



Adapting Cost Efficiency: Activity-Based Costing in Restaurants and Tactics to Strengthen Business in a Turbulent Market

Rathna Durga Ramasubramanian

Master's thesis

June 2024

Master's Degree Programme in Professional Project Management

Rathna Durga Ramasubramanian

Adapting Cost Efficiency: Activity-Based Costing in Restaurants and Tactics to Strengthen Business in a Turbulent Market

Jyväskylä: Jamk University of Applied Sciences, June 2024, pages 70.

Degree Programme in Professional Project Management. Master's thesis.

Permission for open access publication: Yes

Language of publication: English

Abstract

The research work emphasizes the importance and the need for activity-based costing methods and aims to implement the activity-based costing method in the fast-casual restaurant chosen. To gain profit, the need for a sophisticated costing method that can calculate the costs of menu items accurately has to be realized by the management. The activity-based costing method is known for its ability to calculate costs accurately based on the resources used for each activity to produce a product. The overhead costs which cannot be directly traced to the products or services and are known to be difficult to handle are allocated to the products distinctly using the activity-based costing method. In the current dynamic environment, the need to identify the costs involved and their allocation is crucial in running a business.

The work presents the techniques of activity-based costing method and describes the way it was implemented in the restaurant. The menu item prices calculated were compared with the traditional costing method and those differences are clearly explained through the menu engineering technique. The approaches to handling businesses during inflation are mentioned. Understanding the approaches to reduce costs and realizing the benefits of the activity-based costing method to provide accurate product or service costs is essential for the management to make informed decisions. The activity-based costing method is gaining popularity in different business sectors and is interesting to study its benefits.

The research concludes with recommendations for future study and analyzes how well the research questions are answered.

Keywords/tags (subjects)

Activity-Based Costing, Overhead Costs, Bill of Activity, Restaurant Business Model, Menu Engineering

Miscellaneous (Confidential information)

N/A

Table of Contents

1 Introduction	1
1.1 Overview of Costing Methods.....	1
1.1.1 Standard costing	2
1.1.2 Job costing	2
1.2.3 Process costing	2
1.1.4 Direct costing	3
1.1.5 Target costing	3
1.1.6 Activity-based costing (ABC).....	3
1.2 Background	4
1.3 Objectives, Research Problem, Research Questions	5
1.4 Structure of the thesis	5
2 Literature Review	7
2.1 Challenges in cost management in restaurant operations.....	9
2.1.1 Operating activities in restaurants	9
2.1.2 Major challenges in Restaurant operations	11
2.2 Inflation and its impact on restaurants	12
2.3 Pricing Strategy and Competition in the Restaurant Sector	13
2.3.1 Pricing strategy	13
2.3.2 Competitive pressures in the food industry	16
3 Overview of Activity-based costing.....	17
3.1 Cost drivers and activity drivers	19
3.2 Activity measures	19
3.3 Calculating Activity-based costs using the equations	21
3.4 Advantages of activity-based costing	26
3.5 Disadvantages of activity-based costing.....	26
3.6 Role of Activity-based costing in reinforcing business	26
3.6.1 Case Study Example	27
4 Research Method	30
4.1 Overview of research methods	30
4.2 Methodology chosen	30
4.3 Research Design	31

5 Pre-implementation phase.....	32
5.1 Restaurant background.....	32
5.2 Data collection.....	33
5.3 Data analysis.....	33
5.3.1 Identifying Activity Centers, Cost Pools, Cost Drivers.....	33
6 Implementation Phase	36
6.1 Results.....	36
6.1.1 Calculation of Cost Pool Rates.....	36
6.1.2 Pricing the menu by activity-based costing method	38
7 Post-Implementation Phase.....	41
7.1 Menu Engineering	41
7.2 Classifying the menu item from its Contribution Margin & Menu mix.....	42
7.3 Turbulent Market Situations	47
7.4 Handling Costs during Turbulent Market Situations	47
7.5 Exploring activity-based costing in emerging restaurant models.....	49
7.6 Key Performance Indicators (KPI).....	50
8 Discussion and Conclusion	51
8.1 Reliability, Validity and Ethicality	51
8.2 Answering Research Questions.....	52
8.3 Limitations of the thesis work.....	53
8.4 Future Recommendations	54
8.5 Conclusions	54
9 References.....	55
10 Appendices	60
10.1 Appendix I Qualitative data.....	60
10.2 Appendix II Bill of Activity for other menu items using Activity-Based Costing method.....	63
 List of Tables	
Table 1. Data for products	21
Table 2. List of activities and their activity measures	21
Table 3. Pooling of activities to homogeneous cost pools	22

Table 4. Deriving Overhead costs	24
Table 5. Obtaining direct material costs and direct labor costs	24
Table 6. Overhead Cost Allocation in 2012	27
Table 7. Cost per service unit using Traditional Costing in 2012	27
Table 8. Allocation of non-operating costs to operating cost centers	28
Table 9. Cost per guest using ABC in 2012	29
Table 10. Bill of Activity for Chicken Biryani	38
Table 11. Bill of Activity for Chicken 65	39
Table 12. Menu engineering from the selling price and Food costs obtained by the Traditional Costing method	45
Table 13. Menu engineering from Food costs and Menu total costs calculated with the Activity-Based Costing method.....	46

List of Figures

Figure 1. Structure of the thesis	6
Figure 2. Restaurant operation cycle.....	11
Figure 3. Pictorial representation of Inflation.....	12
Figure 4. Value-based pricing.....	14
Figure 5. Market-based pricing	14
Figure 6. Cost-based pricing	15
Figure 7. Pictorial representation of Traditional vs. Activity-based costing methods	23
Figure 8. Research Design Structure	31
Figure 9. Picture of the restaurant studied	32
Figure 10. General ABC model for restaurants	34
Figure 11. ABC model for restaurants with single activity centers	35
Figure 12. Selling price list of the restaurant.....	40
Figure 13. Menu Matrix categories	41
Figure 14. Kasavana-Smith model.....	43
Figure 15. First In, First Out Model (FIFO)	48

1 Introduction

Pricing of products or services in any business sector is crucial as it directly impacts the revenue of the business (Dolgui & Proth, 2010). Setting the price for products or services determines the profit and revenue of the business. If the product is priced high, the product might be positioned as a high-end product in the market and could be assumed as overpriced by customers, whereas if the product is priced low, the product might be positioned as affordable but might be perceived as a low-quality product from customers' perception. Thus, it is very important to understand the market, target customers, product differentiation, and pricing strategy of the business.

To set the price for products or services, the costs involved in providing them are paramount. There are several costing methods to calculate the costs of the product. One such method that has gained importance is the Activity-based costing method. This method emerged due to the limitations of the traditional costing method. Though it is considered to be time-consuming, the activity-based costing method provides accurate information about the costs of products or services.

The thesis work aims to implement an activity-based costing method in a recently opened fast-casual restaurant. Restaurant businesses are known to have challenges of their own and one of the demanding jobs is to set prices for the menu items that determine the success of the restaurant business.

The thesis workflows through the basic understanding of costing methods, more deeply the activity-based costing method, data collection & analysis, implementation of activity-based costing method, and consideration of benefits.

1.1 Overview of Costing Methods

The costing method is a technique that is used by businesses that sell goods and services, to determine the costs accurately for producing and delivering products. Raw materials, labor, and overhead expenses are the major elements that will be analyzed through the costing method and total costs per product or service are thus calculated.

Among the above-mentioned expenses, overhead expenses are the most difficult element to calculate as they cannot be linked directly to the production or process. Overhead expenses are the indirect costs that include,

- Indirect labor – for example, HR, supervisors who are not directly involved in the production.
- Indirect materials – for example, packaging, papers, and stationery items for office work that are not direct raw materials for the production.
- Utilities – water, electricity, and gas expenses used in the facility.
- Physical costs – property taxes, rent, insurance.
- Financial costs – Accounting, banking charges.

A business must choose the right costing method, as the most appropriate method can help to make informed pricing strategies which in turn impacts the profit margin and financial performance.

There are different costing methods, each with its applicability and advantages (Katana, 2024). Among those the six most used costing methods were

- Standard costing
- Job costing
- Process costing
- Target costing
- Product costing &
- Activity-based costing (ABC).

A brief statement about the most commonly used costing method is summarized below:

1.1.1 Standard costing

It is a relatively easy and less time-consuming method to compute. The costs are usually derived from historical data of the organization. If the standards are not updated regularly, then the method would derive inaccurate costs to the product.

1.1.2 Job costing

The costs of each job are tracked. All direct costs are added, and the indirect costs are allocated to each job based on how many resources are consumed. It is time-consuming but relatively accurate. For example, if a job consumes 50 % of the production space, then 50 % of the rent is added to this job.

1.2.3 Process costing

Unlike job costing, the indirect costs are allocated to every process based on how many resources are consumed. It is less time-consuming and can lead to inaccuracies.

1.1.4 Direct costing

It is also called the Variable costing method which considers only the variable production costs. For example, raw materials and labor cost varies with varying production levels and those are accounted for in the costing method, whereas the fixed costs like rent, and taxes are not included. Thus, a clear management decision may not be possible.

1.1.5 Target costing

In target costing, the products are designed and priced as per the customers' demand. It values the customers. As the target price is known, the cost of production of the product needs to be determined so that the organization also makes a profit. Thus, the focus is on sales price and not on the cost of production. If the cost cannot be controlled within the target price, then the quality of the product might be forced to compromise.

1.1.6 Activity-based costing (ABC)

In Activity-based costing (also known as the ABC method), the cost of each product is based on the activities involved in making it and thus, the overhead costs are assigned to activities. The overhead costs are allocated to the cost pools which is a pool of costs consumed to perform a particular activity. The total overhead costs of a cost pool when divided by the number of units of activity gives the activity rate. This activity rate is applied to the number of units of activity for each product to calculate individual overhead costs. This method is very time-consuming.

Among all the costing methods mentioned above, the Activity-Based Costing method is a more sophisticated version of job costing, which helps to calculate the overhead costs of products and services more accurately than any other.

A more detailed aspect of activity-based costing is covered under section 3.

This thesis work describes how an activity-based costing method could be implemented in a restaurant and compares how the pricing of the menu deviates from their current costing method. This research is based on the shared interest of the thesis writer and the restaurant owner (called as restaurateur).

1.2 Background

In Finland, there are over 9700 restaurants and takeaway food operators as of today (March 2024) which is 4.3 % from 2023. This industry has a huge impact on the economic environment of Finland as it is worth 6.6 billion euros in revenue. The restaurant and takeaway food operators' industry is the 17th largest industry in Finland. Over 62,500 people are working in this sector with steady recruitment for more workers (IBISWorld, 2024). The types of restaurants could range from full-service to quick-service, fine dining to fast casual, and food truck restaurants. People with a passion for cooking and an ambition to become entrepreneurs would usually aim to open either a restaurant or catering service, a food truck, or a stall in markets. Despite its attractive mode of business, the establishment of the business and running the business successfully is highly challenging. The resources required to establish a restaurant facility in or around the main market area are hard and competitive for small restaurants when compared to global or national-level restaurant chains. A SWOT analysis is required before establishing the business. After overcoming the first part of the challenges in setting up a restaurant, the second part of the challenges starts with finding skilled laborers, marketing and advertisements, and procurement of food and other raw materials from a retail shop(s). Thirdly, to run the business continuously and successfully the restaurant owner or manager needs to make a wise decision on the items in their menu list which satisfies the market demand and brings profit to the business.

The restaurant industry has very small profit margins and a high failure rate. The restaurant business is a labor-intensive business with labor costs making up a large part of the total cost. Restaurant business mostly results in a very tight profit margin (Raab & Mayer, 2003). Thus, to bring profit to the business, the restaurant owner or the manager needs to dedicate time to a highly crucial factor of the business, the pricing of the menu items. For this, one has to explore the costing methods which is time-consuming. Thus, this work can guide the restaurateur to understand the major cost accounting methods and explain implementing the most reliable costing method.

1.3 Objectives, Research Problem, Research Questions

The scope of the work begins with understanding the activity-based costing method and clarifying the objectives.

The main objective of the thesis work is to implement an activity-based costing method in the restaurant chosen for the study. The outcome of the work will help to see what changes in menu pricing are observed from the restaurants' current costing method. With the changes implemented the other objective is to state the techniques to design the menu list to get a profit in a dynamic environment like the inflation period.

For any business, pricing, and profit is of prime importance. Thus, the **research problem** is, how to obtain the best prices for products in a competitive market and what method needs to be adapted to gain profit.

To bridge the gap between theoretical knowledge and practical implications, this study aims to reach its objectives and to solve the research problem by answering the following **research questions**:

1. What are the steps to implement the activity-based costing method?
2. How to identify the activity drivers and establish the cost pools?
3. How to utilize the data to calculate the price of menu items based on the activity-based costing method?
4. How to benefit despite the market changes and inflation?
5. What could be the benefit of this costing method in the future?

1.4 Structure of the thesis

The thesis starts with the introduction section briefing the costing methods, research objectives, and research problem with the research questions to be answered.

The second section of the work will cover a literature review on the topic chosen and the challenges in the restaurant business.

The third section of the work provides an overview of the Activity-based costing method.

The fourth section briefly states the methodology of the study followed by the pre-implementation phase in the fifth section of the work.

The sixth section describes the implementation phase of the activity-based costing method and later states the benefits and techniques to handle in the post-implementation phase.

Finally, the thesis work concludes with future recommendations and a conclusion part.

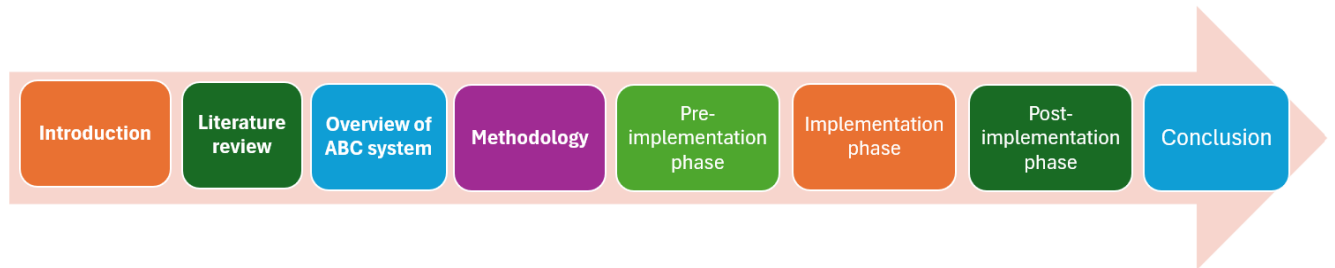


Figure 1. Structure of the thesis

2 Literature Review

Activity-based costing is an efficient technique for presenting accurate costs for products and services. It is used in different business sectors other than manufacturing, like banking, healthcare, transportation, and more.

The selection of a cost calculation method is critical to determine the product profitability. Traditional costing methods often provide false pricing and thus many companies have given up traditional costing methods and started to adopt the new method of Activity-Based Costing (ABC). ABC was developed towards the end of the 1980s to provide more accurate costing information as described by Cooper and Kaplan (1988a).

ABC method was mainly implemented in manufacturing sectors to handle fast changes in technology and automated systems (Saeed et al., 2023).

ABC provides elaborate information on value-added and non-value-added activities in an organization and the costs linked with these activities. Such elaborate information about activities and cost drivers enhances the quality improvement steps by identifying the activities that do not provide value to the process (Carolfi, 1996).

Activity-based costing is a cost allocation strategy that associates costs to activities and allocates the overheads to goods or orders depending on the extent of utilization of activities (Huang et al., 2014).

In an era of global competition and growing technologies, products or services with superior quality and aggressive pricing are consumer demands that influence managers to adopt new techniques and complex cost management systems to improve profit growth. (Beheshti, 2004; Drury & Tayles, 2005). A large number of researchers claim that activity-based costing can provide more accurate allocated costs than traditional cost systems (Ben-Arieh & Qian, 2013).

Since service organizations' costs are mostly direct and fixed, they are better candidates for activity-based costing methods than manufacturing companies (Kaplan & Cooper, 1998).

The use of the ABC system in hospitality industries like tourism enterprises and hotels is potentially interesting but still implemented limitedly (Harris, & Brown, 1998). Yet, it is important to note that ABC can be applied to all types of organizations to remain competitive in a dynamic environment.

In service sectors, customers demand a greater service, and together with the more people-intensive nature of service sectors shrinks the profit margins. Thus, service sectors are critical to lowering the cost of services by reducing expensive services, for example, a bank providing a cashier costs more

than an automated ATM. Thus, the use of ABC in service-oriented companies helps to identify and modify non-value-added activities and becomes a profit-enabling tool (Clarke & Mullins, 2001).

Though limited, ABC has now entered into service industries like healthcare, banking, and insurance. The use of ABC provides more information for managers to make informed decisions (Baxendale & Dombusch, 2000).

The ABC technique has been applied in a wide variety of food service and hotel industries (Pavlatos, 2009).

In service sectors, the profit for each service varies significantly based on customers' demands. Thus, ABC is a vital accounting system to closely track the costs and profit from every customer account (Davis & Darling, 1996).

Finance and marketing are often challenges for restaurant managers (Raab et.al, 2009). All costs involved in sustaining a successful restaurant are not clearly understood by restaurant managers (Raab & Mayer, 2007).

Menu item prices are usually set from variable costs, such as food costs. Restaurant managers overlook the overhead costs, even the labor costs are not fully accounted leading to the failure of restaurants. This is because the management expects the difference between a menu item's price and food cost will account for the overhead costs (Raab & Mayer, 2004).

Raab and his coworkers have demonstrated activity-based costing methods in different restaurant models (Raab & Mayer, 2004; Raab & Mayer, 2007; Raab, Shoemaker & Mayer, 2007; Raab, Mayer & Shoemaker, 2009; Raab et.al, 2009).

2.1 Challenges in cost management in restaurant operations

2.1.1 Operating activities in restaurants

Restaurants have multiple activities and processes for the smooth running of their business. Briefly, some of the restaurant operations are described below (SavorEat, 2022):

2.1.1.1 Purchasing or procurement

Purchasing or procurement of inventory items are the primary functions of a restaurant operation. This process must be done regularly throughout the year and the restaurant's lifetime. Normally, purchasing items would include ingredients, equipment, and décor items. The operation manager needs to follow the order quantity, delivery estimates, reordering schedules, storage spaces, and inventory tracking. While doing this, the operation manager needs to understand and consider the following aspects.

- Changes in food prices based on supply chain shortages, seasonal foods, etc.
- Understanding the customer demand.
- Ordering and re-ordering quantities optimization.
- Manage regular order placement.
- Calculate profit margin.
- Know competitors' pricing strategies and adjust your pricing strategy to maximize profit.

2.1.1.2 Food preparation and cooking

This is the most critical element of restaurants' operations where the kitchen staff prepare the menu items every day.

The basic tasks involved in this process are:

- Segregate the tasks according to the menu.
- Prepare time-based menu plans.
- Create standardized recipes.
- Cooking the meals.
- Ensure food quality, inventory, and timely meal service.
- Adjusting the cooking strategies based on the customer's diet restrictions.

2.1.1.3 Front-of-house (FOH) services

The main purpose of this process is to provide a comfortable and friendly atmosphere for customers. This process involves a wide range of services that directly influence customer satisfaction. Service activities typically include:

- Greeting customers.
- Scheduling reservations and offering customer phone services.
- Interacting with customers.
- Arranging seating.
- Getting orders.
- Serving customers.
- Describing or offering restaurants' specials.
- Answering queries and more.

2.1.1.4 Cleaning

Cleaning is an important process for the customers to feel a clean inviting atmosphere. Clean serving indirectly gives undoubtful perceptions about the quality of food. Furthermore, local agencies instruct restaurants to strictly follow the rules and regulations to provide a hygienic environment for the customers. The tasks under cleaning processes are:

- Assign clean-up duties and responsibilities.
- Monitor the cleanup process.
- Maintain a hygienic environment in the kitchen, serving area, storage areas, washing areas, etc.
- Develop waste disposal procedures.
- Scheduling regular deep clean tasks and more.

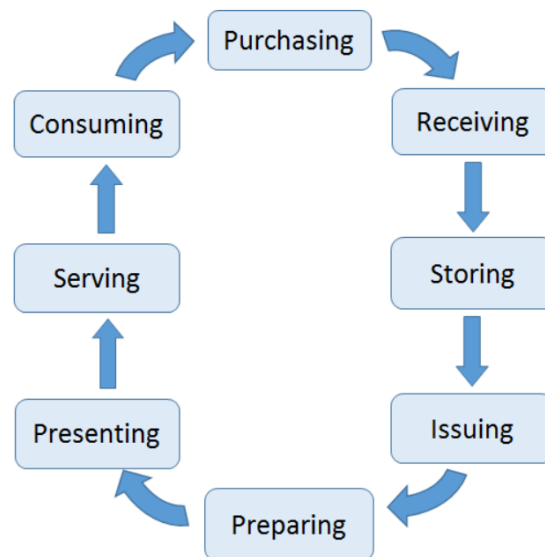


Figure 2. Restaurant operation cycle
(adapted online)

2.1.2 Major challenges in Restaurant operations

2.1.2.1 Labor shortage

Restaurant staff have labor-intensive workdays. Their wages are in general low. Such low wages and low flexibility in scheduling added with less recognition of their work make it a big challenge to hold the laborers in their position (Tablein, 2023). Thus, despite consumer demand, it is difficult to find skillful laborers.

2.1.2.2 Shrinking profit margins

The increase in prices of ingredients, labor equipment, etc. introduces challenges to adjust menu pricing. Thus, fluctuating markets reduce profit margins and restaurants cannot add all the costs to customers and thus restaurants have to face losses.

Profit margins of full-service restaurants could shrink up to 5% and for quick-service restaurants up to 9% (Tablein, 2023). The higher shrinking profit in full-service restaurants is because of the higher overhead and labor costs when compared to quick-service restaurants.

2.1.2.3 Inventory wastage

Ingredients and raw materials expenses are significant in restaurant businesses. As the raw materials have a short shelf-life, any mismanagement would lead to high wastage (Tablein, 2023). Accidental spills, over-storage of foods, and burnt dishes bring losses. Poor inventory management makes restaurants vulnerable.

2.2 Inflation and its impact on restaurants

We are very much aware of how the Coronavirus pandemic affected the health of every person globally and how the way of life changed us to a new normal. The forced lockdown and fewer social gatherings affected many business sectors, and the worst was felt in the hospitality sector, that is, hotels and restaurant businesses. Further, due to the geopolitical situation crisis, inflation affected the EU and Finland. The prices of food and beverages increased by an average of 9% and the inflation rate for 2023 was 6.2% (Helsinki Times, 2024). Due to inflation, consumer habits changed drastically. Consumers visited restaurants less than usual and ordered less food or cheaper food, for example, ordering only the main course than their usual behavior of ordering a starter, main course, and a dessert.



Figure 3. Pictorial representation of Inflation
(adapted online)

In Finland, the news articles described the rapid decline of the restaurant sector in the capital city, Helsinki. Many restaurants went bankrupt globally or otherwise suffered due to financial crises and are forced to use their cash resources to survive. The article reveals that the number of restaurants that went bankrupt in Helsinki increased by 70% year-on-year in 2023 according to data from Asiakastieto (Teivainen, 2024).

This year the increase in electricity prices and food prices has slowed down. The cost of food in Finland in March 2024 decreased by 1.65% when compared to March 2023 (Trading Economics, 2024). This brings a ray of hope to restaurant businesses.

2.3 Pricing Strategy and Competition in the Restaurant Sector

2.3.1 Pricing strategy

Pricing is about deciding restaurants' market position – premium cost or low cost. The management needs to determine its pricing strategy before setting prices for the menu items. It is the prime element for pricing decisions which are then implemented through costing methods.

The major tool to manage restaurant revenue is price (Kimes & Chase, 1998). Alfred Marshall towards the end of the 19th century introduced the art of pricing based on supply and demand; and the primary concern was to study how the demand and supply factors were affected by price (Hayes & Miller, 2011).

Pricing strategy is a critical decision in revenue management (Huefner, 2011).

The three pricing strategies commonly known are **Value-based pricing**, **Market-based pricing**, and **Cost-based pricing** (Mill, 2007).

A summary of these pricing strategies is below:

2.3.1.1 Value-based pricing

The pricing strategy is based on customer satisfaction and how the customer sees the given product or service as "Good Value" (Nagle & Muller, 2018). The viewpoint of the customer is important and how the customer perceives the price for a given item to be worthy (Mill, 2007).

The advantages of this pricing strategy are:

- Getting greater customer loyalty
- Enhanced gain
- Customized to customer needs
- High-quality products and services.

Disadvantages are:

- High labor costs
- Expensive cost of goods
- Tough when a competitor launches a similar product at a similar price.

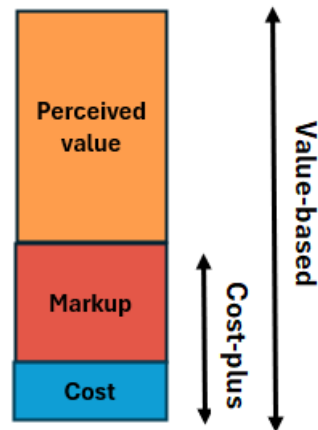


Figure 4. Value-based pricing
(adapted online)

2.3.1.2 Market-based pricing

In Market-based pricing, the strategy depends on the pricing strategy of a competitor. For a new restaurant entrepreneur, pricing items slightly above or below the competitors' price is a starting strategy (Sy 2021).

Based on customers' needs, price sensitivity, and level of competition, high-end restaurants charge more than their competitors if loyal customers are willing to pay premium prices for exceptional food and services.

Thus, **Market-based pricing = cost of product + market factor + premium**

where **market factor** depends on competitors' price or pricing strategy & the customers' willingness & **premium** is the extra cost added if the product is distinguishable.

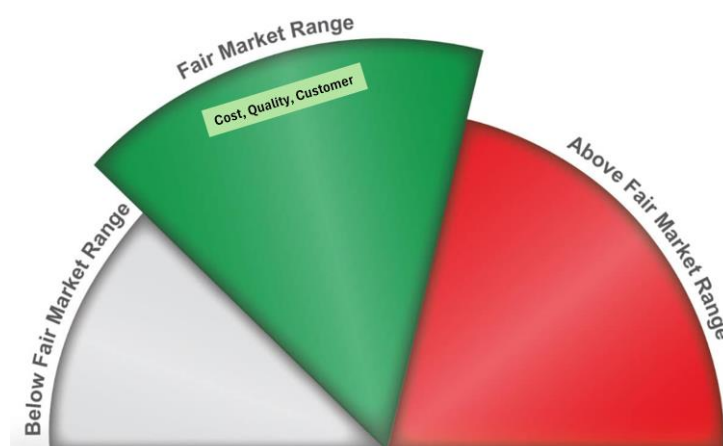


Figure 5. Market-based pricing
(adapted online from Volkswagen, 2024)

The advantages are:

- Able to retain customers
- Could attract new customers.

Disadvantages are:

- Customers' willingness could change
- Competition for the product controls the pricing.

2.3.1.3 Cost-based pricing

This is the most used method of pricing strategy in the restaurant business. Cost-based pricing is less expensive than Value-based pricing (Shakti & Vaidya, 2023). Here the selling price is the total product cost with a certain mark-up percentage to add profit.

Price = Total cost of the product (Variable & Fixed) + Profit Margin

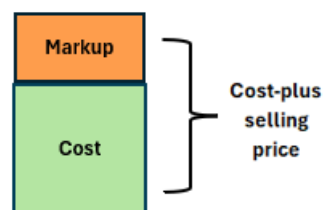


Figure 6. Cost-based pricing
(adapted online)

The advantages are:

- Easy method to use
- High manufacturing costs can be traced.

Disadvantages are:

- The products could be underpriced
- Consumers' market demand is not accounted for.

In general, restaurants use Cost-based pricing at the beginning of their journey and later the pricing strategy may change based on customers' demand.

2.3.2 Competitive pressures in the food industry

The food & beverage industry is tremendously competitive. The competition in the food industry intensifies year after year. Thus, the growth potential is high and on the other side, the closing of the restaurants occurs due to heavy competition.

The competitors could be both direct and indirect (SavorEat, 2022).

Direct competitors are those who provide similar products or services to the same target audience/customers.

Indirect competitors are those who provide differentiated products or services to the same target audience/customers.

Thus, a SWOT (Strengths, Weaknesses, Opportunities & Threats) analysis of competing restaurants in the locality is crucial to outperform the competitor. To stand out in the competitive environment, restaurants need to differentiate their menu from the usual menu list, for example, providing a children's menu, vegan food choices, discounts for loyal customers & students, and special offers on important festival days would attract customers.

Marketing through social networks is crucial to attract attention. Regular updates of recipe images and restaurant images on social networks could bring customers closer to the restaurant mentally.

3 Overview of Activity-based costing

Before understanding the basics of activity-based costing, this part of the thesis also outlines the traditional cost management in the food industry.

Classification of costs is a broad topic and a few commonly used terms are *direct costs*, *indirect costs*, *fixed costs*, and *variable costs*.

- **Direct costs** are usually referred to as direct raw materials costs and direct labor costs which can be traced to the cost object in an economically feasible way, ex. a radio in an automobile is a direct raw material cost, and labor wages and benefits paid for machine operators are direct labor costs.
- **Indirect costs** are all manufacturing costs that are considered to be a part of the cost object, finished products, or work in progress, but cannot be traced to that cost object in an economically feasible way, ex. power supplies, facility insurance, rent, taxes, etc.

Furthermore, short-term costs according to break-even analysis are

- Costs that are directly proportional to the amount of production are called **variable costs**; for example, costs of raw materials used in the production.
- Costs that do not change with the amount of production are called **fixed costs**; for example, facility rent.

For a restaurateur, profitability is of high priority. Despite its importance, restaurant operators do not take it seriously because it is a difficult process or because the food cost is not a fixed cost like rent or labor (Lymar & Gumeniuk, 2019).

Some basic steps to calculate the food costs are: list the cost of ingredients for each dish, figure out the fixed cost per meal served, calculate the percentage of menu price coming from food, and determine the target food cost (Alnasur, 2024).

Traditionally, food cost percentage is calculated from total inventory (otherwise called costs of goods sold COGS) by total food sales.

The food cost percentage formula is

$$\frac{(\text{Beginning inventory} + \text{purchases}) - \text{Ending inventory}}{\text{Total food sales}}$$

For example, consider a café shop has a total sale for a month = 12,500 €

Beginning inventory = 13,225 €

Purchases made during that period = 4000 €

Ending inventory = 12,200 €

Then the food cost percentage would be = $(13,225 + 4000) - 12,200 / 12,500 = 0,40$ or 40 %.

This means that the café is spending 40 % of its revenue on the ingredients. For a better profit, the food cost percentage should be within 28 % to 35 % (Alnasur, 2024). Thus, the above example suggests the café should make changes to get cheaper raw materials or should increase the sale price to maximize its revenue.

The cost of meals primely comes from the cost of food, secondly from salaries and benefits, thirdly from overheads which include fuel, light, heat, water, laundry, social security payments, printing and stationery, cleaning material, advertising, telephone and postage, decorations, license, maintenance, linen, cutlery and crockery, replacement cost, insurance, and finally rent, rates and interests on capital investment, taxes. The overheads are in general greater than the cost of food and overheads increase with time due to increases in utility and facility prices and inflation.

In the traditional costing method, the overhead costs which is a fixed cost is evenly distributed among all products. For example (similar to the example of a YouTube video (MBAbullshitDotCom, 2013)), let us consider a fast-food stall selling two products A and B, and the direct food cost (i.e., both raw material & labor) is 1 € and 2 €, respectively.

For a given month 100 units of A and 100 units of B are sold. One of the overhead costs is electricity and it turned out to be 200 € for the given month. The traditional or absorption costing method allocates this evenly among A and B by dividing the overhead cost by the number of units sold.

= total electricity bill / (units of A sold + units of B sold)

= 200 € / (100 units + 100 units) = 1 €.

Thus, both A and B will have an overhead cost of 1 € each so the total price for A is 2 € (1 € direct cost and 1 € from overhead cost) and B is 3 € (2 € direct cost and 1 € from overhead cost) each.

This method of allocating the overhead cost would give false information as many products do not consume overhead costs in proportion to the volume of products produced. Let us consider that if the electricity used for preparing B is roughly twice that of A, then the price of making A estimated to be 2 €, and B is estimated to be 4 €. As the traditional method distributes the overhead costs evenly

among products, selling a few units B say for 3 € may not be a problem, but selling 100 units or 1000 units B with a 3 € price tag rather than a minimum 4 € would impact the revenue. Thus, the traditional costing method allocates too much overhead cost to some products and too little to other products.

To overcome this problem, the Activity-Based Costing method (also called as ABC method) is crucial as the costs that are caused by, or driven by the same activity are pooled together referred to as **cost pools**, and the overhead costs are allocated as per the activity volume.

Activity-based costing is a method where costs are assigned to products, services, tasks, etc. are based on

- the activities that go into them
- resources consumed by those activities.

By measuring the activities and resources consumed by those activities for a given product, the activity-based costing method converts the indirect costs of the traditional costing method into direct costs. As a result, the cost of goods sold and the gross margin vary for each product between traditional cost and activity-based cost accounting (Schmidt, n.d.).

3.1 Cost drivers and activity drivers

Cost drivers and activity drivers are the same. A driver is the cause of a cost and whichever drives an activity will also drive the costs of the activity. There are both primary and secondary drivers. A primary driver is the initial cause of the activity and the secondary driver is the following activity or event that is caused by previous primary activity. Example of primary costs like customer demands, and product design leads to purchasing activity which is the secondary driver that drives the purchasing cost. Although all activities are cost drivers, drivers could also be events or other phenomena (Martin, 2016).

3.2 Activity measures

Activity measure is a unit of measurement chosen to represent the volume of activity and the primary driver. For example, the number of direct labor hours depends on the level of production activity (secondary activity) which is caused by the customer demands (primary activity). Thus, the number of direct labor hours is an activity measure chosen to trace the production activity. (Martin, 2016).

James R. Martin in his book *Management Accounting: Concepts, Techniques & Controversial Issues* explains the following steps required to design an ABC model

- Identify the main activities of the department.
- Determine the primary and secondary activities.
- Aggregate the activities into homogenous cost pools.
- Select activity measures to represent each pool.

Further, there are 3 equations to get the activity-based costs per unit. The figures required to use in these equations can be extracted either from the historical records or budget estimates for the upcoming period. Three steps and three equations involved in calculating activity-based costs per unit are:

1. Calculate activity overhead rates for each activity cost pool

$$R_j = \text{Annual costs of activity } j \div \text{Annual quantity of activity } j$$

where R_j = the activity overhead rate for activity j ; j = the number of the activity.

2. Determine the total annual costs of each product from the activity overhead rates and activity quantities

$$C_i = D_i + \sum (R_j)(A_{ji})$$

where, C_i = Total annual cost of product i .

D_i = direct cost of product i .

A_{ji} = quantity of activity j consumed by product i .

R_j = the activity overhead rate for activity j .

j = the number of the activity.

i = the number of the product.

\sum = the sum of.

3. Calculate each product's unit costs from the total annual costs for each product i and the number of units of product i .

$$\text{Unit cost for product } i = C_i \div \text{Units of product } i.$$

3.3 Calculating Activity-based costs using the equations

To illustrate the use of these equations, and to understand how activity-based costing differs from traditional costing, consider the following manufacturing firm's example taken from the book written by James R. Martin (2016).

A company produces products I and II. The figures are kept simple for easy understanding. The basic data is provided in Table 1 and overhead activities with its activity measures are in Table 2.

Table 1. Data for products

Product Data	I	II
Annual production quantity in units	100	1000
Material cost per unit	50 €	50 €
Direct labor hours per unit	1	1
Direct labor cost per hour	10 €	10 €
Number of purchase orders required per year	1	2
Number of engineering work orders required per year	4	8
Number of machine setups required per year	2	4

Table 2. List of activities and their activity measures

Type of Activity (activity pool)	Activities	Annual costs (€)	Activity measure
Non-production activity pool	Purchasing and receiving	24,000	No. of purchase orders
	Engineering	18,000	No. of engineering work orders
	Machine setup	24,600	No. of machine setups
Production activity pool	Machining, power, and maintenance	22,000	No. of direct labor hours
	Materials planning & handling	11,000	No. of materials
Total overhead costs		99,600	

Table 2 can be compressed to provide a simple combined homogeneous cost pool shown below,

Table 3. Pooling of activities to homogeneous cost pools

Activity pool	Annual costs (€)	Activity measure
Non-production volume	66,600	No. of purchase orders
Production volume	33,000	No. of direct labor hours
Total overhead costs	99,600	

Step 1: Calculate activity overhead rates

$$R_j = \text{Annual costs of activity } j \div \text{Annual quantity of activity } j$$

For non-production volume related the annual costs of activity is 66,600 € (from **Table 3**) & Non-production volume has the number of purchase orders as the activity measure. From **Table 1**, the total annual quantity of activity is 3 as purchase orders for product I = 1 and purchase orders for product II = 2.

Therefore, $R_j = 66,600 \text{ €} \div 3 = \mathbf{22,200 \text{ €}}$ per purchase order.

For production volume related the annual cost is 33,000 € (from **Table 3**). The activity measure is the number of direct hours and from **Table 1**, the total annual quantity of activity is **1100** as direct labor hours for product I is 1 h x 100 units = 100 h and direct labor hours for product II is 1 h x 1000 units = 1000 h.

Therefore, $R_j = 33,000 \text{ €} \div 1100 = \mathbf{30 \text{ €}}$ per direct labor hour.

Step 2: Determining the total annual costs $C_i = D_i + \sum(R_j)(A_{ji})$

For calculation purposes, we know that the activity measure for non-production volume is the number of purchase orders, which is 1 PO for product I and 2 PO for product II.

The activity measure for production volume is the number of direct hours, product I = 100 direct labor hours, and product II = 1000 direct labor hours.

For overhead costs: calculate $\sum(R_j)(A_{ji})$

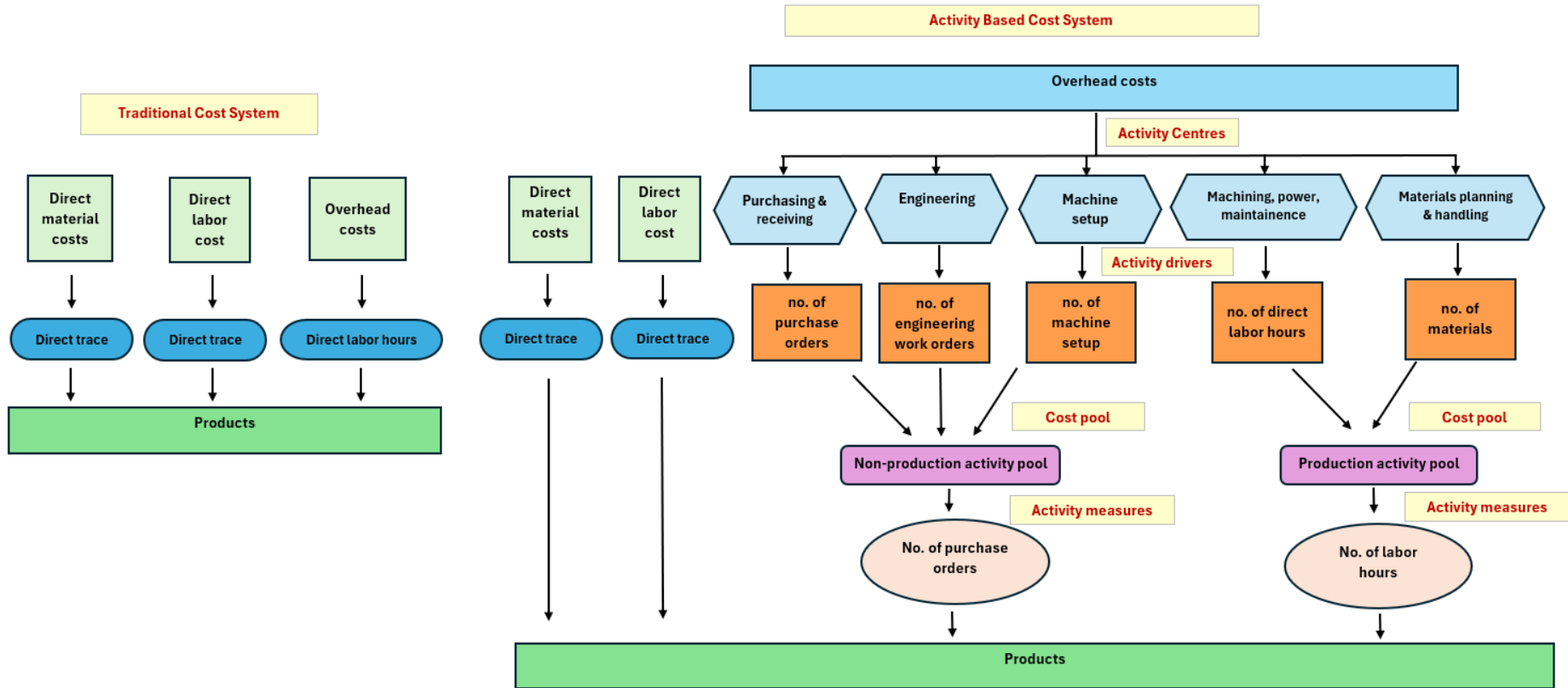


Figure 7. Pictorial representation of Traditional vs. Activity-based costing methods
(for the above example)

Table 4. Deriving Overhead costs

Cost pool	Activity rate R _j (calculated above) in €	Quantity of activity measure A _{ji}	R _j x A _{ji}
Non-production volume	22,200	1 PO (for I)	22,200 (for I)
		2 PO (for II)	44,400 (for II)
Production volume	30	100 h (for I)	3000 (for I)
		1000 h (for II)	30,000 (for II)
			22,200 + 3000 =
			25,200 € (for I)
Total overhead costs		Σ(R_j)(A_{ji})	44,400 + 30,000 =
			74,400 € (for II)

Direct costs: The direct costs are calculated by multiplying the no. of product units with its activity rate.

Table 5. Obtaining direct material costs and direct labor costs

Cost pool	The activity rate for products I and II (provided in Table 1) in €	No. of units	Total cost Activity rate x no. of units
Direct material	50	100 (for I)	5000 (for I)
		1000 (for II)	50,000 (for II)
Direct labor	10	100 (for I)	1000 (for I)
		1000 (for II)	10,000 (for II)
			5000 + 1000 =
			6000 € (for I)
Total Direct costs		D_i	50,000 + 10,000 =
			60,000 € (for II)

From the values obtained from **Table 4** and **Table 5**, the final cost for the products is obtained:

For **Product I** -> $C_i = D_i + \Sigma(R_j)(A_{ji})$

C_i (or C_I) = 6000 € + 25,200 € = **31,200 €**

For **Product II** -> $C_i = D_i + \Sigma(R_j)(A_{ji})$

C_i (or C_{II}) = 60,000 € + 74,400 € = **134,400 €**

Step 3: Activity-based Unit Cost for each product

Unit cost for product i = $C_i \div \text{Units of product i}$

For Product I, the unit cost = $31,200 \text{ €} \div 100 \text{ units} = \mathbf{312 \text{ € per unit}}$.

For Product II, the unit cost = $134,400 \text{ €} \div 1000 \text{ units} = \mathbf{134.4 \text{ € per unit}}$.

With the above ABC cost information in hand, next, let us look at the simple traditional or absorption costing method to compare,

Here all overhead costs are allocated to products using direct labor hours. From Table 2, we know the total overhead cost is **99,600 €**. Total direct hours are **1100 h** (as calculated earlier).

Thus, the overhead rate per unit = $99,600 \text{ €} \div 1100 \text{ direct hours} = \mathbf{90.54 \text{ € per direct hour}}$.

Since both products, I and II have reported to involve 1 hour of direct labor per unit, the above calculated overhead rate per direct hour is the same for both products. Also from Table 1, the direct material cost is 50 € and direct labor is 10 €.

Thus, **traditional costs for a product = direct material + direct labor + overhead rate/direct hour**

For Products I and II the traditional costs per unit = $\mathbf{50 \text{ €} + 10 \text{ €} + 90.54 \text{ €} = 150.54 \text{ €}}$

The traditional method of calculation shows Product I is 161.45 € less than the ABC model of calculation & Product II is 16.15 € more than the ABC model.

Thus, to overcome these discrepancies, managers need to be more careful in choosing the right costing method for their business model.

3.4 Advantages of activity-based costing

- Activity-based costing method provides accurate costs for products and services as it takes account of all activities involved in the process. Unlike the traditional costing method, here the overhead cost allocation is accurate as we saw in the example mentioned above.
- Activity-based costing method helps in decision-making because of the accuracy of costs. The management can make clear decisions about pricing, product mix, and further improvements. The products or services that do not provide profit to the organization can be stopped or removed from their portfolio.
- Reduce the costs: Since ABC helps to identify activities that are driving its costs, focus can be made on the overall reduction of costs, maximizing profit, and staying competitive.

3.5 Disadvantages of activity-based costing

- Activity-based costing method is complex as a detailed understanding of all activities related to products and services is required. This is more complex for larger companies involved in complex operations.
- Activity-based costing method is time-consuming and expensive as more time and data are required to establish the costing method. For smaller companies, the changes required in the accounting system are more expensive to invest.
- To provide accurate data, a significant amount of data needs to be analyzed, thus a dedicated team is required. To get accurate costs, the data should be updated at all times with constant changes in the market prices.
- Activity-based costing methods may not be suitable for all types of industries, especially for service-based industries where the direct costs are significantly less than those of manufacturing industries.

3.6 Role of Activity-based costing in reinforcing business

The activity-based costing method is known to provide reliable information about costs and profits. Analysis of activities reveals both the value-added and non-value-added activities. Activities that are identified as value-added activities can be improved. ABC helps to recognize the performance of each activity and helps to eliminate waste, inefficiencies, and non-value-added activities. Thus, the management can make informed decisions to thrive in the business.

3.6.1 Case Study Example

The case study chosen was about the implementation of an activity-based costing method in the hospitality sector was studied by Mashayekhi, B & Ara, M in the year 2012. The hotel had 132 rooms and employed 75 personnel. For costing purposes, the authors state that there are five service centers namely house-keeping, restaurant, coffee shop, conference room, and souvenir shop. In their system, floor space occupied was considered as the overhead allocation base. The overhead cost was 234,731 dollars, total floor space was 7300 m². Thus, the predetermined overhead allocation rate is $234,731/7300 = 32.155$ dollars/m².

The traditional costing method was first explained in the article to arrive at the cost per service unit to compare it with the figure obtained by the ABC method. With the traditional costing method, the overhead costs were allocated to different service centers by multiplying their corresponding floor space with a predetermined overhead allocation rate.

Table 6. Overhead Cost Allocation in 2012

Service centers	Floor space occupied (m ²)	Predetermined overhead allocation rate (dollars/m ²)	Allocated overhead (in dollars)
House Keeping	5700	32.155	183,283
Restaurant	500		16,078
Coffee shop	200		6,431
Conference room	700		22,508
Souvenir shop	200		6,431
Total	7,300		234,731

Table 7. Cost per service unit using Traditional Costing in 2012

Service centers	Activity unit (allocation base)	Total costs (in dollars)	Number of activity units	Cost per each activity unit (in dollars)
House Keeping	No. of rooms	263,162	32,028	8.22
Restaurant	No. of guests	145,000	116,000	1.25
Coffee shop	No. of guests	59,162	85,880	0.69
Conference room	No. of renting	31,000	349	88.83
Souvenir shop	No. of renting	5,595	10	560

Later the direct labor and material costs were added to get the total costs allocated for each service center **Table 7**. The cost per service unit was then obtained by dividing the total costs by the number of activity units.

With this data, the authors summarized that a guest staying a night at the hotel and visiting the restaurant and coffee shop once during the stay would cost $8.22+1.25+0.69 = 10.16$ dollars.

Next, to apply the ABC system, the activities were recognized and the allocation base was identified by the authors. The five main cost centers identified under the activity-based costing method are a) Housekeeping, b) Restaurant, c) Administrative and Accounting, d) Technical and Engineering, and e) Marketing. Among these Housekeeping and Restaurant are classified as operational costs which are directly related to the services provided to the customer and the remaining cost centers are classified as non-operational costs that cannot be traced directly to the services. Every cost center separately had its costs for payroll, raw material, employee benefits, utility, repair and maintenance, and other costs. All those data were presented in the article. The non-operational costs from Administrative and Accounting, Technical and Engineering, and Marketing were then allocated to Housekeeping and Restaurant operational costs as shown in the table below. The allocated rate was obtained from each cost of non-operational center/ total floor space of housekeeping and restaurant.

Table 8. Allocation of non-operating costs to operating cost centers

Cost Type		Payroll	Raw material	Employee benefit	Utility	Repair & maintenance	Other
Non-operating costs	A & A	15,880	4,471	6,729	8,237	6,132	6,289
	T & E	9,925	12,881	4,075	1,799	3,396	1,162
	M	3,970	7,342	1,899	558	1,366	2,698
Floor space occupied	H & R	7,300	7,300	7,300	7,300	7,300	7,300
	A & A	2.18	0.61	0.92	1.13	0.84	0.86
	T & E	1.36	1.76	0.56	0.25	0.47	0.16
Allocation rate	M	0.54	1.01	0.26	0.08	0.19	0.37
	A & A	12,835	3,614	5,439	6,657	4,956	5,083
	T & E	8,022	10,411	3,293	1,454	2,745	939
Allocated cost to H	M	3,209	5,934	1,535	451	1,104	2,181
	A & A	3,045	857	1,290	1,580	1,176	1,206
	T & E	1,903	2,470	782	345	651	223
Allocated cost to R	M	761	1,408	364	107	262	517

Notes: A & A = Administrative & Accounting, T & E = Technical & Engineering, M = Marketing, H = Housekeeping, R = Restaurant. All costs are in dollars.

The direct labor costs, direct raw materials costs, and the non-operating costs were allocated to Housekeeping and Restaurant cost centers. Housekeeping costs per room and restaurant costs per served meal were calculated from the number of sold rooms or number of served meals for the year 2012.

Table 9. Cost per guest using ABC in 2012

Cost types	Total costs		No. of sold rooms	No. of served meals	House-keeping cost per room	Restaurant cost per served meals	Total cost per guest
	House-keeping	Restaurant					
Payroll costs	87,585	55,336	32,028	201,880	2.73	0.27	3.01
Raw material	55,309	70,489			1.73	0.35	2.08
Employee benefit	36,714	20,719			1.15	0.1	1.25
Utility	57,989	7,401			1.81	0.04	1.85
R & M	52,931	8,964			1.65	0.04	1.70
Other	42,083	7,934			1.31	0.04	1.35
Total	332,611	170,843			10.39	0.85	11.23

All costs are in dollars. R & M = Repair & Maintenance.

From these calculations, a guest staying a night at the hotel and consuming a meal at the restaurant (including the coffee shop) once would cost 11.23 dollars as per the activity-based costing method and 10.16 dollars from the traditional costing method. The authors strongly recommended the implementation of ABC in the hospitality industry to get more precise information for the managers to make accurate and reliable decisions.

4 Research Method

4.1 Overview of research methods

Research methods are the ways of collecting and analyzing data which commonly include surveys, experiments, interviews, and observations.

Quantitative and Qualitative methods are the common types of data collection methods.

Data that is collected by oneself for research purposes is called primary data and the data collected by someone else when used for research purposes is called secondary data (Pritha, 2023).

Based on the type of research and research questions, either quantitative or qualitative or mixed (both qualitative & quantitative) method is adapted to collect data. In the quantitative method, the sample could be small or large and the numerical data collected is analyzed by statistical methods. In the qualitative method, the sample is usually small and the interviews with professionals are analyzed by interpretations & categorizations.

4.2 Methodology chosen

This study will be conducted in a restaurant and the professional involved here is the restaurateur. The qualitative method is adapted as a suitable methodology to collect data for this research work. A semi-structured interview with the restaurateur was done to get the restaurateur's opinions and experiences with the pricing of menu items and the challenges faced in the business. The interview questions are designed to get more insight into the business and the pricing strategy. The interview questions are prepared in a simple format and kept open-ended for easy understanding & inviting the participant to share more information, respectively.

Furthermore, observations were made at the restaurant to get more data required to list the activities involved in the preparation of the menu item. The required information for the thesis work is collected partly through interviews and partly by observations.

4.3 Research Design

Research design is a structure for the collection and analysis of data (Saunders et al., 2012).

As the methodology chosen for this study is qualitative; the research design is pictured below with two phases of qualitative data. The first phase is the semi-structured interview with the restaurateur and the second phase is the data collected from observations made at the restaurant. Analysis of data from both phases is done by content analysis.

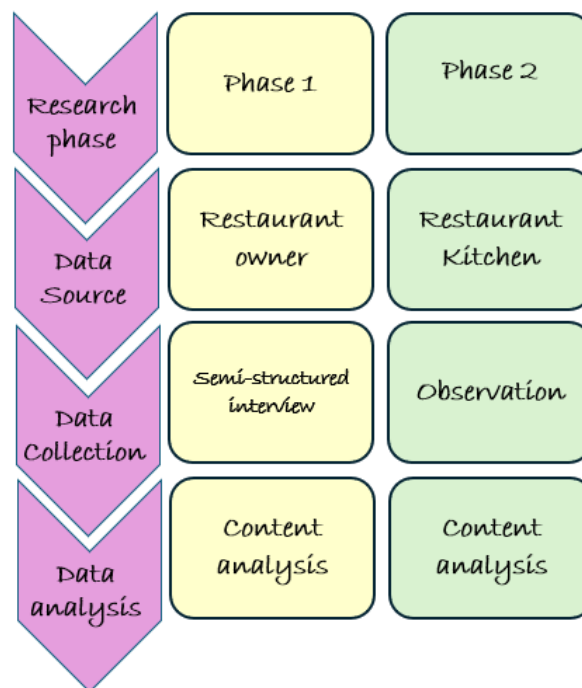


Figure 8. Research Design Structure

5 Pre-implementation phase

5.1 Restaurant background

The restaurant chosen is 7 km away from Oulu City Centre and it is in the middle of a small-scale industrial area. It was opened by two people as a lunch buffet restaurant. They were new to the restaurant business. The target customers were people working in the industrial area. Paper advertisements were mainly done only around the restaurant area. The restaurateur was also marketing the restaurant services through social media like Facebook and WhatsApp groups. The buffet was partly Indian and partly Finnish styles. They sold the buffet lunch for a price lower than usual when compared to the restaurants in the center of the city. This brought a very tight profit margin and they had to stop working on the buffet lunch model. Soon one of the restaurateurs turned it into a fast-casual restaurant. The restaurateur started focusing on a few Indian menu items and took orders mostly online. Since it is a new restaurant and not fully established the restaurateur does not take a salary for the work, instead pays a certain amount for a temporary staff who works when asked for. The time spent is about 1 to 2 hours in the kitchen in the evenings based on the number of orders. The restaurateur also explores different styles of restaurants to attract more customers.

The restaurant delivery mode is predominantly Restaurant-to-Consumer Delivery which means that the meals ordered online are picked up in the restaurant and directly delivered by the restaurant. Food delivery through third-party platforms like Foodora and Wolt was not restricted either.

The restaurateur readily accepted the author of this thesis to carry out the research work. The required data for the work was obtained quickly and the restaurateur was interested to see how the project work could help the restaurant business in fixing the prices for the menu items.



Figure 9. Picture of the restaurant studied

5.2 Data collection

The semi-structured interview was conducted with the owner of the restaurant (restaurateur), and it was recorded with the help of a smartphone. The interview lasted for 15 minutes. The recordings were transcribed to a Word document manually.

Separately, the costs, both labor costs and overhead costs for April 2024 were collected from the restaurateur.

The observations made at the restaurant helped to gather information regarding different activities involved in the preparation of a menu item and the time consumed for each activity was written down. This is very important data to work on implementing the activity-based costing method for a menu item.

5.3 Data analysis

5.3.1 Identifying Activity Centers, Cost Pools, Cost Drivers

The concerned restaurant mostly takes orders online and most of the time delivers home. Thus, the major activities observed at the restaurant were

- Taking orders
- Cleaning
- Preparing
- Cooking
- Administrating &
- Delivering.

Before the data analysis, let us look at the known ABC model for restaurant services (shown below).

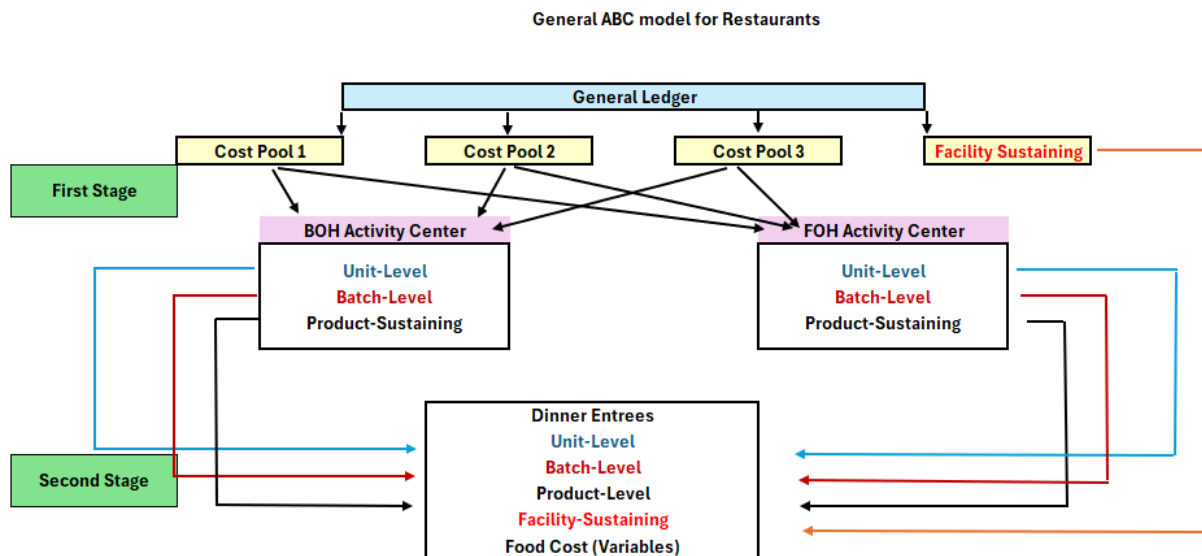


Figure 10. General ABC model for restaurants
(adapted from Cooper & Kaplan, 1988b)

From the usual ABC model (Figure 10), we can see that there are two activity centers Front-of-House (FOH) (briefed in section 2.1.1) and Back-of-House (BOH) (all activities taking place in the kitchen), whereas in the current study, there is no or too little to describe as Front-of-House activity center and thus only Back-of-House activity center was considered. As the ABC model can be tuned to the nature of business (Kaplan & Cooper, 1992), the overhead costs of the restaurant under study will be assigned to a single activity center.

In the first stage of the ABC model, the overhead costs can be assigned to activity centers either directly or through the first stage cost driver (Garrison & Noreen, 1997). In the first stage, overhead cost pools are separated into homogenous cost pools, which means that the cost pool has one specific cost driver and secondly the cost pool rate needs to be determined (Shim & Siegel, 1992).

Thus, the general ledger for this restaurant model would be similar to the model described by Raab et.al., (2008).

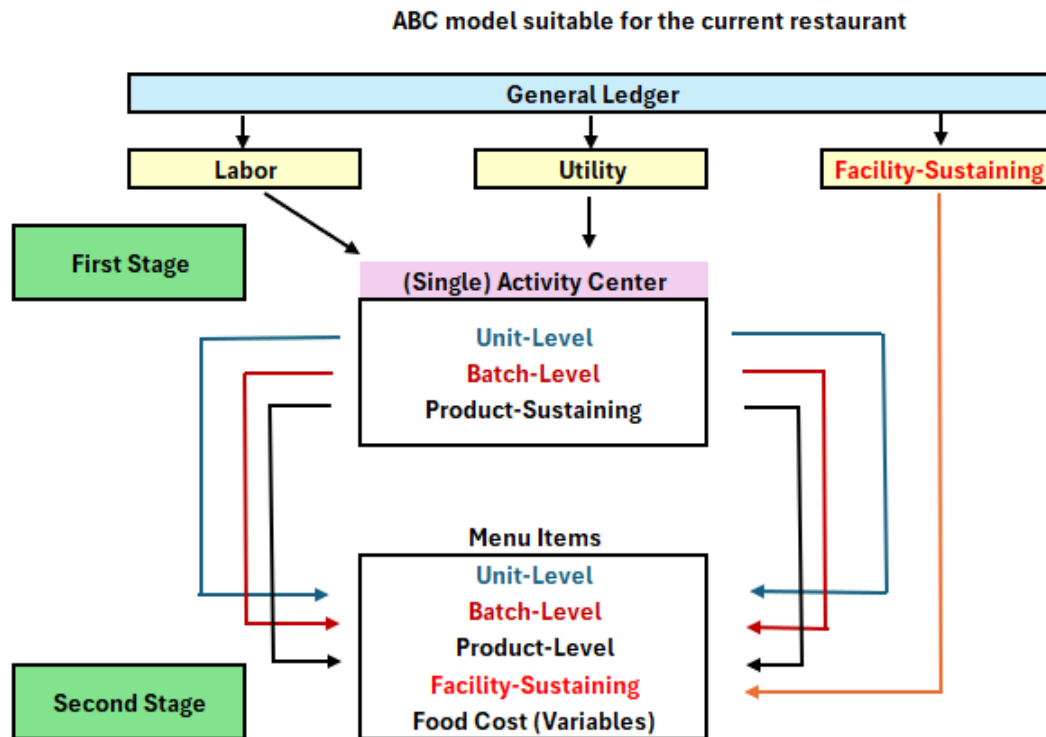


Figure 11. ABC model for restaurants with single activity centers
(adapted from Annaraud, Raab & Schrock, 2008)

For a clear understanding of the ABC model, Figure 11 describes the general ledger having one activity center (Back-of-house activity center) with unit-level, batch-level, and product-sustaining activities in it.

The major cost types involved in the BOH activity center are a. Labor costs, b. Utility & c. Facility-Sustaining costs. These costs are segregated into homogenous cost pools, namely, Labor, Utility & Facility-sustaining.

The labor cost pool has labor hours as the cost driver and the Utility cost pool has electricity rates as cost drivers. These can be assigned directly to the activity center.

The Facility-Sustaining cost pool has the total number or volume of products produced in the given workspace as a cost driver and those are assigned to each menu item through the second stage.

After categorizing the cost pools, the data collected helped to calculate the cost pool rates (in Section 6).

6 Implementation Phase

6.1 Results

6.1.1 Calculation of Cost Pool Rates

In the previous section, cost pools were determined and to get the cost pool rates, the data obtained from the restaurant is crucial.

The information obtained is given below:

Total labor cost per minute = 0,125 €

Utility cost (electricity) for the month = 250 €

Facility sustaining costs for the month = 585,60 €

Total number of menu items sold for the month = 45

Electricity consumed for the month = 1750 kWh

Average electricity consumption for a menu item = 3 kWh

The most popular menu item (highest number sold) = Chicken biryani & sold 22 packets

Food cost for the popular menu item (1 plate) = 13,90 €

Information about other menu items sold second highest = Chicken 65 & sold 8 plates.

1. For labor costs, **the labor cost pool rate = Total labor costs for a period / total number of labor hours for a period.**

Here the labor costs include salaries, wages, benefits, insurance, employer taxes, etc. As the restaurant chosen employs a temporary staff who helps when required, a clear wage or working hours is not available, but the information provided by the restaurateur is **0,125 euros per minute** which is the direct answer for the labor cost pool rate calculation.

2. **Utility cost pool rate = total amount of electricity expense for a period / total number of electric watts consumed.**

In our case, it was only electric power. Consumed power is 1750 kWh and the bill cost 250 euros. Thus, the utility cost pool rate is 250 euros / 1750 kWh = **0,086 euros / kWh**. On average, the electricity consumed by every menu item by the usage of refrigerator, freezer, stove, and other equipment is estimated to be 3 kWh. So, the price would be 3 kWh x 0,086 euros /kWh = **0,257 euros**.

Instead of applying these costs directly to every menu item, the popularity of the menu item along with this cost would give a more reasonable way of calculating utility costs (Annaraud, et al. 2008).

In the case of the menu Chicken Biryani, 22 units were sold among the total 45 units for a given period, which is $22/45 \times 100 = 48,89\%$ popularity index. Thus, the utility cost added to this particular menu item is **0,257 euros x 48,89 % = 0,13 euros**.

Likewise, the utility costs for the remaining menu items were calculated.

3. Facility-sustaining costs are a sum of other overhead costs like rent, insurance, security, marketing, repair & maintenance, administration, direct operating supplies, etc.

Facility-sustaining cost pool rate = overhead costs for a period/number of menu items sold during a period.

The facility-sustaining costs from rent, tax, insurance, license, fuel, advertisement, and administration for a month add up to 585,60 euros.

Total number of food items sold is 45. Thus, the facility-sustaining cost pool rate is $585,60 / 45 = 13,01$ euros.

With these cost pool rates in hand and other data obtained by observation, the activity-based costing method could be implemented to get accurate pricing for the menu.

To implement the activity-based costing method, two of the most sold menu items were chosen to describe in the Implementation phase. The time taken for each activity involved in the preparation of the menu item was observed at the restaurant.

In section 3, we had an example of the activity-based costing method in the manufacturing industry, where the production and non-production overhead costs multiplied with their cost pool rates and coupled with direct costs helped to calculate the price of a unit product according to the activity-based costing method. Unlike the manufacturing industry, accurate pricing of the menu can be established by activity-based costing method from the time taken for every activity multiplied by its corresponding cost pool rate, and direct food costs per unit are finally added.

6.1.2 Pricing the menu by activity-based costing method

6.1.2.1 Bill of Activity

The list of all costs for the activities is called a bill of activity. Each menu item will have its bill of activity. From section 6.1.1. the labor cost pool rate is 0,125 euros/minute; the utility cost for the menu Chicken Biryani is 0,13 euros and facility sustaining activities cost 13 euros.

Table 10. Bill of Activity for Chicken Biryani

Activities	Resources used (minutes)	Cost pool rates (€/minutes)	Total cost (€) (Resources used x cost pool rates)
Unit-Level Activities			
Getting orders	0,50	0,125	0,063
Preparation	5,00	0,125	0,625
Cooking	20,00	0,125	2,500
Total Unit-Level Activities	25,50		3,188
Batch-Level Activities			
Preparation	5,00	0,125	0,625
Cleaning	3,00	0,125	0,375
Administrating	2,00	0,125	0,250
Total Batch-Level Activities	10,00		1,250
Product-Sustaining Activities			
Utilities	0,49	0,257	0,126
Facility-Sustaining Activities			
Food Costs			13,013
Total Costs			22,652

Since this restaurant model has only a Back-of-House activity center, there is only one Unit-Level activity that involves getting orders, preparation before cooking, and cooking activities. The time taken for each of these activities is mentioned under the resources used. As it involves manual labor work, the time taken for those activities was multiplied by the labor cost rate, that is, 0.125 euros per minute.

Batch-level activities under the Back-of-House activity center involve kitchen set-up preparation, cleaning of the kitchen, and administration work in ordering, and invoicing. Again, labor work is involved thus, the cost pool rate is the labor cost pool rate multiplied by the time taken for each activity.

Product-sustaining activities are those that involve recipe testing or re-inventing a menu item, and new menu items created each month. In this menu, rather than testing of recipe, a base material is prepared beforehand and stored in the refrigerator to use during preparation of the menu item.

Utilities are the electricity costs calculated earlier from the popularity percentage of the menu and its estimated electricity costs for a menu item (explained in section 6.1.1). Similarly, the facility-sustaining costs are calculated earlier.

Apart from those, there are direct food costs that come from the ingredients used in preparing a unit of menu item. The total cost for a plate of Chicken Biryani thus stands at **22,65 euros**. To obtain profit, the selling price of this menu item adds a mark-up percentage to the total cost.

Table 11. Bill of Activity for Chicken 65

Activities	Resources used (minutes)	Cost pool rates (€/minutes)	Total cost (€) (Resources used x cost pool rate)
Unit-Level Activities			
Getting orders	0,50	0,125	0,063
Preparation	10,00	0,125	1,250
Cooking	15,00	0,125	1,875
Total Unit-Level Activities	25,50		3,188
Batch-Level Activities			
Preparation	5,00	0,125	0,625
Cleaning	3,00	0,125	0,375
Administrating	2,00	0,125	0,250
Total Batch-Level Activities	10,00		1,250
Product-Sustaining Activities	2,00	0,125	0,250
Utilities	0,178	0,257	0,046
Facility-Sustaining Activities			13,013
Food Costs			2,500
Total Costs			20,247

Similarly, the total cost of Chicken 65 is also calculated by using the activity-based costing method. In this case, units sold are 8 out of the total menu item 45. Thus, the popularity of the menu = $8/45 \times 100 = 17,78\%$ (or 0,178). The bill of activity for this menu item is shown in **Table 11**.

The restaurant was selling these items Chicken Biryani and Chicken 65 at 13,90 euros and 12,90 euros, respectively. The management mainly focused on direct food costs, a rough estimation of labor costs for preparing a menu item, and a rough estimation of utility costs added with mark-up percentage to arrive at a competitive selling price. However, the facility-sustaining overhead costs were not distributed among the products leading to loss.



BIRYANI	
Veg Biryani	12.90€
Mushroom Biryani	12.90€
Hallal Chicken Biryani	13.90€
Halla Mutton Biryani	16.90€
800 gms biryani served with salad raita	
STARTERS (400G)	
Mushroom 65	12.90€
Chicken 65 wings	12.90€
DOSA MENU (2PCS+2 CHUTNEYS)	
WELCOME FIRST 20 ORDERS	
Ghee Dosa	12.90€
Ghee Masala Dosa	14.90€
Ghee Spicy Dosa	12.90€
ORDER AND PARTICIPATE IN THE RAFFLE	

Figure 12. Selling price list of the restaurant

Through the activity-based costing method, the bill of activity for other menu items was calculated and all the results showed the total cost to be around 20 euros which is higher than the selling price obtained from the current costing method (**10.2 Appendix II**). Thus, the activity-based costing method is very efficient in calculating the total cost for a product or menu item.

After implementing the activity-based costing, menu engineering can be done. Menu engineering is an important application to classify the menu item on the profit vs. popularity scale. It also helps to compare the classification of menu items between the current selling price reached by the traditional costing method and the accurate cost calculated from the activity-based costing in the next chapter.

7 Post-Implementation Phase

An important application of the activity-based costing method that gives an accurate cost for menu items is Menu Engineering. It is a tool to improve profits and understand the performance of the restaurant.

7.1 Menu Engineering

When the menu price is accurate, menu engineering will help to distinguish between profitable and non-profitable menu items. Menu engineering helps the management to take action on the menu item bringing losses to the restaurant. Menu engineering requires more time as more data provides accurate results. It also needs a skilled person to perform menu engineering (Gyaan, n.d).

To understand how it is done, some basics are to be described. In 1980, Miller created the first model known as the Menu Analysis Model which defines food based on popularity and production cost. Later, Kasavana and Smith in 1982 replaced Miller's production cost with contribution margin and established this menu matrix model which is still popularly used.

Menu engineering categorizes menu items into four types. The pictorial representation of the menu engineering matrix is shown below:

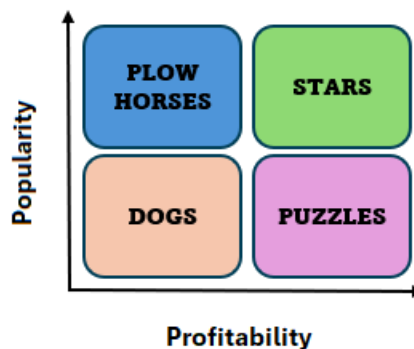


Figure 13. Menu Matrix categories (adapted online)

It is a chart with an X-axis representing the profitability of the menu item and a Y-axis representing the popularity or the number of sold menu items.

Category 1: Stars – High Profitability & High Popularity

The menu item that falls under this category means that the menu is doing good in the business and no changes are required.

Category 2: **Puzzles – High Profitability & Low Popularity**

The menu item under this category may need promotions or advertisements or make it appetizing.

Category 3: **Plowhorses – Low Profitability & High Popularity**

Despite being popular, if the menu does not bring profits, then it could be over-priced. Re-launching the menu with some changes would help. Reducing the portion size would be beneficial.

Category 4: **Dogs – Low Profitability & Low Popularity**

A menu item under this category must be either re-invented or removed to avoid losses.

Thus, menu engineering provides valuable information about the menu items and customers' demands. Removing non-profitable menu items can help to avoid losses on unwanted food costs or food materials and divert the resources to a profitable menu item.

7.2 Classifying the menu item from its Contribution Margin & Menu mix

With the food cost and selling price data collected for the restaurant, **Table 12** is prepared listing the menu items, number of units sold in a month, menu mix % (otherwise called popularity %), and Item contribution margin.

The table gives clear information on how to reach those figures. In brief, it is described below,

Menu mix % = number of units sold / total number of units sold (in a month) (in %)

Food Cost = cost of raw materials used in the preparation of one unit of a menu (say menu A1),

whereas **Menu Cost** is Food cost multiplied by the number of menus (A1) sold (Food cost x no. of units of a menu item sold).

The **selling price** is the price at which a unit of menu item (A1) is sold by the restaurant, and

Menu Revenue is the Selling price multiplied by the number of A1 sold (Selling price x no. of units of a menu item sold).

Item contribution margin = Selling price – Food cost, and

Menu Item contribution margin = (Selling price – Food cost) x number of units of a menu item sold (A1).

When these are calculated for all selected menu items, the sum of all Menu item contribution margins and the average contribution margin are obtained.

Average contribution margin = Sum of all menu item contribution margin/number of total menu units sold.

From the Item contribution margin and Average contribution margin, we can classify the menu item as 'High' or 'Low' on the profit scale (i.e. **Contribution margin category**).

If the Item contribution margin (of a menu) is greater than the Average contribution margin, then it is considered to be profitable and vice versa.

Now to classify the menu item based on popularity, i.e. **Menu Mix category**, **Item percentage** is calculated.

Item percentage = $1/\text{number of menu items chosen for the study} \times 70\%$

In this study 7 menu items were selected to implement activity-based costing, thus

Item percentage = $1/7 \times 70\% = 10\%$.

To obtain a realistic value, 70% is used traditionally (Kasavana, & Smith, 1982). Some restaurants could use 100% which is decided by the managers.

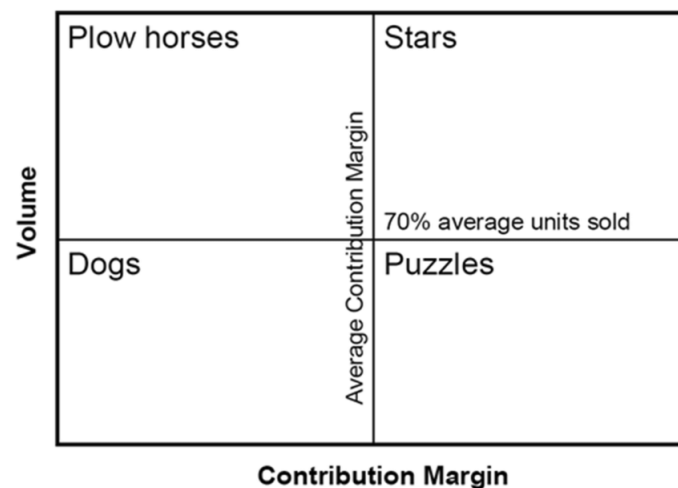


Figure 14. Kasavana-Smith model
(adapted online)

The **menu mix category** is now done by comparing the Menu mix % and Item percentage. If the Menu mix % is greater than the Item percentage, then it is considered to be 'High' on the popularity scale, otherwise considered 'Low'.

From the classifications made for the Contribution Margin category (Profit scale) and Menu mix category (Popularity scale), the menu items are classified as STARS, PUZZLES, PLOWHORSES, or DOGS as represented in the Menu matrix (Figure 13).

By understanding where the menu item falls in the matrix the management can act accordingly to engineer its menu list and sales profit. **Table 12 & Table 13** represent the Menu matrix classification of the items from the data obtained from the traditional costing method and activity-based costing method.

Table 12 shows that only one of the menu items Chicken Biryani falls under the category STARS, Chicken 65 is classified as PLOWHORSE, Mushroom Biryani, and Mutton Biryani are classified as PUZZLES, with the remaining items falling under the category DOGS.

The restaurateur charges 2 euros for every delivery to the customer. Adding 2 euros to the current selling price did not bring any change to the classification of menu items.

Table 13 classified the menu items differently based on the costs calculated by implementing the activity-based costing method. With this method all menu items show high profit and based on their popularity, both Chicken Biryani and Chicken 65 were classified as STARS, and the remaining menu items as PUZZLES. There is no menu item under the category DOGS.

Remember, the activity-based costing method provided only the accurate cost of the menu items, and only those figures are used in **Table 13** without any markup costs added or suggested to reach the profitable selling price. Similarly, if the restaurateur still wishes to charge 2 euros for delivery after implementing the ABC model, a rough estimation of the fuel consumption for delivery within an average radius of 5 Km costs 0,46 euros, and an approximate 10 min activity of labor to drive with a labor cost pool rate of 0,125 min costs 0,125 euros/min x 10 min = 1,25 euros. The total delivery cost would be = 1,25 + 0,46 euros = 1,71 euros. This additional delivery charge also brings a very small amount of profit. The delivery costs stay constant for any menu item, but the information on delivery charges and distance covered to deliver is not stable during the study period, thus this part of the activity is omitted in the total cost calculation. In the future, it could be easily added under the administration activity and utility fuel activity. The tables below clearly show the differences in categorizing the menu items based on the selling price obtained by the traditional costing method and the costs calculated through the activity-based costing method.

Table 12. Menu engineering from the selling price and Food costs obtained by the Traditional Costing method

Menu items	Sold in April (number sold)	Menu Mix % (no. of units sold/ total no. of items sold) %	Food cost	Sales price	Item Contribution Margin (Sale price - Food cost)	Menu Cost (Food cost x No. of units sold)	Menu Revenues (Sales price x No. of units sold)	Menu Contribution Margin (Item Contribution Margin x no. of units sold)	Contribution Margin category (If Item contribution margin > average contribution margin then 'High' otherwise 'Low')	Menu Mix category (If Menu Mix % > Item % then 'High' otherwise 'Low')	Class
1 Chicken Biryani	22	49 %	3,2	13,90	10,70	70,4	305,8	235,4	High	High	STARS
2 Mushroom Biryani	4	9 %	3	13,90	10,90	12	55,6	43,6	High	Low	PUZZLES
3 Vegetable Biryani	3	7 %	2,6	12,90	10,30	7,8	38,7	30,9	Low	Low	DOGS
4 Chicken 65	8	18 %	2,5	12,90	10,40	20	103,2	83,2	Low	High	PLOW HORSES
5 Mushroom 65	3	7 %	3	12,90	9,90	9	38,7	29,7	Low	Low	DOGS
6 Dosa	3	7 %	2,4	12,90	10,50	7,2	38,7	31,5	Low	Low	DOGS
7 Mutton Biryani	2	4 %	4	16,90	12,90	8	33,8	25,8	High	Low	PUZZLES
Total	45							480,1			

Average Contribution Margin = total Menu Contribution Margin / total no. of units sold

Average CM = **10,67**

Item percentage = 1 / total no. of items in the list x 70 %

Item percentage = **10,0 %**

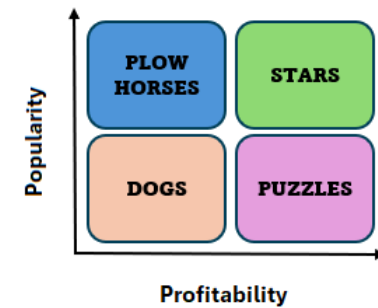


Table 13. Menu engineering from Food costs and Menu total costs calculated with the Activity-Based Costing method

Menu items	Sold in April (number sold)	Menu Mix % (no. of units sold/ total no. of items sold) %	Food cost	Sales price*	Item Contribution Margin (Sale price - Food cost)	Menu Cost (Food cost x No. of units sold)	Menu Revenues (Sales price x No. of units sold)	Menu Contribution Margin (Item Contribution Margin x no. of units sold)	Contribution Margin category (If Item contribution margin > average contribution margin then 'High' otherwise 'Low')	Menu Mix category (If Menu Mix % > Item % then 'High' otherwise 'Low')	Class
1 Chicken Biryani	22	49 %	3,2	22,65	19,45	70,4	498,3	427,9	High	High	STARS
2 Mushroom Biryani	4	9 %	3	19,73	16,73	12	78,92	66,92	Low	Low	DOGS
3 Vegetable Biryani	3	7 %	2,6	19,76	17,16	7,8	59,28	51,48	Low	Low	DOGS
4 Chicken 65	8	18 %	2,5	20,25	17,75	20	162	142	Low	High	PLOWHORSES
5 Mushroom 65	3	7 %	3	20,09	17,09	9	60,27	51,27	Low	Low	DOGS
6 Dosa	3	7 %	2,4	17,49	15,09	7,2	52,47	45,27	Low	Low	DOGS
7 Mutton Biryani	2	4 %	4	21,46	17,46	8	42,92	34,92	Low	Low	DOGS
Total	45							819,76			

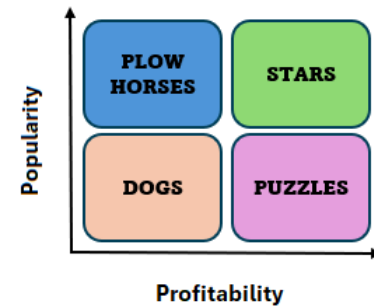
*These are the menu item cost calculated using ABC method, no mark-up percentage added

Average Contribution Margin = total Menu Contribution Margin / total no. of units sold

Average CM = **18,14**

Item percentage = 1 / total no. of items in the list x 70 %

Item percentage = **10,0 %**



7.3 Turbulent Market Situations

The previous year, 2023 was much affected by inflation globally and the inflation rate was in different percentages in different countries. In section 2.2 few current situations of inflation in Finland, in 2024 are covered. Inflation is simply, the rise of general prices in an economy. All product prices rise during inflation, and thus cost of living is higher.

All industries are affected by inflation and worse was felt with restaurant/food industries. Restaurant industries are known to have tight profit margins, when food prices, electricity, and labor wages increase due to inflation, the existing smaller profit is drastically affected.

Rising menu prices impact customer relationships negatively and if benefits for laborers are avoided, then the chances of losing skilled laborers are high. Many times inflation is caused by low agricultural production due to weather changes or severe supply chain disruption. Due to the burden of an increase in food prices, restaurants have to increase menu prices that might drive away customers.

7.4 Handling Costs during Turbulent Market Situations

Among all the costs incurred by a restaurant, food costs are the ones that can be controlled to some extent by proper management.

A few critical approaches known (White, J. 2023) when management intends to reduce food costs are,

1. Menu Engineering

This topic was explained in the previous section 7.1. Menu engineering helps to understand the performance of the restaurant from sales data, item popularity, and customer demand. Re-inventing, re-branding, or removing the menu items as per the results of menu engineering will help the management to control or reduce unwanted food costs.

2. Procurement

To avoid major supply chain disruptions, it is always a good idea to procure raw materials/food items from local suppliers or farmers as much as possible. This method benefits each others' business and minimizes transportation charges.

3. Inventory management

Efficient inventory management is a must criterion as food wastage brings big losses that are avoidable. It is beneficial to buy large quantities of products that have long shelf-life but storing large quantities of less shelf-life products must be avoided.

Another factor to keep in mind is, rather than purchasing cheap priced low-quality raw materials, buying medium or premium priced good quality food items will save money from losses of spoiled or damaged food items example, vegetables, and fruits.

When it comes to inventory management it is advisable to strictly follow the First-in-First-Out (FIFO) method of stocking food materials, so that the food items closer to the expiry date are used first and the new products are stored behind for future use.

First In, First Out (FIFO) Method



Figure 15. First In, First Out Model (FIFO)
(adapted online)

4. Supplier negotiation

Building strong supplier partnerships helps to negotiate discounts, payment dates, and much more. Negotiation with suppliers on large orders could help to get attractive pricing (Dzierlatka, 2024).

5. Energy efficiency

Repair and maintenance of old equipment or buying new equipment are equally important to avoid large energy consumption. Installing low-energy and efficient lighting in the restaurant helps to lower energy consumption (Dzierlatka, 2024).

6. Labor optimization

Depending on the demand for work, adjusting labor power helps to manage labor costs. Cross-training of staff for multiple jobs improves operational efficiency. If there are materials that can be sourced elsewhere for a better quality and cheaper price, outsourcing certain tasks or pre-made ingredients

will save time and money which in turn improve labor efficiency by getting the most out of the labor costs.

7. Consistent food portion

Consistent food portions across all menu items can manage to provide uniform service to customers and the portion size manages food expenses and wastage as well.

8. Waste management

Waste removal costs can be minimized by using composites and recycling certain materials (Dzierlatka, 2024).

With these possible approaches and periodic updates of the activity-based costing system with changes in food prices, supply, and market demands, actions for cost reduction could be made. With periodic menu engineering updates, the performance of the sales could make the management use the resources efficiently and avoid unwanted expenses.

7.5 Exploring activity-based costing in emerging restaurant models

Activity-based costing method gaining more attention in different sectors of business as it gives the true cost for a product or service. Thus, the ABC can be explored in all restaurant models.

Restaurant models are continuously emerging and are becoming more and more online. Recently, three online models among the other restaurant models have become popular and those are Cloud Kitchens (Ghost Kitchens), Online food aggregators, and virtual restaurants (Deliverect, 2023). All these are connected to the customers through digital platforms, they do not need physical dining space, and ordering the food of choice is done online and delivered to the customers. Activity-based costing methods on all these restaurant models are possible and like other restaurant models, cost reduction, efficiency, and profits can be tuned by understanding the performance of the business.

Apart from that, activity-based costing method in delivery platforms helps management to decide on the strategy of delivery, like direct delivery to customers, outsourcing to a third party, or in-store pickups. ABC method is already implemented in logistics sectors, thus implementing the ABC method on different types of delivery platforms is possible. It provides information on the precise cost of each activity involved in providing services. Choosing the prices differently between peak hours and non-peak hours, daytime delivery vs evening delivery, urban area deliveries vs rural area deliveries, choosing the best delivery vehicle and delivery routes, and use of third-party platforms like Foodora and Wolt can be analyzed with the help of activity-based costing method.

7.6 Key Performance Indicators (KPI)

The scope of activity-based costing methods is wide in restaurant models and beneficial. The KPI from a business perspective by implementing the activity-based costing method are:

- Clear understanding of activity centers, and homogenous cost pools.
- Understanding the customers' demand and performance of the business.
- Differentiating profitable and non-profitable products.
- Ways to reduce costs are visible.
- Informed decision on pricing strategy.
- Handling of dynamic environment is feasible by understanding the business costs and performances.
- Setting the right selling price when expanding the business.
- Collaboration with suppliers, and delivery platforms.
- Providing services as per customers' diet restrictions and staying competitive.
- Improved customer satisfaction.

8 Discussion and Conclusion

8.1 Reliability, Validity and Ethicality

Qualitative data cannot be quantified and thus validity comes into play to establish the data. Validity relates to the appropriateness of research value, tools & techniques, processes, and data collection (Mohamad, 2015).

To further add, validity means to answer whether the research question(s) is valid for the desired outcome, whether the choice of methodology is suitable to answer the research question(s), whether sampling and data analysis are appropriate, and whether the results are valid for the context.

In this work, qualitative data is the methodology adapted to collect data and it is the most suitable choice for this study. Though the sample size is small, the interviewee is the responsible and reliable candidate for this study. The interview gives information to understand the views and opinions of the restaurateur in the business model. The interview recorded was transcribed without imposing the author's ideology or opinion. Also, the observation made which is another form of qualitative data is the appropriate method to collect the information required to arrive at the results. The data collected to perform costing calculations were verified by the restaurateur. The validity of the work is established as the methodology chosen arrived at the results reinforcing the answers to the research questions.

The reliability of quantitative research means the replicability of processes and results. In qualitative research, reliability means consistency (Grossoehme, 2014). There are a few techniques to establish reliability in qualitative research and two among those are the use of tables to record data, constant testing, and comparison of data. The thesis work involves several tables of data collected and results supporting the research questions.

The research must follow Responsible Conduct of Research (RCR) to be ethically acceptable, reliable, and credible. Research ethicality has to safeguard participants' rights and dignity. In this work, research ethics are followed throughout the process. The data was collected with proper consent from the participant and the personal information of the participant is kept confidential. To avoid plagiarism all sources obtained from research articles to online sources, are cited in the thesis work. The results were reported accurately as obtained.

8.2 Answering Research Questions

With the pre-implementation, implementation, and post-implementation phases of the activity-based costing research work done, it is time to look back at the research questions mentioned at the beginning of the work and to clarify whether those research questions have answers in the work done so far.

Research Question 1: What are the steps to implement the activity-based costing method?

The author of the thesis was introduced to the topic of activity-based costing for the research work. Hence, understanding the concepts of the costing method, terms used in the activity-based costing method, and their meanings was done through literature reading, that is, through scientific articles and online websites. In particular to the restaurant businesses, a few articles were of great help in understanding the restaurant model, requirements to implement the activity-based costing method, and factors affecting the allocation of costs. With these as a starting point, a deeper search of the literature for every important concept of ABC was done. Some case study examples in the literature gave a clear picture of the types of data required and how those data are used in allocation. This stood as a base to start writing the thesis. Revisiting the sections 5 and 6 in this work explains the steps involved to implement the activity-based costing method.

Research Question 2: How to identify the activity drivers and establish the cost pools?

The overview of the activity-based costing method in section 3 has a literature example to understand how the cost allocations are done. The cost drivers and cost pools are explained in that example. A business with several activity centers would involve a complicated allocation system, but the preliminary example written in section 3 is of great help to the author (myself) in learning the activity-based costing method.

For a restaurant business, the activity center, and cost pools are different than other business sectors and to understand that, the pre-implementation phase of the work (section 5) describes more about the restaurant model suitable for this work. The activity center, cost drivers, and cost pools are identified in section 5.

Research Question 3: How to utilize the data to calculate the price of menu items based on the activity-based costing method?

Section 6 of this work, which is the implementation of the activity-based costing method presents how activities are captured during the observational data collection phase and the cost pool rate calculated earlier arrives at the cost for every activity involved in an activity center. The utility cost and the

overhead costs were allocated to the menu item through calculations explained earlier. Adding all the costs together with direct food costs reaches a reasonable menu item cost. The differences between traditional and activity-based costing in arriving at the menu item cost show the robustness of the activity-based costing method.

Research Question 4: How to benefit despite the market changes and inflation?

To answer this question, section 7 of the work explains menu engineering which is a valuable application after calculating the menu item cost through the activity-based costing method.

The approaches to reduce costs are also explained in section 7.4. Together with menu engineering and other cost control approaches, cost reduction is possible, and running a business without suffocation in a dynamic environment is feasible.

Research Question 5: What could be the benefit of this costing method in the future?

With emerging restaurant models and the use of technologies, the overhead costs, direct costs, and mode of operation will change. But, by understanding the business model, and its pricing strategy, activity-based costing can be employed to calculate accurate menu item costs (briefed in sections 7.5 and 7.6). Thus, management can make clear decisions to realize the benefits of utilizing the activity-based costing method.

8.3 Limitations of the thesis work

There are a couple of limitations on the scope of the work to establish the flexibility of the implementation. Firstly, as the thesis work focuses on the data collected from a particular restaurant, the scope is limited to sampling and relies only on the qualitative data collected from the restaurateur. Thus, the result may not fully represent all professionals in this field and the scope is limited to one business model.

Secondly, the work is conducted within a short period and the flexibility of the implemented system cannot be studied when the management expands its operation with different strategies. The total cost of the menu items was calculated only based on the current restaurant model and is subjected to changes with changes in the restaurant model.

8.4 Future Recommendations

The study focused mainly on implementing the activity-based costing method with the data obtained from the restaurant and outlined how menu engineering could be used to study the performance of the business. Applying the activity-based costing method on its delivery platform was not studied here. Though it is a smaller part when compared to the restaurant activities, the study on the activities involved with delivery, the resources involved, and the cost pool rate is significant to further improve management decisions on pricing strategy. In the future, a study on this part of the same business sector is recommended to provide a bigger picture of the cost allocation model. A comparative study on the costs of the menu items between a fast-casual restaurant model and an emerging restaurant model for example the Ghost Kitchen model is recommended as it could help the management to decide on the type of restaurant model to implement if the customer demand allows.

8.5 Conclusions

The thesis work further demonstrates the need for a more sophisticated activity-based costing method as a reliable tool to calculate the accurate costs of the products. The results obtained helped to point out the deviations observed between activity-based costing and traditional costing methods. To fix the right selling price, the need to use the right costing method at the beginning of the launching of a product or service is thus very crucial.

The thesis topic is highly motivating and a clear learning tool for the author to study both accounting and activity-based costing method concepts. It is very interesting to see how the activity-based costing method considers all activities involved in producing a product with even a negligibly small activity being left unnoticed.

9 References

- Alnasur, S. (2024). How to Calculate Food Cost in 2024 (The ultimate guide with examples). Retrieved from <https://restaurant.eatapp.co/blog/how-to-calculate-restaurant-food-cost>.
- Baxendale, S. J., & Dombusch, V. (2000). Activity-based costing for a hospice. *Strategic Finance*, 81(9), 64-71.
- Beheshti (2004). An empirical analysis of manufacturing overhead cost drivers. *Journal of Accounting and Economics*, 19, 115-137.
- Ben-Arieh, D., & Qian, L. (2013). Activity-based cost management for design and development stage. *International Journal of Production Economics*, 83, 169-183.
- Carolfi, I. A. (1996). ABM can Improve Quality and Control Costs. *Cost and Management*, May: 12-16.
- Clarke, P., & Mullins, T. (2001). Activity-based costing in the non-manufacturing sector in Ireland: A preliminary investigation. *Irish Journal of Management*, 22(2), 1-18.
- Cooper, R., & Kaplan, R. S. (1988). Measure Costs Right: Make The Right Decisions. *Harvard Business Review*, 66, 96-103.
- Davis, T. R. V., & Darling, B. L. (1996). ABC in a virtual corporation. *Management Accounting*, 78(4), 18-24.
- Dolgui, A., & Proth, J. M. (2010). Pricing strategies and models. *Annual Reviews in Control*, 34, 101-110.
- Drury, C. R., & Tayles, R. S. (2005). Profit priorities from activity-based costing. *Harvard Business Review*, 3, 130-135.
- Dzierlatka, J. (2024, April 25). 20 Tips to Reduce Restaurant Costs & Expenses (Real Examples). Upmenu. Retrieved from <https://www.upmenu.com/blog/restaurant-costs/>.
- Food Industry Trends 2023: How Restaurants' Business Models Need to Change to Succeed. *What does the future of restaurants look like?*. Deliverect, 2023. Retrieved from

<https://www.deliverect.com/en/blog/trending/food-industry-trends-2023-how-restaurants-business-models-need-to-change-to-succeed>.

Food price inflation shows sign of stabilization – Rose 9 % in the previous year. (2024, January 15).

Helsinki Times. Retrieved from <https://www.helsinkitimes.fi/finland/finland-news/domestic/24754-food-price-inflation-showing-signs-of-stabilization-rose-9-in-the-previous-year.html>.

Grossoehme, D, H (2014). Overview of qualitative research. *Journal of Health Care Chaplain*, 20(3), 109–122.

Harris, P., & Brown, B. (1998). Research and development in hospitality accounting and financial management. *Hospitality Management*, 17, 161-181.

Hayes, D., & Miller, A. (2011). *Revenue Management for the Hospitality Industry*. John Wiley & Sons. Canada.

Huang, S. Y., Chen, H. J., Chiu, A. A., & Chen, C. P. (2014). The application of the theory of constraints and activity-based costing to business excellence: The case of automotive electronics manufacture firms. *Total Quality Management and Business Excellence*, 25(5-6), 532-545.
<https://doi.org/10.1080/14783363.2013.820023>.

Huefner, R. (2011). *Revenue Management: A path to increased Profits*. First Edition. Business Expert. New York.

IBISWorld (2024). Restaurants & Takeaway Food Operators in Finland: *Industry Statistics 2011-2028*. Retrieved from <https://www.ibisworld.com/finland/industry-statistics/restaurants-takeaway-food-operators/3420>.

Kaplan, R. S., & Cooper, R. (1998). *Cost & effect: Using integrated systems to drive profitability and performance*. Boston: Harvard Business School Press.

Kasavana, M. L., Smith, D. I. (1982). *Menu engineering: A practical guide to menu analysis* (1st ed.). Okemos, MI: Hospitality Publications.

- Katana (2024). Costing methods and the importance of choosing the correct one. Retrieved from <https://katanamrp.com/costing-methods/>.
- Kimes, S. E., & Chase, R. B. (1998). The strategic levers of yield management. *Journal of Service Research*, 1 (2), pp. 156–166. doi: <https://journals.sagepub.com/doi/10.1177/109467059800100205>.
- Lymar, V., & Gumeniuk, O. (2019). Management of Food Cost in Restaurant Business. *Economics and Organization of Management*, 3 (35), 146-154.
- Martin, J. R. (2016). Activity-Based Product Costing. *Management Accounting: Concepts, Techniques & Controversial Issues*. Chapter 7.
- Mashayekihi, B., & Ara, M. (2017). Activity-Based Costing in the Hospitality Industry: A Case Study in a Hotel. *International Journal of Social and Business Sciences*, 11 (9), 2254-2258.
- MBAbullshitDotCom (2013, October 29). *3 Minutes! Activity Based Costing Managerial Accounting Example (ABC Super Simplified)* [Video]. YouTube. <https://www.youtube.com/watch?v=ivlI0HvUPQo>.
- Mill, R. C. (2007). *Restaurant Management: Customers, operations, and employees*. Pearson Publishing Limited. Third Edition.
- Miller, J. (1980). *Menu pricing and strategy*. Boston, MA: CBI Books.
- Mohamad, M.M., Sulaiman, N. L., Sern, L.C., Salleh, K. M. (2015). Measuring the Validity and Reliability of Research Instruments. *Procedia - Social and Behavioral Sciences*, 204, 164-171. doi: 10.1016/j.sbspro.2015.08.129.
- Nagle, T., & Muller, G. (2018). *The strategy and tactics of pricing: a guide to growing more profitability*. Sixth Edition. Routledge. New York.
- Pavlatos, O. (2009). Activity-based costing in the hospitality industry: Evidence from Greece. *Journal of Hospitality and Tourism Research*, 33, 511-527.
- Pritha, B. (2023). Data collection: Definition, Methods & Examples. Retrieved from <https://www.scribbr.com/methodology/data-collection/>.

- Raab, C., & Mayer, K. J. (2003). Exploring the Use of Activity-Based Costing in the Restaurant Industry. *International Journal of Hospitality & Tourism Administration* 4.2, 79–96.
- Raab, C., & Mayer, K. (2004). Exploring the use of activity-based costing in the restaurant industry. *International Journal of Hospitality and Tourism Administration*, 4, 79-96.
- Raab, C., & Mayer, K. (2007). Menu engineering and activity-based costing-can they work together in a restaurant? *International Journal of Contemporary Hospitality Management*, 19, 43-52.
- Raab, C., Mayer, K., & Shoemaker, S. (2009). Menu engineering using activity-based costing: An exploratory study using a profit factor comparison approach. *Journal of Hospitality and Tourism Research*, 34, 204-224.
- Raab, C., Mayer, K., Shoemaker, S., & Ng, S. (2009). Activity-based pricing: Can it be applied in restaurants? *International Journal of Contemporary Hospitality Management*, 21, 393-410.
- Raab, C., Shoemaker, S., & Mayer, K. (2007). Activity-based costing: A more accurate way to estimate the costs for a restaurant menu. *International Journal of Hospitality and Tourism Administration*, 8, 1-15.
- Saeed, A. M. M., Widyaningsih, A., & Khaled, A. S. D. (2023). Activity-Based Costing (ABC) in the Manufacturing Industry: A Literature Review. *JDE (Journal of Developing Economies)*, 8(2), 261-270.
- Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students*. 6th ed. Pearson Education. Harlow.
- SavorEat, (2022). How to Leverage Competitive Analysis to Beat Competition in the Food Industry. Retrieved from <https://savoreat.com/how-to-leverage-competitive-analysis-to-beat-competition-in-the-food-industry/>.
- SavorEat, (2022). Restaurant Operations Management: Today's Challenges and Solutions. Retrieved from <https://savoreat.com/restaurant-operations-management-todays-challenges-and-solutions/>

- Schmidt, M. (n.d.). How to Use Activity-Based Costing (ABC). *Business Encyclopedia*. Retrieved from <https://www.business-case-analysis.com/activity-based-costing.html#contentslist>.
- Shakti, V., & Vaidya, D. (2023). Value-based pricing. Retrieved from <https://www.wallstreetmojo.com/value-based-pricing/>.
- Singh, D. (1999). Design of Activity-Based Costing in a Small Company: A Case Study. *Computers & Industrial Engineering*, 37, 413-416.
- Sy, A. G. (2021). Market Based Pricing: A. useful and easy guide to pricing strategy. Retrieved from <https://www.sortlist.com/blog/market-based-pricing/>.
- Tablein, (2023). Top Restaurant Management Challenges (and Solutions). Retrieved from <https://www.tablein.com/blog/restaurant-management-challenges>
- Teivainen, A. (2024, March 22). HS: Restaurants in Helsinki are in dire straits. March 2024. *Helsinki Times*. Retrieved from <https://www.helsinkitimes.fi/business/25025-hs-restaurants-in-helsinki-are-in-dire-straits.html>.
- Trading Economics. (2024, March). Finland Food Inflation. *Statistics Finland*. Retrieved from <https://tradingeconomics.com/finland/food-inflation>.
- White, J. (2023). Rising Costs: The Impact of Inflation on Restaurants. Retrieved from <https://www.gotenzo.com/resources/insight/rising-prices-the-impact-of-inflation-on-restaurants/>.

10 Appendices

10.1 Appendix I Qualitative data

The qualitative data collected by a semi-structured interview with the restaurateur of the restaurant is presented below. Since the interviewee and the restaurateur are the same person, the term 'restaurateur' is continued in presenting the interview answers.

1. How long have you been in this industry and what made you choose this business?

The restaurateur started the restaurant business 7 months back. He was working with Foodora and Wolt and got interested in working more with the restaurant industry as it was in his opinion a profitable business.

2. What are your responsibilities?

The restaurateur currently handles all parts of work in the restaurant starting from getting orders from customers, purchasing raw materials & ingredients, accounting job, cooking, cleaning, delivering food to customers, and other administrative work. When required the temporary staff helps with kitchen work.

3. What are the services you provide?

The restaurateur is glad to provide good food to customers and provides catering services for business events, party events, and other related events.

4. Does customer demand impact the pricing of a menu?

The customer feels that the food provided by his restaurant is cheaper than the ones from the city centre and the restaurateur considers it to be good to attract more customers.

5. How do you price your menu items?

The pricing is done by the classical method by considering the food costs per plate and adding operating costs. The restaurateur gets materials from retail shops to control the purchase cost of ingredients.

6. How often do you change the price of menu items?

Once in 3 months the restaurateur updates the grocery prices and decides on the selling price of menu items.

7. What challenges do you face day to day in this business in a dynamic environment?

The main challenge is from prices of menu items provided by competitive restaurants. Secondly, delivery of food to customers is challenging especially during cold winters due to poor road conditions and fewer people working with delivery platforms during winter. This affects the prompt delivery of warm food to customers. Also supply chain in winter is slightly affected which in turn affects the availability of fewer ingredients, especially vegetables.

8. How do you think inflation has affected your business and customer demand?

Customers order more during the beginning of the month as their resources are in a good state and the number of orders towards the end of the month decreases. Also, the customers' orders have a different pattern during seasonal times. The restaurateur feels that at the beginning of December, the orders are fewer as people save money for Christmas and later they spend more on ordering food items around Christmas and New Year. Then again, by the middle of January, the number of orders drop distinctly.

9. How do you plan to overcome the challenges during inflation or other critical periods?

The restaurant has loyal customers and the restaurateur places 'rolling advertisements' of the restaurant's menu items on social media so that the customer can come across his restaurant advertisement more often. This way the customers are reminded about the restaurant and its menu items.

10. How do you plan to use the technology to reach more customers?

The restaurateur uses social media like Facebook, WhatsApp groups, and Instagram to advertise his restaurant. Apart from these, digital banners are also used in the city center. The digital banners are usually used by global or national food chain companies like McDonald's, Subway, and Hesburger. Classical advertisements through radio and television are also planned as it reaches more people in Finland.

Delivery platforms used by the restaurant are self-delivery, third-party delivery through Foodora and Wolt, and in-store pick-up.

11. What do you think of this research work as you have already seen the cost calculations made for your menu items?

The restaurateur does not know exactly about the costing method but has seen the cost calculation of ingredients and overhead costs used for analysis. According to the restaurateur, the ingredient prices change based on market conditions and the research findings might show high or low cost relative to their selling price and will take in mind price adjustments and cost-saving measures.

According to the restaurateur, Cost data is in an understandable and actionable format, and graphs, and charts tell more clearly the usage for future analysis.

12. How well your restaurant can adapt to this new costing method?

The restaurateur is willing to adapt to the new costing method after a pilot test before full-scale implementation. Also consciously consider setting up new metrics to evaluate the effectiveness of the new costing method.

13. Can you comment on how this research work is beneficial to your current restaurant business model and for future business models?

The restaurateur readily accepted to carry out the research work as adapting to a new costing method can be highly beneficial for his business. The restaurateur further elaborated that the benefit expected for the current business would be to improve accuracy, enhance efficiency, cost control, and better pricing strategies. For his future business, the benefits could be in deciding on scalability, strategic planning, innovation and adaptability, long-term sustainability, and competitive advantage.

10.2 Appendix II Bill of Activity for other menu items using Activity-Based Costing method

The utility charges for different menu items were calculated based on their popularity index and the resources used for each activity were taken into account to calculate the accurate cost for the menu items using the activity-based costing method.

utility: average charge for any dish	0,257	euros
Mushroom biryani sold in April	4	
No. of menu items sold in April	45	
Popularity index of menu	(no. of menu 1 sold/total sales no)	in percentage
	8,89	%

calculated utility charge for Mushroom biryani 0,023 euros

utility: average charge for any dish	0,257	euros
Vegetable biryani sold in April	3	
No. of menu items sold in April	45	
Popularity index of menu	(no. of menu 1 sold/total sales no)	in percentage
	6,67	%

calculated utility charge for Vegetable biryani 0,017 euros

1. Bill of activity for Mushroom biryani

Activities	Resources used (minutes)	Cost pool rates (€/minutes)	Total cost (€)
Unit-Level Activities			
Getting orders	0,50	0,125	0,063
Preparation	4,00	0,125	0,500
Cooking	15,00	0,125	1,875
Total Unit-Level Activities	19,50		2,438
Batch-Level Activities			
Preparation	5,00	0,125	0,625
Cleaning	3,00	0,125	0,375
Administrating	2,00	0,125	0,250
Total Batch-Level Activities	10,00		1,250
Product-Sustaining Activities	0,00	0,125	0,000
Utilities	0,089	0,257	0,023
Facility-Sustaining Activities			13,013
Food Costs			3,000
Total Costs			19,724

2. Bill of activity for Vegetable Biryani

Activities	Resources used (minutes)	Cost pool rates	Total cost (€)
Unit-Level Activities			
Getting orders	0,50	0,125	0,063
Preparation	7,00	0,125	0,875
Cooking	15,00	0,125	1,875
Total Unit-Level Activities	22,50		2,813
Batch-Level Activities			
Preparation	5,00	0,125	0,625
Cleaning	3,00	0,125	0,375
Administrating	2,00	0,125	0,250
Total Batch-Level Activities	10,00		1,250
Product-Sustaining Activities	0,50	0,125	0,063
Utilities	0,067	0,257	0,017
Facility-Sustaining Activities			13,013
Food Costs			2,600
Total Costs			19,755

utility: average charge for any dish	0,257	euros
Dosa sold in April	3	
No. of menu items sold in April	45	
Popularity index of menu	(no. of menu 1 sold/total sales no)	in percentage %
	6,67	
calculated utility charge for Dosa	0,017	euros

utility: average charge for any dish	0,257	euros
Mutton Biryani sold in April	2	
No. of menu items sold in April	45	
Popularity index of menu	(no. of menu 1 sold/total sales no)	in percentage %
	4,44	
calculated utility charge for Mutton Biryani	0,011	euros

3. Bill of activity for Dosa

Activities	Resources used (minutes)	Cost pool rates (€/minutes)	Total cost (€)
Unit-Level Activities			
Getting orders	0,50	0,125	0,063
Preparation	3,00	0,125	0,375
Cooking	3,00	0,125	0,375
Total Unit-Level Activities	6,50		0,813
Batch-Level Activities			
Preparation	5,00	0,125	0,625
Cleaning	3,00	0,125	0,375
Administrating	2,00	0,125	0,250
Total Batch-Level Activities	10,00		1,250
Product-Sustaining Activities	0,00	0,125	0,000
Utilities	0,067	0,257	0,017
Facility-Sustaining Activities			13,013
Food Costs			2,400
Total Costs			17,493

4. Bill of activity for Mutton Biryani

Activities	Resources used (minutes)	Cost pool rates (€/minutes)	Total cost (€)
Unit-Level Activities			
Getting orders	0,50	0,125	0,063
Preparation	5,00	0,125	0,625
Cooking	20,00	0,125	2,500
Total Unit-Level Activities	25,50		3,188
Batch-Level Activities			
Preparation	5,00	0,125	0,625
Cleaning	3,00	0,125	0,375
Administrating	2,00	0,125	0,250
Total Batch-Level Activities	10,00		1,250
Product-Sustaining Activities	0,00	0,125	0,000
Utilities	0,044	0,257	0,011
Facility-Sustaining Activities			13,013
Food Costs			4,000
Total Costs			21,462

utility: average charge for any dish	0,257	euros
Mushroom 65 sold in April	3	
No. of menu items sold in April	45	
Popularity index of menu	(no. of menu 1 sold/total sales no)	in percentage
	6,67	%
calculated utility charge for Mushroom 65	0,017	euros

5. Bill of activity for Mushroom 65

Activities	Resources used (minutes)	Cost pool rates	Total cost (€)
Unit-Level Activities			
Getting orders	0,50	0,125	0,063
Preparation	5,00	0,125	0,625
Cooking	15,00	0,125	1,875
Total Unit-Level Activities	20,50		2,563
Batch-Level Activities			
Preparation	5,00	0,125	0,625
Cleaning	3,00	0,125	0,375
Administrating	2,00	0,125	0,250
Total Batch-Level Activities	10,00		1,250
Product-Sustaining Activities	2,00	0,125	0,250
Utilities	0,067	0,257	0,017
Facility-Sustaining Activities			13,013
Food Costs			3,000
Total Costs			20,093