and Trading industries will be affected in a number of ways by this study. The actual data shows that this analytical framework for calculating break even points for various industries is well-developed. This research will also help businesses fill up massive spreadsheets with data in order to make computations quick and easy and determine the Break-Even Point. In addition, all theoretical and macro-level Break-Even Point calculations will be stopped for this investigation. By taking into consideration impacting factors like Contribution margin of each SKU, Market demand, and capacity, this will address the challenges and problems related to determining the Break-even point.

To ensure that the impact of Capacity, Demand, and Product Mix is not compromised, it is advised that the top management associates use this improved formula and system application utilities to calculate the Break-Even Point. This will allow decisions and profit planning to be based on the effective and applicable Break-Even point. The entity may achieve Break-Even Point with the lowest output volume by identifying and eliminating loss-making and low-contributing product segments from the product mix.

By identifying an accuracy level at which the organisation can reach a Break-even point with a limited number of SKUs, volumes, and lean operations, this break-even point research is likely to have a substantial impact on the company. This research, which also examines the contribution margin made by individual products (SKUs) to the company, may be used to identify which SKUs have higher profit margins than others in terms of the bottom line. Thus, the management may decide to accept or improve the items with the greatest contributing value

(conR1), as well as having the option of eliminating the goods with the lowest contributing value (conR2)

By analysing a large amount of data quickly, this research aids in determining the Break-Even point in the future. The precision of decision-making and planning for profit maximisation is improved by using profitable product categories and working with a constrained volume.

The likelihood of cost reduction and market expansion based on the contribution ranking of each SKU is raised since the management has determined the product-by-product contribution and overall margin as well as a suitable Break-Even point based on this research. Additionally, it affects the comprehensive product mix as well as the capacity analysis.

Taking capacity, demand, and actual sales performance into consideration, the break-even point analysis also provides the maximum quantity that can be sold at any given time for each SKU. This suggests that management has the option to assess how capacity may be used in relation to market demand or to impose capacity restrictions in response to a restricted market demand.

## 7. Limitations and Future Research

Like all studies, this one has certain drawbacks. One of this study's shortcomings is that it only examined the manufacturing and commerce sectors. To enable further empirical testing of the methodology developed in this study, it is advised that additional research be done on other companies or nations. It is also advised that different samples besides manufacturing and trading be used to increase the generalizability of the findings. Finally, it is advised that this study be conducted and tested in additional countries, as it was only conducted in Malaysia.

The several product categories with important market demand and supply consequences were considered in this study. But the Break-even point also has to be adjusted for hidden elements and increasingly complicated businesses. The calculation process, application qualities, and implementation of the aforementioned Micro BEP formulae are more challenging.

Through the determination of the break-even point in the plastic sectors, this study provided support for the analysis. Customer satisfaction levels and SKU handling are more challenging in the plastics business than in other sectors. Based on their protocols and practises, all sectors' criticality, nevertheless, continues to be constant. Few sectors are more complex than the plastics sector, including those based on engineering, medicine, fast-moving consumer products, etc. Future studies may thus modify this study and its application to various businesses in order to check the accuracy of this analysis.



There are not many things that this research has not looked at. These include, among other things, the possibility of removing low-contributing items, the impact of set-up costs, the modification of fixed costs, the identification and segregation of fixed costs within semi-variable costs, the restriction on price fixing based on competition. Future research might include and examine these factors that could affect the break-even point utilising real data sources.

Even if the Break-Even Point is calculated and identified accurately, market circumstances and competition will ultimately dictate how it is used and how future decisions are made. Management must choose whether to retain or increase production capacity if there is a high level of demand for a product with a high profit margin. Additionally, some clients request a variety of goods from a certain company. Few of these products could make money, while the majority might lose money. The firm may not be able to remove loss-making products from a single customer due to the determination of the Break-even point since it could have to give up these losses in order to secure profit-generating lines with those customers. This will help the company long-term business security. It may be good to bargain with the customer for a higher selling price in order to secure the business and boost revenues.

The point at which there is neither a profit nor a loss has a significant impact on the application of the marginal costing approach in calculating a product's price. The company can have trouble getting the right order at the right time if the point is chosen based just on a single SKU. As a result, the various levels of the product mix and its standard pricing strategy must be considered when choosing a price. While setting or formulating prices in response to competition and current demand, the Break-even point may vary somewhat due to changes in contribution margin and mix.

In conclusion, the findings of this study may help scholars and practitioners understand the real-world applications of breakeven point while also helping businesses fill up massive spreadsheets with data to make it easier to calculate breakeven point. Finally, since this study was cross-sectional, it was unable to take into consideration changes in demand or price rises. Long-term research may thus be feasible in the future.

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