Menu Profitability Analysis Models: Linking Theory and Practice in the Greek Hospitality Context

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I hereby declare that the work submitted is mine and that where I have made use of another’s work, I have attributed the source(s) according to the Regulations set in the Student’s Handbook.

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“Too late, but I understand. That we don't perish of understanding everything too late, that is a miracle. But we do perish of that — of just that.”

— Philip Roth, Sabbath’s Theater
Abstract

The purpose of this action research study is to explore three common menu profitability analysis models, in order to determine if two Hotels in Rhodes utilize the right methods in order to analyze their menus. Also, this work seeks to critically explore the vulnerabilities of common analysis tools and aims to find the most optimal one.

Firstly, this dissertation aims to familiarize the reader with the idea of cost and its various aspects. Afterwards, cost control will be explained, along with the notion of standardization and then the core issue of this work, menu analysis, will be explored, by thoroughly examining three menu analysis models. Then, data from Greek Hotels will be implemented, in order to test the models and confirm theoretical assumptions. Conclusions will be finally drawn, and a theoretical analysis model will be proposed, as an alternative approach to the existing methods.

This study will manage to prove that two of the most popular Hospitality Enterprises in Rhodes, with structured cost control systems, use less accurate methods to analyze the profitability of their menus. The findings will show that there is a significant difference in results, between the simpler model that the two Hotels use and the more accurate, multi-dimensional model, that theory supports. Meanwhile, it will be attested that criticism surrounding the inaccuracy and deficiency of the is valid.

As the first piece of academic work examining three menu analysis models in a Greek context, this thesis aims to highlight the need for further study, on a comparative basis, in order to determine the vulnerabilities of hospitality cost control in Greece. More research is required, so as to construct a more rounded picture of the existing situation, as hospitality is a crucial source of income generation, for the whole country.

**Keywords:** Menu analysis, profitability analysis, hospitality cost control, menu analysis models.
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I. Introduction

1. General Notions

Food and Beverage constitute an integral part of the Hospitality Experience; not only account for nearly one-third of hoteliers’ revenues\(^1\)\(^2\), but also act as a critical element of guest satisfaction and as a powerful differentiator. Therefore, developing and sustaining a structured cost accounting system, namely documenting and analyzing sales, expenses, and profits of food service operations (Dopson & Hayes, 2016), enables Managers and Accountants to control costs accurately and, apart from ensuring profitability for the department itself, they can create a source of competitive advantage for the entire company.

A preliminary discrimination should be made regarding cost accounting, between financial and managerial accounting. Whereas the prior is mostly concerned with the preparation of financial statements and compliance with specific legal standards, is destined for decision-makers and is outward-looking, aiming to report past results and inform all interested parties, management accounting is much more concerned with the provision and use of accounting information to managers within an organization (Chibli, 2017). It is inward-looking and compares historical data, aiding in managerial planning, without any legal compliance regarding the structure and content of reports. Consequently, managerial accounting methods and tools, are the “armory” of the Food and Beverage manager, in order to make informed decisions on the tactical, operational and strategic level.

Cost control is associated with numerous aspects of planning in hospitality, with the Food and Beverage field being the most complex and demanding. Albeit, there is one single facet of the latter that everything revolves around (Ojugo, 2010),

the menu. Generally, someone may think of the menu in two ways: firstly, as a working document used by managers to plan, organize, operate, and control back-of-the-house operations and secondly, as a published announcement of what is offered to patrons in the front-of-the-house (Kotschevar & Withrow, 2008). The primary product of restaurants is the meal experience, consisting of many components, such as food and beverages, atmosphere, social factors and management (Ozdemir & Caliskan, 2014). All these components aim to form perceptions and create memorable experiences (Johns & Kivela, 2001) (Gustafsson, 2004) (Hansen, et al., 2005); as the latter are in the center of experience economy (Pine & Gilmore, 1998), menu stands as a significant mean to facilitate the creation of a unique hospitality experience.

From a back-of-the-house standpoint, menu acts as the node of various costing aspects and, utterly, as the highest expression of fundamental cost control principles of a company, being a crucial tool to achieve profitability. More specifically, it is an “instructor” that dictates what will be produced, what types of equipment and ingredients are needed, as well as which qualifications employees should possess (Ozdemir & Caliskan, 2014). As such, Seaberg (1990) has indisputably concluded that menus are more than the conventional function of a communication and selling tool, but also a research and experimentation device that can be studied to increase profits. An accurately cost and priced menu, with frequent analysis and revision, can be a precious asset for a hospitality company.

2. Aims and objectives

The main hypothesis of this study is that two of the highest ranked hotels in Rhodes, a 5-star and a 4-star one, with structured cost control systems, use less accurate methods to analyze the profitability of their menus. For the first time, relevant data from Rhodian Hotels will be presented, providing a clear image of the different costing and pricing policies in place, as well as of the menu offerings and the
food and beverage turnover of two Greek Hotels in the Aegean. Different menu analysis models will be explored, starting from the one used in working practice, contrasting it with more complex ones, which theory evangelizes, highlighting their differences, outlining their strengths and weaknesses in real numbers. Finally, this dissertation aims to propose an alternative, collective, theoretical model of analysis, in order to develop a more precise costing and profitability “equation”. As this is the first piece of academic work that explores the aforementioned models in a local context, it constitutes an important foundation of research in the Greek hospitality sector. Similar research has been carried out only in foreign countries so far and not in a combined way, focusing on one model at a time (Atkinson & Jones, 1993) (LeBruto, et al., 1995) (Kwong, 2005) (Sandeep & Vinti, 2009) (Kang, et al., 2010). The absence of such research in Greece can be attributed to various factors, namely the absence of elaborate cost control techniques in Greek Hotels, insufficient data reporting and recording and, above all, the reluctance of Hoteliers to “reveal” cost and sales figures.

This dissertation may act as a stimulus for further research within the field of menu analysis in Greece, by students and academics in the fields of management and accounting, hospitality consultants and strategists. Further accumulation and analysis of cost data from other hotels, throughout Greece, seems vital, as tourist numbers are continually rising, highlighting the need to address efficient ways of securing profitability. Moreover, professional food service managers around the country may treat this work as a useful and important benchmarking tool, to determine the vulnerabilities of their costing methods, gain valuable insight of how the most popular hospitality enterprises in Rhodes’s plan and keep track of their menu costs and finally devise their own, successful menu-costing structure.

II. Literature Review

1. Cost
Although the word “cost” colloquially implies negativity, indicating a mere economic burden or liability, it possesses a different meaning within the accounting field. There, it is considered as a resource sacrificed or forgone to achieve a specific objective and it is usually measured as the monetary amount that must be paid to acquire goods or services (Datar & Rajan, 2017), underlining a fully “operational” function. As such, management accounting regards it as an expense incurred in order to increase revenues (Chibili, 2017). Since most hospitality operations use nearly 90% of their revenues to pay for costs (Chibili, 2017), it is evident that efficiently managing the latter ones is crucial for balancing the numbers and achieving profitability.

Managers are interested in measuring the cost of specific items that the company provides, called cost objects (Datar & Rajan, 2017). Generally monitored cost objects in the hotel industry include: the cost of cleaning a room, the cost of processing a unit of laundry, as well as the food cost of a meal (Guilding, 2002). An accurate measurement entails the understanding of cost behavior, namely the way that different costs react to changing levels of activity; as the activity level rises and falls, a particular cost may rise and fall as well (Brewer, et al., 2009). Therefore, costs for a specific operation and over a definite period, may be classified into two categories, fixed and variable. The first ones, usually remain constant within a “relevant range” of activity and a specific time cycle, regardless of sales volume and are not expected to change in the short run (Pizam, 2010) (Chibili, 2017) (Datar & Rajan, 2017). Even when the company doors are locked, insurance, managerial salaries and -in some cases- equipment leases, must be paid.

On the other hand, variable costs change in proportion to changes at the level of related volume or activity (Datar & Rajan, 2017). The activity can be expressed in many ways, such as rooms and meals sold, resulting in variable costs regarding linen washed, toiletries and amenities used, along with raw materials purchased for preparing a meal. Costs can also be semi-variable, demonstrating both variable and fixed behavior (Brewer, et al., 2009) (Ojugo, 2010). Salaries are usually considered as such since basic wage is always the fixed part and the overtime payments act as the variable part. A final differentiation should take place between standard, budgeted and actual cost. Standard cost measures how much a product or service should
normally cost based on a given volume of sales and serves as a benchmark, against which actual cost is compared (Chibli, 2017). An actual cost is the cost incurred, as distinguished from a budgeted one, which is a predicted, or forecasted (Datar & Rajan, 2017). The establishment of standard costs provides the basis for decision making, permits costs analysis and control and the measurement of inventory and cost of goods sold (Chibli, 2017).

Creating a structured costing system is mostly related to two central functions, cost accumulation and cost assignment. More specifically, managers aim to manage costs in two steps; firstly, by collecting data in an organized way and classifying them in relevant categories, such as “labor”, “materials” and “advertising” and then, by assigning these cost data to specific objects (Bhimani, et al., 2008). This assignment should be done differently, whether costs are direct or indirect. The first ones can be directly attributed to a specific cost object, in an economically feasible way, in a task called “tracing” (Datar & Rajan, 2017), such as labor costs for every hotel department. Indirect costs, on the other hand, are not easily traceable to a specific department or division (Jagels & Coltman, 2004) and thus, cannot be directly “allocated” to an object; managers should find a rational method to split these costs fairly and proportionately. Electricity, for example, stands as an indirect cost for a hotel and should be allocated upon some reasonable base.

2. Food and Beverage Cost Control and Standardization

Sufficient knowledge of all different kinds of costs and a thorough understanding of their interrelations enables hospitality managers to perform successful Food and Beverage Cost Control. The latter is defined as the process used by
managers to regulate costs and guard against excessive costs; it is ongoing and involves every step in the chain of purchasing, receiving, storing, issuing, and preparing food and beverages for sale, as well as training and scheduling the personnel involved (Dittmer & Keefe, 2009). Accurately controlling costs associated with a hospitality firm is much more than a mantra, as well as a simple procedure. It is a rather multilayered process, involving various steps and oriented planning beforehand. Planning, namely devising a particular strategy and selecting a specific course of action, along with directing and motivating, which involves mobilizing people to carry out plans and run routine operations (Brewer, et al., 2009), are the two steps preceding control. Budgeting, an essential subset of planning, details the operational direction of the unit and refines the expected financial results, essentially informing managers what must be done, in order to achieve the predetermined financial goals (Dopson & Hayes, 2016). Budgeting is a task of vital importance, as it devises a roadmap for managers, who should communicate it to employees, in a practical way.

The costs of a Food and Beverage outlet can be classified into four categories: Food cost, Beverage cost, Labor cost and Other expenses (Dopson & Hayes, 2016). The actual cost of food sold includes all the money spent on food, namely the purchase of raw materials, whether this food was offered to guests, stolen, thrown away due to a mistake in order or spoilage (Ojugo, 2010) (Dopson & Hayes, 2016). Cost of beverages comprises of the euros spent on beverage inventory, whether the bottles were wholly offered to guests, or the bartender has overpoured drinks, or even if the bottle was broken (Dopson & Hayes, 2016). Cost of labor refers to the payroll, namely all forms of pay and other rewards going to employees as a result of their employment status (Dopson & Hayes, 2016) (Dittmer & Keefe, 2009). Under the label “other expenses”, there are costs that do not fall under one of the three categories, such as utility bills, mortgage loan payments, rent or depreciation (Dopson & Hayes, 2016).

What is really important to stress, is that in the food and beverage industry, “control” means mostly controlling people, rather than things; food does not disappear by itself and it is not consumed by rodents unless human beings make that food accessible, customers seldom leave without paying unless staff members make
that possible (Dittmer & Keefe, 2009). Consequently, the food and beverage manager’s aims to attain cost accounting goals may be achieved in four steps; by establishing standard procedures for operation, training all individuals to follow established standards and standard procedures, monitoring performance and comparing actual performances with established standards and taking appropriate action to correct deviations from standards (Dittmer & Keefe, 2009). This work aims to place its focus on the third aspect, based on the analysis of the first.

Standards are rules and methods to be followed, in order to ensure operational efficiency, consistent service delivery and ultimately, generation of profit. They can be associated with quality, such as the degree of excellence in raw materials purchased, quantity, namely measures of the count in food portions, or expressed as standard cost, which is the cost of goods or services identified, approved, and accepted by management (Dittmer & Keefe, 2009). Standardization is also about the establishment of procedures to be followed, such as the preparation of food, in relation to the time consumed, specific ways of cooking and presenting a dish. Based on that scheme, it is crucial to understand two main aspects, product yield and standardized recipes.

Product yield or, as Food and Beverage Managers often call it, yield test, helps determining how much actual, usable product comes out of the raw product, which in turn enables the purchasing department to differentiate in quality and usable quantity between two or more vendors quoting a price on the same food product (Ojugo, 2010). Raw materials acquired for a particular price, have a specific weight in their AP state, which stands for “as purchased” (Dopson & Hayes, 2016). Yield tests disclose the “real money” paid for each item, after having cleaned, trimmed, cooked and portioned it; the latter is called EP state, which stands for “edible portion” (Dopson & Hayes, 2016). For example, a fresh fish needs to be descaled, properly cut and filleted, in order to be grilled and served. Its final, EP weight might differ considerably than its initial one; the price paid for it, however, was for its AP state. Consequently, it is essential to know the EP cost, as it represents the actual cost of an ingredient or menu item, based on its product yield (Dopson & Hayes, 2016).

The essence of standardization can be mainly traced in standardized recipes. Although the menu determines what will be sold and at what price, recipes control
quality and quantity of the dishes, as well as the procedure to be followed (Dopson & Hayes, 2016), in a detailed way, ensuring consistency from a service and cost standpoint alike. Standardized recipes, although often overlooked by many food service professionals, act as a boulder for the whole cost control system, as they enable accurate purchasing, facilitate precise dish costing and menu pricing, as well as assist in employees’ training, in order to achieve uniformity and precision in food production (Dopson & Hayes, 2016). Depending on the price category and the style of the restaurant, the Food and Beverage Manager and the Chef join forces to design the menu, by selecting the appropriate dishes and devising their recipes, based on specific ingredients. Accurate measurements should be performed, by weighing and counting the needed quantity of individual ingredients, which are cost according to their purchase price, their yield and then aggregated in monetary terms, in order to produce the standard recipe cost, based upon a standard portion. For convenience reasons, standardized recipes yield a predetermined number of standard portions, in order to produce a meaningful final, cumulative number, as it would be impossible to calculate prices of sub-parts (Dittmer & Keefe, 2009); then it is up to the kitchen staff to prepare the portions accordingly. Standard portion cost is defined as the monetary amount that a standard portion should cost, provided that a recipe will be followed (Dittmer & Keefe, 2009). The standard portion cost acts as a budget to produce a dish, what the portion cost and size should be (Dittmer & Keefe, 2009).

Standardized recipe templates can be more or less complex, depending on the level of reporting and analysis a manager wants to achieve. They are usually jointly created by the Chef and the Food and Beverage Manager in order to achieve uniformity and they mention the ingredients, their precise amounts and their cost. They may also describe the cooking procedure that should be followed. Recipes can be devised on a custom spreadsheet, as it is shown in Table 1, where the various ingredients will be mentioned, along with their required amounts and their costs, in order to finally calculate the total recipe and the portion cost as well.
Standardized recipes can be furthermore created through the relative function of an Enterprise Resource Planning program, in order to link standard cost and purchasing data directly. There, the software calculates daily procurement data, on condition that that they are registered forthwith, in order to determine the cost fluctuations, within every recipe. The system manages to keep track of the median purchasing prices, depending on the invoices registered in the system, so as to devise the standard cost of a Standardized Recipe. Not only that, but the software makes further calculations, such as the Cost of each recipe, the cost percentage, the Contribution Margin and the Contribution Margin percentage, along with the Net Income from the portions sold.
Standardized recipes hardly change within a season. They do so, only if there is a dramatic alteration in market prices, or if a specific good is out of stock and a substitute is needed. Subsequent recalculations are then necessary, in order to make accurate cost reporting.

3. The menu and its analysis

For food-service guests, a menu is a list, often presented with some fanfare, presenting the food and drink offering of a restaurant. For the manager of a food service establishment, however, it represents something significantly more. It is a strategic document that defines the purpose of the company and every phase of its operation, is the managerial idea around which the whole operation revolves (Kotschevar & Withrow, 2008). It is the menu that determines what a restaurant stands for, as it crystallizes its strategic vision and mission, as well as reifies the management’s tactical decisions. Provided that the menu is thoroughly and logically planned, reasonably priced, nicely presented, carefully executed and continuously analyzed, it can become an essential source of sustainable competitive advantage for the company.

Whereas menu development has a strong future orientation of what the restaurant should represent, based on a predetermined concept, menu analysis is the evaluation of the past—menu cost and sales data—for identifying customers’ needs and perceptions and improving menu performance (Ojugo, 2010). According to Atkinson and Jones (1993), menu analysis has been defined as “the systematic evaluation of a menu’s cost and/or sales, to identify opportunities for improved performance”. It is the last step of the aforementioned “menu-chain” and constitutes an essential reality check, to determine the popularity and profitability of the dishes offered. The choice of the appropriate menu analysis method depends on the context; different menu types, require a different analysis approach.
Depending on the menu, the offering is placed in a different format and rationale. Three are the most common menu types, cycle, table d’hôte and à la carte. The cyclical ones provide different dishes, each day, for a period of two to five weeks, with specific, repeated recipes and are usually employed in hospitals, schools and main restaurants of hotels (McVety, et al., 2009). Table d’hôte menus group several food items of different categories together, namely starters, entrees, main courses and desserts, at a single price (Kotschevar & Withrow, 2008); the patrons may choose one out of each category. Individual restaurants and main restaurants of hotels may follow this rationale, as alterations of the food offering enable Managers to take advantage of low market prices of specific goods, tackle the seasonality of specific raw materials and utterly enables them to introduce new dishes to guests, avoiding undesired repetitions. Finally, à la carte menus split dishes into similar categories and offer food items separately, at a separate price (Kotschevar & Withrow, 2008). They are designed to enable guests to choose food according to their needs and tastes and eventually devise their meal (Pizam, 2010). À la carte is the type of menu that most establishments provide, as a stable choice of offered dishes enables stability in purchasing and better-informed pricing, consistency in food production and nurturing of a clear company image.

According to Atkinson and Jones (1993), menu analysis is the generic term for any approach that seeks to improve menu performance. Menu analysis aims for two things: firstly, to ensure complete guest satisfaction, by retaining successful menu items and enhancing or replacing unpopular ones and secondly, to achieve profitability goals, by devising higher profit margins and achieving higher sales volume. It requires recording and collecting menu items’ performance data, which are specific to the establishment; that data can be integrated into the restaurant’s overall performance assessments (Ozdemir & Caliskan, 2014). The purpose of the analysis is to provide food service managers, cost controllers and accountants with relevant information, on the extent to which quantitative variables such as changes in individual menu items’ contribution margins, changes in proportion of different menu items sold and changes

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4 This count was historically done by having a clerk, cashier, or another individual take the sales checks and make a hand count tabulation (Kotschevar & Withrow, 2008). Nowadays, sophisticated POS systems keep records automatically, providing managers and controllers with sales data and statistics.
in quantity of menu items sold affect overall contribution margin of a menu (Annaraud, 2007).

4. Analysis models

Menu analysis models enable restaurateurs to systematically evaluate individual à la carte menu items, by comparing them to some average standards, based on pre-selected criteria (Taylor & Brown, 2007). They constitute operational techniques, mainly focusing on costs and improved profitability, a perfect example of the so-called “micro-marketing” (Atkinson & Jones, 1993). This policy is not new; skilled chefs de cuisine in pre-Second World War kitchens regularly identified well-performing dishes and encouraged their sale, while removed underperforming menu items (Atkinson & Jones, 1993). It was also a matter of limited-shelf life of commodities, due to lack of proper conservation means, which forced chefs to devise table d'hôte menus, as a stable offering was impossible. As new food production and conservation systems emerged, à la carte menus became the norm and the narrower but specific and solid food offering needed new methods of analysis. It was not until the 1980s (Annaraud, 2007), that academics started constructing models of menu analysis, in order to assist the growing Food and Beverage-related part of the economy.

Initially, academics started from simpler, two-dimensional methods, by considering two variables in order to measure menu profitability. In the following years, more variables were added into the equation and as such more complex, multi-dimensional models were constructed, in order to provide managers with a more coherent and rounded view. This dissertation aims to analyze and implement three of the models mentioned earlier, namely the “Menu Engineering Model” by Kasavana and Smith, the “Enhanced Menu Engineering Model” by LeBruto, Quain and Ashley and the “Goal Value Analysis” by Hayes and Huffman. The choice was made upon specific criteria; widespread use in working practice, relative ease of implementation and clarity of inferences to be drawn from the results.

a. Menu Engineering

In 1982, Michael Kasavana and Donald Smith developed a technique called “Menu Engineering” (Kasavana & Smith, 1982), which would quickly become the most popular way to analyze the profitability of menus along food service managers and academics alike (Dittmer & Keefe, 2009). The model studies profitability in relation to the popularity of menu items, is two-dimensional, is elaborated in four quadrants and is based on sales volume and contribution margin. The latter is defined as the amount that remains after the product cost of the menu item is subtracted from the item’s selling price; it is essentially the amount that will be available to pay for labor, controllable and non-controllable other expenses and, utterly, to keep as profit (Dopson & Hayes, 2016). Menu engineering requires prior, accurate menu costing through standardized recipes, in order to secure precise results. The data required includes selling prices, sales counts of each menu item and direct product costs (Ojugo, 2010).

The analysis is carried out in a step-by-step process, utterly categorizing menu items, according to their performance. The four categories are: stars, namely dishes that produce both high contribution margin and high volume (Dittmer & Keefe, 2009); plowhorses, items that are popular, even though they do not yield a high contribution margin (Chibili, 2017); “puzzles”, which are profitable but low-sale and “dogs”, items that are neither popular, nor highly profitable (Ojugo, 2010). An Excel worksheet, as
shown in Figure 1 should be used to analyze the menu, in order to make individual calculations analytically, in order to conclude the individual performance of each item.

The menu engineering worksheet contains thirteen columns and seven boxes, which are organized as follows:

- Column A lists all the menu items
- Column B contains the sales volume of every item
- Column C enlists the sales percentage of each dish in the menu mix
- Column D states the cost of each dish
- Column E mentions the selling price of each item
- Column F calculates the contribution margin of each item, namely the amount that the sale of a menu item “contributes” to pay for all non-food costs allocated to the food service operation and to help with profit requirements (Chibili, 2017)
• Column G calculates the menu costs, namely the total food cost of every item, by multiplying the number of items sold (B) by the individual food cost (D).

• Column H calculates the total revenues from each item, by multiplying the number of items sold (B) by the selling price (E).

• Box I calculates the total cost of menu items sold

• Box J calculates the total revenues generated, by all menu items

• Box K calculates the overall food cost percentage\(^5\), by dividing total cost with total sales

• Column L calculates the total contribution margin of each item (contribution margin of each item, times the number of dishes sold)

• Box M represents the total contribution margin, of all menu items

• Box N represents the total sales volume, of all menu items

• Box O calculates the average contribution margin of all dishes and it is used as an average number, in order to compare individual contribution margins and classify each item accordingly

• Column P classifies menu items as high or low in the category, depending on their total contribution margin, as calculated in box O

• Box Q states the average popularity of all menu items. Whereas average popularity would account for 100%, divided by the number of menu items, Kasavana and Smith (1982) (2002) argued that in real life, it would be unreasonable to expect that every menu item will achieve the minimum level of sales and therefore suggested that the minimum popularity of each item should be only 70% of the average popularity number (Chibili, 2017)\(^6\)

• Column R classifies dishes as “high” or “low”, by comparing the menu mix percentage of each dish in Column C with the average figure in Box Q

• Column S categorizes every menu item, according to its performance as “star”, “plowhorse”, “puzzle” and “dog”.

Menu engineering contains aspects of profitability and popularity analysis, followed by their evaluation. Through categorization, as depicted in Figure 2, it aims to

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\(^5\) Food cost percentage results by dividing the total food cost by total sales.

\(^6\) 70% × (Quantity of each menu item sold) / (Total quantity of all menu items sold).
assist food-service managers in tactical and operational decision making, as each category of classification addresses different changes, in order to enhance individual contribution margins. Stars are dishes that should not be altered, under any circumstances. Rigid specifications for quality, portion size and presentation should be maintained, while, depending on the elasticity of demand, their price can be raised to secure more profits (Ojugo, 2010; Chibili, 2017). Stars are the perfect expression of the Pareto principle, or the 80/20 rule; most of the revenue will be generated from only a small proportion of menu items. Plowhorses, regardless of their popularity, yield low profits, due to their low contribution margin. They should be kept in the menu, but management should try to increase their contribution margin, without affecting demand; this can be done either by raising their price, or by decreasing cost, through the use of alternative ingredients, or by reducing their standard portion (Chibili, 2017; Dittmer & Keefe, 2009). Puzzles are the most challenging category to manipulate. As they are profitable, but low-sale items, each one of them must be individually reviewed. Depending on the reason of low popularity, namely poor dish quality, low standards of presentation, unjustifiably high price or nonexistent promotion, different measures need to be taken (Ojugo, 2010). If the management does not decide to remove them from the menu, these items should, according to the reason of their unpopularity, be renamed, repositioned in a more favorable location of the menu, priced less than they currently do, on the grounds that any reduction does not eradicate contribution margin and, if no measure can alter the situation, be taken out of the menu (Chibili, 2017). Dogs, finally, are the losers in the business, as they are both costly and undesirable. Management should try and increase their price, to determine if they can at least reach the status of puzzles; otherwise, these items should be entirely removed from the menu or replaced with others (Chibili, 2017).
However, it should not be overlooked that hospitality is about providing services to guests, who are the ones that enable the firm to achieve profitability and prosper through the years. Consequently, less profitable items, called “loss leaders”, although don’t decisively contribute in the bottom line, serve a purpose by chipping in the general success of the restaurant, by exclusively providing a specific menu item and attracting a considerable clientele due to that (Ojugo, 2010). Therefore, there is a thin line between balancing numbers strictly and ensuring long-term success and guest’s loyalty; very often, loss leaders shall be kept in the menu, along with profit leaders.

Notwithstanding that Menu Engineering is a structured and decent analysis model, there are some limitations to consider. The foremost refers to sales volume; unless a specific sales volume level is reached, menu items with favorable contribution margins cannot generate enough profit to cover the total costs, since contribution
margin is not weighted by sales volume (Taylor & Brown, 2007). Furthermore, the model favors items with higher contribution margin, as management may intentionally promote more dishes with a higher price, which eventually decrease demand and total operational profitability (Taylor & Brown, 2007). The model, also, assumes that all non-material direct costs are equally related to all menu items (Morrison, 1996), something that does not reflect the real situation. Moreover, any replacement or elimination of items, according to the analysis’ results, is destined to create a vicious circle of adjustment, as Hayes and Huffman clearly and convincingly proved (1985). Each alteration will result in previously strong dishes becoming weak, as every new item will deduct sales from existing items, as the latter will gradually miss the -targeted-average score. Finally, Kasavana and Smith failed to take labor and other food-related costs into consideration.

b. Menu Engineering: A Model Including Labor

The Menu Engineering model was well-acclaimed by academics and almost every subsequent model is based, to a considerable extent, upon it (Taylor & Brown, 2007). However, all the following analyses underlined its deficiencies and proposed evolved structures. One of them is the model devised by LeBruto, Quain and Ashley (1995), who criticized M.E.M. for ignoring the profit factors, a concept developed by Pavesic (1985), in order to identify each menu item’s share of the total menu profit. Moreover, Kasavana and Smith (1982) made wrong cost assumptions and did not incorporate labor expenses into calculations, thus delivering unreliable final numbers.

Menu Engineering may be based on contribution margin for its calculations, has, however, inaccurately assumed that variable costs of a particular menu item equal only its food cost, thus concluding that all other costs are fixed (LeBruto, et al., 1995).

---

8 With profit factors, Pavesic (1985) introduced another important dimension to the M.E.M. analysis, which provided a relative ranking of menu items, instead of merely categorizing them as high- or low-profit ones (Raab, et al., 2010). The PF represents the relative total profitability of each menu item and provides analytical data that allows a more sensitive classification of menu items (Raab, et al., 2010) and it is counted in two steps; firstly, the average CM is calculated and then, the total CM of each item is divided by the average CM.
Food cost itself may be variable, but a single subtraction from the selling price does not account for every single variable expense of a dish; any other associated costs should be computed as well. Furthermore, acknowledging Looft’s (1989) assertion, regarding the need to consider labor costs, as well as the inherent difficulties of such a venture, LeBruto, Quain and Ashley (1995) proposed enhancement of M.E.M. They supported that the most significant difficulty with the inclusion of all variable costs in the contribution margin computation, is the effort required to separate semi-variable costs into their fixed and variable components. Therefore, they proposed the use of statistical methods, such as the high/low or minimum/maximum method and the construction of a scattergram graphical presentation and regression analysis. Moreover, they proposed the use of qualitative methods, such as the sheer judgement of the food service manager, or the exercise of jury execution, by ranking the labor effort required for each menu item, relative to the other menu items in the grouping (LeBruto, et al., 1995).

LeBruto, Quain and Ashley (1995) concluded their research with enhancement of Menu Engineering, constructing a new matrix, as depicted in Figure 3, with a total of eight sectors of classification, based again upon volume relative to contribution margin. Labor was separated in half, into high and low segments, with the menu items falling equally into each category (Taylor & Brown, 2007). The proposed classification stands as follows (LeBruto, et al., 1995):

- High contribution margin, low labor, and high popularity (Shining Star)
- High contribution margin, high labor, and high popularity (Star)
- High contribution margin, low labor, and low popularity (Puzzle)
- High contribution margin, high labor, and low popularity (Brain Teaser)
- Low contribution margin, low labor, and high popularity (Tractor)
- Low contribution margin, high labor, and high popularity (Plowhorse)
- Low contribution margin, low labor, and low popularity (Dog)

As Schmidgall (1990) suggested, the rankings and labeling of a high and a low labor classification, should be a judgment call by the professional food manager or through employing the technique of a jury of executive opinion.
• Low contribution margin, high labor, and low popularity (Ultimate Dog).

<table>
<thead>
<tr>
<th>LeBruto, Quin, &amp; Ashley Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Labor Plowhorse</td>
</tr>
<tr>
<td>Low Labor Tractor</td>
</tr>
<tr>
<td>70% Average Units sold</td>
</tr>
<tr>
<td>High Labor Ultimate Dog</td>
</tr>
<tr>
<td>Low Labor Dog</td>
</tr>
</tbody>
</table>

*Figure 3 LeBruto, Quain and Ashley Matrix (Taylor & Brown, 2007)*

LeBruto, Quan and Ashley managed to extend the concept of Kasavana and Smith, by adding another -qualitative- parameter, in order to achieve a better understanding of dishes’ performance, relative to their labor needs. Essentially, each initial category was split into two new sub-categories, with the aim of adding a more comprehensive base of comparison. Food service managers are thus enabled to determine their low- and high-labor menu items, so as to take corrective action; depending on the classification, the dishes should become -at least- low-labor, with the ultimate aim of becoming (low labor) shining stars.

Although the enhanced M.E.M. tried to ameliorate the aforementioned issues of the initial model, by incorporating labor costs and presenting a more comprehensive picture of menu profitability, it still could not recover from the common flaws of matrix analysis (Hayes & Huffman, 1985). As average numbers determine the two axes, namely contribution margin and sales volume, some items must fall into the less-desirable categories, while high and low volume will always be defined according to some average volume (Hayes & Huffman, 1985). Additionally, the additional categories did not provide more thorough numerical data on cost and profit, aiding only in terminological augmentation, thus increasing vagueness.
c. Goal-Value Analysis

The inherent deficiencies of specific average indices were quickly understood and a simpler, yet more helpful model was constructed by D. Hayes and L. Huffman, called Goal-Value Analysis. The model, as presented (1985), revisited (1995) and re-approached (2016), uses an algebraic formula to replace restrictive menu averaging techniques and analysis matrices (Dopson & Hayes, 2016). The formula is used to arrive at a goal-index, called the numerical target or score (Kotschevar & Withrow, 2008), for every menu item. Net contribution is regarded as an important factor in consideration of the latter, as “goal achievement” is analyzed in the light of net contribution (Hayes & Huffman, 1985).

The Goal-Value model utilizes food cost percentage, sales volume (or item popularity), selling price and variable costs, such as labor and any other expenses associated with food. To determine the overall goal value of an entire menu, the operator uses the average portion cost (total food cost divided by number of items sold) in place of the portion cost, the check average (total sales divided by number of guests served) in place of the selling price\(^{10}\), and the average number of items sold in place of a single item’s sales (Hayes & Huffman, 1995; Dopson & Hayes, 2016). The main idea behind the model was that every menu item should stand on its own, from a profitability standpoint, avoiding direct competition with other dishes and abstaining from the vicious circle of adjustments. The formula is devised as follows:

\[
A \times B \times C \times D = \text{Goal Value}
\]

- \(A = 1 - \text{Food Cost Percentage}\)
- \(B = \text{Item popularity}\)
- \(C = \text{Selling price}\)
- \(D = 1 - (\text{Variable Cost Percentage} + \text{Food Cost Percentage}).\)

\(^{10}\) It is better to take into consideration the check average (Dopson & Hayes, 2016), which divides sales with covers, rather than the average selling price (total daily sales divided by number of items sold) (Hayes & Huffman, 1985; Hayes & Huffman, 1995), as it provides a picture closer to reality and calculates the actual turnover; it is guests that count, not dishes.
In order to utilize the formula, food service managers should, firstly, create Profit and Loss statements for each dish, in order to individually attribute a fair share of variable and fixed costs (Hayes & Huffman, 1985). Hayes and Huffman have proposed that fixed costs can be allocated simply by dividing the costs by the number of items, attributing a stable monetary amount to each dish, whilst variable costs, can be attributed using a stable percentage to every menu item, relative to total variable costs. Bayou and Bennett (1992) and Dopson and Hayes (2016), suggested a simpler analysis approach, by using just two tables, one for data aggregation and one for final calculations, instead of individual P&L statements. The unique score of each item will be finally compared to the Goal-Value of the whole menu, in order to define its profitability.

Potential drawbacks to the analysis model could be caused by the inherent difficulties of assigning variable and allocating fixed costs. Labor costs, for instance, considered as purely variable, must be appropriately assigned to every dish; a ranking procedure, similar to the one proposed by LeBruto, Quain and Ashley (1995), could be followed. Alternatively, an average labor cost could be counted and calculated for all items, a policy that most operators follow, usually computing labor costs as 30% of the total sales (Dopson & Hayes, 2016), an approach which considers variable costs as fixed, for every item. Kotschevar (2008) has proposed modifying the formula to increase its accuracy. Regarding variable costs, an item can be assigned high, medium, or low variable costs, according to the labor required for each. Finally, the scoring system, although easy to comprehend and to make individual calculations, it does not depict profitability in monetary terms.

III. Methodology

1. Research approach

The research strategy that will be used to implement the empirical findings is action research (AR). By employing the latter, the researcher starts with a particular problem that needs to be solved or understood better, usually within the environment he or she is working (Cunningham, 1995). Action research is not just a method, but
rather a whole process, a commitment to solve a specific issue, by employing three stages; looking, namely observing and recording the context, thinking about the problems in more detail and identifying solutions and finally acting, by putting solutions into practice and evaluating (Biggam, 2015).

This conclusive research is associated with the exploration and evaluation of the three most important menu profitability models, in order to answer the three following questions:

- Is the most commonly used menu profitability analysis model sufficient and trustworthy?
- What are the (most) optimal models to use, in order to define menu profitability?
- Are two of the most popular hotels in Rhodes employing the right methods?

Professional engagement in the field of Food and Beverage Cost Control provides an excellent opportunity to delve into the work material and evaluate it academically, in order to determine its vulnerabilities. As such, determining the flaws of the most popular analysis methods is a fascinating practical task, with the aim of improving profitability and securing a spherical picture of costs. Given the nature of this research, namely the assiduous exploration of various models, with the use of numerical data from hotel restaurants, mainly sales volume, recipe and labor cost, in order to investigate the profitability of each menu item and the total menu profitability, action research stands as the most applicable approach to examine the way a hotel evaluates relevant data. What makes AR the only suitable research method for the current dissertation, is that, whereas in most methodologies you start with a specific question to be answered, hereby there are questions, but the “burning desire” is to make a difference in the situation, as well as measure it (James, et al., 2012). Moreover, collection and analysis of raw numbers, with the view of applying and testing new processes and procedures, so as to finally develop new solutions, can be achieved only by AR.
2. Data collection and analysis framework

The empirical research of this dissertation consists of primary quantitative data collected in person or provided by the cost-control offices of hotels. More specifically, data was extracted via the P.O.S. systems, as well as from managerial accounting reports produced during the summer season of 2017. Two à la carte restaurants of two hotels from Rhodes were chosen; Restaurant “A” from a five-star hotel and “B” from a four-star hotel. For confidentiality reasons, the names of the Hotels and their Restaurants will not be disclosed, as their respective owners and managers have requested. Both hotels are ranked among the twenty best hotels in Rhodes, according to TripAdvisor and the choice was based upon their reputation on overall guest satisfaction; the four-star hotel has received the Travellers’ choice award, has been featuring in lists of the best hotels in Greece, according to guest reviews on TripAdvisor and has been awarded the Gold Medal, based on guests’ satisfaction, by one of the biggest Tour Operators in the globe. The five-star hotel has also received Gold Awards for guest satisfaction, as well as a guest review award by booking websites. Last but not least, both enterprises have structured and elaborate costing systems, supported by their cost control offices and departmental managers.

Menus of food-service establishments that operate on an à la carte basis, constitute an ideal item for research, as dishes are prepared upon request, there is a clear and precise costing procedure and sales can be monitored accurately, whereas buffet restaurants operate on a “bulk-rationale”, an average weighted cost is determined once or twice per month, by employing “flash cost” procedures, with considerable probability of divergence in calculations between days. Furthermore, buffet meals in hotel restaurants are usually included in the holiday package, so profitability levels are more or less predetermined, whereas à la carte restaurants require accurate cost control to measure and ensure their profitability.

Data of different categories will be analyzed and interpreted in a connected way, namely standard costs (standardized recipes), selling prices, combined with sales data and variable costs (labor). Managerial accounting reports and extracted data from P.O.S. systems will provide these descriptive statistics. The figures will be injected into the three profitability analysis models, in order to produce a meaningful result. Results
of every model will be compared one another, with the utmost aim of determining the most accurate and reliable method, in real numbers.

3. Limitations and potential problems

Action research has a specific thematic focus, in sampling means, making the number of cases to be studied limited by nature, thus not allowing broad generalization with other hotels in the Aegean or Greece. Two establishments from Rhodes were chosen and this can be attributed to inaccessibility of relevant data, as hoteliers are reluctant to make managerial accounting data public, mostly for competition reasons. Also, there are various cases of hotels that do not possess structured costing systems, thus keeping little or no cost and sales records. The lack of relevant research, so far, constitutes another issue, as it prohibits potential data comparison and “collective” conclusions. Finally, as Rhodes is dominated by Tour Operators, who mainly employ the All-Inclusive model within their affiliated hotels, elaborate costing techniques are not the norm; as such, the number of enterprises that can be studied regionally, in that way, is relatively small. Albeit the limitations, the chosen hotels stand as the best in class for the Aegean and Greece alike, not only regarding operational and organizational efficiency, but also in terms of guest satisfaction and perceived quality. Also, the thorough analysis of models in a specific context compensates the lack of “extended” generalizability, standing as the foundation stone of relevant future research in Greece.

IV. Action research findings: Description, Analysis and Synthesis

1. Research Results

This chapter aims to reveal and interpret descriptively the empirical findings of the action research carried out during the summer season of 2017, in the two hospitality enterprises mentioned in the Methodology chapter. The three menu
profitability analysis models will be examined individually and separately for each hotel, analyzed in order to lead to conclusions through comparison.

The two food service outlets constitute the most popular à la carte restaurants of their establishments, in terms of cover capacity and sales volume. They both operate from May to October, during lunch and dinner shifts, being the only open, casual à la carte dining places in these hotels. Restaurant A employs seven staff members (nine during August), namely one captain, one waiter, one assistant waiter and two trainee waiters, one head cook, one assistant cook and during August, one trainee cook and an extra cook. Restaurant B, on the contrary, employs four people (five from June to August), namely one captain, one waiter, one trainee waiter (from June-August), one head cook and one assistant cook. A total of sixteen dishes were selected for the model application, namely eight dishes from each restaurant, corresponding to different categories\textsuperscript{11}. The menu items chosen from each restaurant are either identical or similar, in order to ensure consistency of comparison and meaningfulness in the final results.

Items of Restaurant A and B are separately analyzed separately in Tables 2 and 3, respectively. The analysis is concerned with standard cost, selling price and contribution margin, taking also account its sales volume and the revenues generated. Then, average figures for standard cost, selling price and CM are calculated, while sales and revenues from all items are totaled. From Restaurant A, the dishes to be examined are: “Turkey Club Sandwich” (snack), “Grilled Lamb Chops” (main course), “Eggplant Gnocchi” (pasta), “Chicken Tajin” (main course), “Beef Carpaccio” (starter), “Black Angus Burger” (snack), “Picanha Black Angus” (fine beef cut) and “Monkfish fillet” (main course).

\textsuperscript{11} According to the Menu categories that the two Hotels have set.
The dishes offered span from 12,80€, for the “modest” Turkey Club Sandwich, a relatively common menu item, in a 5-star version, however, to 60€ for the Picanha Black Angus, a 500-gram premium beef cut from the round part of Angus Cattle. The sales of the eight dishes total 1979 items, which generated a revenue of 37.679,40€, with a labor cost of 14.174,08€, for service and kitchen staff, namely 37,61% of the total revenues. The average standard cost is 6,51€, whilst the average selling price is 24€, equaling an average contribution margin of 17,49€.

The dishes offered here range from 9€, for the Club Sandwich, to 21,5€, for the classic and always popular Beef Fillet. The average numbers for Restaurant B, are 5,4€ for the standard cost, 14,94€ for the selling price and 9,53€ for the contribution margin. With a total sales volume of 1621 items, Restaurant B managed to generate 21.664,50€ during the summer season of 2017, with a labor cost of 6553,51€, namely 30,25 % of the total revenues.

At first reading, there are enormous differences between the two restaurants. Whereas dishes of A have higher average standard cost by 20,55%, the restaurant has established a higher average selling price by 60,6%; and a higher average contribution margin, by 83,5%, as it is depicted in Figure 4:

![Average Numbers Comparison of Restaurants A and B](image)

At the same time, Restaurant A managed to generate 16.014,9€ more than B, with a bigger turnover by 358 items, however, as it is shown in Figure 5:
The achievement of 73.92% more revenues, with regards to considerably higher sales, is attributed mostly the marketing strategy of Hotel A, expressed through the five-star concept, concerning ambiance, service quality and dish presentation. These aspects enable a pricing strategy with higher markups, resulting in noticeably higher average contribution margin, 17.49€ against 9.53€, as the (average) price breakdown of Figures 6 and 7 indicate;
More specifically, Restaurant A has a markup multiplier of 3.68, enabling an average selling price of 24€ whilst Restaurant B a markup of 2.76, on average, achieving a price of 14.94€. Furthermore, it is a matter of operational efficiency, regarding meal preparation; Hotel A, utilizes some of the main-kitchen personnel, in order to assist with cleaning, cutting and cooking food, in order to shorten delivery times and raise the restaurant’s cooking capacity, thus allowing a bigger turnover and higher revenues.

2. Menu Engineering Model
   a. Restaurant A

The findings from Restaurant A, as shown in Table 4, confirm the theoretical assumptions regarding the Menu Engineering Model, as well as the criticism surrounding it. The contribution margin range of Restaurant A is considerably broad, namely 29.92€, whilst its selling price range is 47.2€. Also, its menu mix is dominated by three items, as they account for 78% of its sales,
as depicted in Figure 8. There is one star, three plowhorses, two puzzles and two dogs.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Menu Item Name</th>
<th>Number Sold</th>
<th>Mix %</th>
<th>Item Cost</th>
<th>Selling Price</th>
<th>CM (E-D)</th>
<th>Menu Costs (D+B)</th>
<th>Revenues (E+B)</th>
<th>CM Category</th>
<th>Menu Mix %</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turkey Club Sandwich</td>
<td>600</td>
<td>30,32</td>
<td>€2,329</td>
<td>€12,8</td>
<td>€10,47</td>
<td>€1,397,40</td>
<td>€7,680,00</td>
<td>UNDER</td>
<td>OVER</td>
<td>PLOWHORSE</td>
</tr>
<tr>
<td>2</td>
<td>Grilled Lamb Chops</td>
<td>286</td>
<td>14,5</td>
<td>€7,288</td>
<td>€24,8</td>
<td>€17,51</td>
<td>€2,084,37</td>
<td>€7,092,80</td>
<td>OVER</td>
<td>OVER</td>
<td>STAR</td>
</tr>
<tr>
<td>3</td>
<td>Eggplant Gnocchi</td>
<td>127</td>
<td>6,42</td>
<td>€2,729</td>
<td>€13,0</td>
<td>€10,27</td>
<td>€346,58</td>
<td>€1,651,00</td>
<td>OVER</td>
<td>UNDER</td>
<td>DOG</td>
</tr>
<tr>
<td>4</td>
<td>Chicken Tajin</td>
<td>89</td>
<td>4,50</td>
<td>€3,561</td>
<td>€13,8</td>
<td>€13,24</td>
<td>€1,004,99</td>
<td>€3,891,60</td>
<td>UNDER</td>
<td>OVER</td>
<td>PLOWHORSE</td>
</tr>
<tr>
<td>5</td>
<td>Beef Carpaccio</td>
<td>207</td>
<td>10,46</td>
<td>€4,855</td>
<td>€18,8</td>
<td>€13,95</td>
<td>€3,911,88</td>
<td>€2,886,62</td>
<td>UNDER</td>
<td>OVER</td>
<td>PLOWHORSE</td>
</tr>
<tr>
<td>6</td>
<td>Black Angus Burger</td>
<td>556</td>
<td>28,09</td>
<td>€3,570</td>
<td>€17,8</td>
<td>€14,23</td>
<td>€1,984,92</td>
<td>€9,896,80</td>
<td>OVER</td>
<td>OVER</td>
<td>PLOWHORSE</td>
</tr>
<tr>
<td>7</td>
<td>Monkfish fillet</td>
<td>91</td>
<td>4,60</td>
<td>€22,81</td>
<td>€60,0</td>
<td>€37,19</td>
<td>€2,075,71</td>
<td>€5,460,00</td>
<td>OVER</td>
<td>UNDER</td>
<td>PUZZLE</td>
</tr>
</tbody>
</table>

More precisely only one dish is classified as star, the “Grilled Lamb Chops”. It has the third-highest contribution margin, namely 17,51€ and the third-highest sales volume, by 286 dishes, perfectly confirming the rule of high contribution margin and high sales volume, in order to be a star. There are three plowhorses, “Turkey Club Sandwich”, “Black Angus Burger” and “Beef Carpaccio”; even if their contribution margin percentages are proportionately higher than the one of Lamb Chops, namely 81,79% for the Club, 79,94% for the Burger and 74,42% for the Carpaccio, as shown in Figure 8 and although the first two make up for 58% of the total menu mix, 30% and 28% respectively, they are still not classified as stars.
These “unfavorable” dishes, from a contribution margin standpoint, even if they had their sales volume dramatically increased, would still belong to the same category, as items with higher contribution margin will always be favored. The acceptance that, as plowhorses, these dishes should either have their prices risen or their portions minimized, cannot be fully applied here. Turkey Club Sandwich and Black Angus Burger have already a relatively low food cost; on the same time, individual prices are always determined by a variety of factors —subjective ones, among others, such as the “reasonable” price for guests, according to food service manager’s judgment. Although it is a matter of price elasticity of demand in concreto, 12,8€ and 17,8€ are already high prices for snacks, with high contribution margins and it would be generally risky to increase the price for a single Club Sandwich or Black Angus Burger. Portion size reduction, also, with such a standard food cost, would not bring about significant change in profitability.

On the other hand, dropping food cost could be disastrous, as that could imply a drop in quality. Restaurant A belongs to a five-star resort and the Club costs 2,329€, whilst a similar dish in Restaurant B, located in a four-star hotel, costs 1,97€ and these extra 0,36 cents are the ones that clearly differentiate the two enterprises, concerning quality and stars. Hotels, finally, tend to exploit the benefits of economies of scale
regarding bulk purchases; therefore, it would not be feasible to alter the food ingredients easily, without recording losses.

Last but not least, the two puzzles of the menu, “Picanha Black Angus” and “Monkfish Fillet”, although having very high contribution margins, 37,19€ and 23,06€ respectively, have sold little. Removing these dishes from the menu would be not possible in Restaurant A, as they represent its two exclusive dishes. Repositioning them in the menu, as well as repricing them, could enable them to generate more sales, provided that their contribution margins do not fall considerably.

As things stand, the menu items matrix of Restaurant A differs considerably from the ideal one, as expressed in Figure 2, due to the “diffusion” of particular values. The star dish is classified as such but does not fall far from the plowhorse quadrant, as it is located in the far end of the stars’ quadrant. Moreover, the two dogs are not located very far from the Lamb Chops, whilst Picanha Black Angus is placed nearly by the end of the scattergram, thus being an extreme value, relative to the rest menu items.

![Menu Items Matrix](image)

*Figure 9 Restaurant A Menu Items Matrix. Grilled Lamb Chops (Star) is circled in green, Eggplant Gnocchi and Chicken Tajin (Dogs) are circled in red.*
b. Restaurant B

The situation with Restaurant B differs substantially from what is so far observed, as it is depicted in Table 5. Here, there is a considerably smaller contribution margin range than the one of Restaurant A, namely 6,06€ against 29,92€, whilst selling price range is 12,5€ against 47,2€. The sales mix is also different, as four items have been sold less than 100 times. Therefore, the star dishes are two and there are two plowhorses, three puzzles and one dog.

This situation takes place as, generally, four-star hotels charge less than five-star establishments and consequently are not able to offer very expensive items, with a significant price difference. Beef Fillet and Sea Bass Fillet are the two stars, possessing the two highest contribution margins and being third and fourth in overall popularity. They are precisely what Picanha and Monkfish could not be for Restaurant A, as they are the exclusive dishes here, are offered at reasonable prices and therefore sell a lot.
On the other hand, there are two plowhorses, again the Club Sandwich and the Burger ("Homemade Burger" here), as they generally are two of the most popular dishes in casual restaurants; they both account for 54% of the whole menu mix. However, due to their considerably low contribution margins of 7,03€ and 6,85€, and albeit their high sale volume of 54% of the total mix, as Figure 10 indicates, they cannot become stars.

![Menu Mix Percentage](image)

*Figure 10 Menu Mix Percentage of Restaurant B*

With such a low food cost, any further price increase would be potentially unreasonable for the guests, as these items are considered as snacks. The multipliers used here are lower than the ones in Restaurant A; 4,56 for the Club Sandwich against 5,49 for the Turkey Club and 3,58 for the Homemade Burger, against 4,98 for the Black Angus one, as the guests in a four-star hotel are more price sensitive.

Moreover, the Lamb Chops, Chicken Risotto and Veal Carpaccio have recorded similar sales numbers (87, 50 and 81 items respectively) and their contribution margins range within 2,08€, consequently being all classified as puzzles. These items are typical
à la carte dishes, which should be treated with discretion. Any price reduction, without a considerable increase in sales, would not have a different effect on their classification, or, even worse, they could become dogs. The issues regarding food quality and price reduction are in place here as well and any price increase should be treated carefully, always taking into account the price elasticity of demand.

Finally, Ravioli constitute the dog dish in the menu of Restaurant B. This comes as no surprise, as this dish has a relatively low contribution margin and has recorded low sales. Ravioli are handmade in Restaurant B, a fact that increases cost considerably. Normally, being a loss leader would imply that this item should be eliminated from the menu, as its cost cannot be considerably decreased without a quality decline. Nevertheless, although being a loss leader, this dish differentiates the offering of its establishment from the nearby hotels and restaurants. Therefore, removing it from the menu in order to enhance profitability would have negative marketing implications and could cause a bigger problem on the long term, than the one it would actually solve.

The matrix of Restaurant B, as depicted in Figure 11, is closer to the ideal matrix devised by Kasavana and Smith (Figure 2) than the one of Restaurant A, as there is a more balanced distribution of dishes in the four quadrants. The two stars are closely placed, up and right in the matrix, while being far enough from the dog quadrant. Ravioli are located down and on the left side, with a considerable distance from the rest of the dishes.
Figure 11 Menu Items Matrix of Restaurant B. Sea Bass Fillet and Beef Fillet (Stars) are circled in green, whilst Ravioli (Dog) are circled in red.
3. Menu Engineering: A Model Including Labor

As the enhanced M.E.M. is numerically based upon the initial model, no further calculations should be made. In order to utilize this version, however, some preliminary classifications need to be done. Acknowledging Schmidgall’s (1990) assumptions, regarding labor ranking and labelling, all menu items will be classified according to their labor category, based on food service managers’ judgements. The classification will be made according to two criteria, preparation complexity and preparation time, in order to define it as high- or low-labor. Concerning preparation, the ordering will be made as follows; the average complexity in preparation is measured as about three different main actions per item, namely three different categories of main actions, such as grilling a specific ingredient, boiling another one and baking both of them. If a menu item entails more than three actions, it is classified as high in complexity and if it entails three or less, as low in complexity.\(^\text{12}\) Regarding time, it is calculated that the average preparation time for all menu items is around twelve minutes. Anything that needs twelve minutes or less is low in preparation time and all others that need more than twelve minutes, are classified as high in preparation time. A combination of both elements, time and complexity, will provide the labor classification for each dish.

a. Restaurant A

For Restaurant A, six out of eight dishes are classified as low in labor, namely 75% of all the menu items and this can be mostly attributed to the excellent kitchen preparation. As already mentioned, Hotel A utilizes the Main Kitchen staff during lull times, in order to aid in the kitchen of Restaurant A. Preparation complexity is

\(^{12}\) The Lamb Chops from Restaurant B, for example, require more actions in order to be prepared, than the Grilled Lamb Chops from Restaurant A, as they are a premium and elaborate, dinner à la carte dish, rather than a regular lunch menu item, as for Restaurant A. More specifically, the lamb chops should be marinated for some minutes (1), then grilled properly (2), a variety of vegetables should be grilled (3) or cooked with rosemary and herb paste (4) and then all the ingredients should be properly set up and served with demi-glace sauce (5). The Grilled Lamb Chops of Restaurant A need just grilling next to pitta bread (1), potato wedges are fried (2) and then the ingredients are served with a tzatziki dip (3).
mitigated and time is shortened, as many ingredients are already prepared. For example, Chicken Tajin is cooked three times per week, then kept in “Tajine” pots and it is heated and served upon demand. All of the meat is already cut, cleared from fat, seasoned and marinated, ready to cook or grill. Furthermore, Gnocchi is frozen, the ingredients of the Burger and the Club Sandwich are already cut and individually portioned, such as lettuce and tomato, which enables the kitchen operations to run smoothly. The only two high-labor dishes, Picanha and Monkfish fillet, are prepared à la minute, as they constitute the two premium menu items and their ingredients need proper handling.

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Preparation Complexity</th>
<th>Preparation Time</th>
<th>Labor Categorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey Club Sandwich</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Grilled Lamb Chops</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Eggplant Gnocchi</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Chicken Tajin</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Beef Carpaccio</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Black Angus Burger</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Monkfish Fillet</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Picanha Black Angus</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

*Table 6 Labor Categorization of dishes from Restaurant A*

Table 7 shows the “particularization” of dishes, according to labor and categorizes the Lamb Chops as the most successful dish (Low Labor Shining Star), while Eggplant Gnocchi and Chicken Tajin stand as Low Labor Dogs. All other dishes stand in-between, with the Monkfish Fillet and the Picanha being the particular highlights, due to their high-labor category.

<table>
<thead>
<tr>
<th>High Labor Plowhorse: -</th>
<th>High Labor Star: -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Labor Tractor: Turkey Club Sandwich, Black Angus Burger, Beef Carpaccio</td>
<td>Low Labor Shining Star: Grilled Lamb Chops</td>
</tr>
<tr>
<td>High Labor Ultimate Dog: -</td>
<td>High Labor Brain Teaser: Monkfish Fillet, Picanha Black Angus</td>
</tr>
<tr>
<td>Low Labor Dog: Eggplant Gnocchi, Chicken Tajin</td>
<td>Low Labor Puzzle: -</td>
</tr>
</tbody>
</table>

*Table 7 Enhanced Menu Engineering Model Classification for Restaurant A*
b. Restaurant B

Table 8 shows that the inferences drawn from data of Restaurant A apply, mutatis mutandis, to Restaurant B. The main difference between the two restaurants, is the size of the establishments they are in and, consequently, the difference in the number of kitchen staff. As Hotel B is smaller than A, its main kitchen employs less personnel; thus, its contribution and assistance to the à la carte kitchen is limited. Consequently, 50% of the dishes are low-labor (Club Sandwich, Risotto, Carpaccio, Homemade Burger) and 50% are high-labor (Lamb Chops, Ravioli, Sea Bass Fillet, Beef Fillet). For example, the Lamb Chops, as already said, are a dinner dish in this menu, thus more actions need to be taken, regarding preparation and more elaboration.

<table>
<thead>
<tr>
<th>Item Name</th>
<th>Preparation Complexity</th>
<th>Preparation Time</th>
<th>Labor Categorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Club Sandwich</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Lamb Chops</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Ravioli</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Chicken Risotto</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Veal Carpaccio</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Homemade Burger</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Sea Bass Fillet</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Beef Fillet</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

*Table 8 Labor Categorization of dishes for Restaurant B*

Table 9 shows the consequent classification of menu items. The two “extreme” categories, High Labor Stars and High Labor Ultimate Dogs are the ones who stand out, with the other dishes being in-between. Concerning the two premium dishes, Beef Fillet and Sea Bass Fillet, require proper handling and cooking, entailing more time and complexity, thus being the High Labor Stars. Ravioli, on the other hand, are handmade, thus need stuffing and folding, apart from boiling. Therefore, apart from low contribution margin and high cost, they also entail a lot of kitchen labor. For marketing and strategic policy reasons, however, Ravioli should not be removed from the menu. The food service manager and the executive chef of Hotel B need to take corrective
action, in order to make Ravioli at least a low labor dog, saving labor power for more profitable menu items.

<table>
<thead>
<tr>
<th>High Labor Plowhorse: -</th>
<th>High Labor Star: Sea Bass Fillet, Beef Fillet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Labor Tractor: Club Sandwich, Homemade Burger</td>
<td>Low Labor Shining Star: -</td>
</tr>
<tr>
<td>High Labor Ultimate Dog: Ravioli</td>
<td>High Labor Brain Teaser: Lamb Chops</td>
</tr>
<tr>
<td>Low Labor Dog: -</td>
<td>Low Labor Puzzle: Chicken Risotto, Veal Carpaccio</td>
</tr>
</tbody>
</table>

Table 9 Enhanced Menu Engineering Model Classification for Restaurant B

c. Implications of Enhanced M.E.M.

Albeit the “vivid” paraphrasing of the four categories, which aim to provide food service managers with a more concrete picture regarding cost, LeBruto, Quain and Ashley did not alleviate the ever-present deficiencies of two-dimensional matrices. Categorization is still based upon the preceding model and the labor-extension is just adding supplementary tags. However, management can benefit partially from the enhancement and take some corrective action, not only regarding costs directly related to food, as for now, but for labor as well. Managers may implement the findings from the analysis by restructuring their procedures regarding food production, by employing more staff in order to accomplish an optimal labor cost-food turnover relationship, or by purchasing ingredients that are already wholly- or semi-prepared. Nevertheless, something that should not pass by the attention of food service managers is the measurement of qualitative values, such as preparation complexity. Although employing a judgement call by the professional food manager is a relatively simpler method to define labor needs of each dish, rather than applying purely statistical methods, some concrete criteria need to be established to achieve a reliable unit of measurement, in order to yield meaningful results.

4. Goal-Value Analysis

In order to utilize the third menu profitability analysis model, the approach of Dopson and Hayes (2016) was followed, also acknowledging the assumptions of Bayou
and Bennett (1992). A quite simpler method than the initial one, which fits the hotel sector perfectly, as almost every hotel in Greece aggregates fixed and most non-food variable costs, by making an independent estimate, assigning these costs to the company as a whole and not to individual departments. For example, rent, insurance and debt, along with paper napkins, ketchup sauce or toothpicks are not allocated to every department or outlet, individually and proportionately, but are calculated in the corporate Profit and Loss statement by the accounting office. Consequently, it would be impossible for individual Profit and Loss Statements to be appropriately devised, as the two hotels have neither set any appropriate allocation bases nor do allocate costs this way. Therefore, two categories of costs will be taken into account, standard food cost percentage and labor cost percentage, along with sales volume and selling price, as shown in Tables 10 and 12, for Restaurant A and B respectively. For analysis purposes, labor (variable) cost percentage will be calculated for each Restaurant as a total number, as mentioned in the general results analysis; 37.61% for Restaurant A and 30.25% for Restaurant B.

a. Restaurant A

The aggregation of cost and sales numbers of Restaurant A in Table 10 entails the calculation of its check average. According to official data, revenues for Season 2017 were 37,679.4 €, having served 2046 guests; this equals an 18,41 € check average.

<table>
<thead>
<tr>
<th>Item</th>
<th>Food Cost %</th>
<th>Number Sold</th>
<th>Selling Price</th>
<th>Variable Cost %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey Club Sandwich</td>
<td>18.19%</td>
<td>600</td>
<td>12.8 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Grilled Lamb Chops</td>
<td>29.38%</td>
<td>286</td>
<td>24.8 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Eggplant Gnocchi</td>
<td>20.99%</td>
<td>127</td>
<td>13 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Chicken Tajin</td>
<td>10.54%</td>
<td>89</td>
<td>14.8 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Beef Carpaccio</td>
<td>25.82%</td>
<td>207</td>
<td>18.8 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Black Angus Burger</td>
<td>20%</td>
<td>556</td>
<td>17.8 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Picanha Black Angus</td>
<td>38%</td>
<td>91</td>
<td>60 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Monkfish Fillet</td>
<td>23.13%</td>
<td>23</td>
<td>30 €</td>
<td>37.61%</td>
</tr>
<tr>
<td>Overall Menu Goal Value</td>
<td>27.25%</td>
<td>247</td>
<td>18.41 €</td>
<td>37.61%</td>
</tr>
</tbody>
</table>

*Table 10 Goal Value Analysis data of Restaurant A*
Table 1 depicts the findings from Restaurant A, which ascertain what has been theoretically supported; Goal Value Analysis is a method based on common sense, not favoring specific cost aspects of menu items. Three of the dishes have scored above average and five below, within a score range of 3147.97. The ones above, namely Black Angus Burger, Turkey Club Sandwich and Grilled Lamb Chops are items with high contribution margin percentages, Lamb Chops and Black Angus Burger have competent prices, whilst all three are the most popular dishes of the menu, accounting for 72% of total sales. Beef Carpaccio has fallen short of the overall menu goal value; with slightly higher sales, the dish could score higher than 1162.48.

The four remaining items must be examined in pairs and separately. The two “puzzles”, the Monkfish and the Picanha, have scored relatively low, as the -previously-much-favoring contribution margin is not the sole determinant for classification here; therefore, low scores, especially for the Monkfish, were foreseeable. On the other hand, Chicken Tajin and Eggplant Gnocchi, the two “dogs”, have two of the worst scores and this comes as no surprise; low contribution margins, low selling prices, along with low popularity, do not enable them to reach a much higher position.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Menu Item</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Goal Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Black Angus Burger</td>
<td>0.2</td>
<td>556</td>
<td>17.8 €</td>
<td>3356,2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Turkey Club Sandwich</td>
<td>0.1819</td>
<td>600</td>
<td>12.8 €</td>
<td>2777.08</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Grilled Lamb Chops</td>
<td>0.2938</td>
<td>286</td>
<td>24.8 €</td>
<td>1653.44</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Overall Menu Goal Value</td>
<td>0.2725</td>
<td>247</td>
<td>18.41 €</td>
<td>1162.48</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Beef Carpaccio</td>
<td>0.2582</td>
<td>207</td>
<td>18.8 €</td>
<td>1055.69</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Picanha</td>
<td>0.38</td>
<td>91</td>
<td>60 €</td>
<td>825.65</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Chicken Tajin</td>
<td>0.1054</td>
<td>89</td>
<td>14.8 €</td>
<td>610.98</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Eggplant Gnocchi</td>
<td>0.2099</td>
<td>127</td>
<td>13 €</td>
<td>540.04</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Monkfish Fillet</td>
<td>0.2313</td>
<td>23</td>
<td>30 €</td>
<td>208.23</td>
<td></td>
</tr>
</tbody>
</table>

*Table 2 Goal Value Analysis Results of Restaurant A*

b. Restaurant B

The calculation of the overall menu goal value for Restaurant B, as shown in Table 12, is based upon a check average of 13,6€; this is results from dividing the season’s revenues of 21.664,5€ by the 1590 guests served.
The case of Restaurant B differs to some extent, from Restaurant A, as the calculated Goal Values indicate in Table 13. Here, the score range is 1170.72, a number considerably smaller and the dishes are split 50%-50%; four are performing above average and four below. The Club Sandwich and the Homemade Burger are the dishes with the most optimal combination of food cost, sales volume and price, thus classified first and second respectively. Right after them, the two “stars”, Sea Bass Fillet and Beef Fillet, as they also possess an optimal combination of the four values, with their lower sales being counterbalanced by their high selling prices. The rest items, namely Ravioli, Veal Carpaccio, Lamb Chops and Chicken Risotto, have scored below average, in fact from 301.72 to 340.89 below the average goal value. These scores are easily explained by the similarities between the four items, regarding their contribution margin percentages, which range from 79.01% to 63.2%, with their prices counterbalancing the proportional differences. The items also lie within a small popularity range of 37 dishes, consequently achieving low goal values. What is worth noting, is that, although Ravioli was a clear “dog” dish according to M.E.M., with Risotto, Lamb Chops and Carpaccio being “puzzles”, they managed to score higher than the other three, even with a minimal difference. This situation is a clear sample of the relativity and unreliability of two-dimensional matrices, that subsidize specific values, defying common sense.

<table>
<thead>
<tr>
<th>Item</th>
<th>Food Cost %</th>
<th>Number Sold</th>
<th>Selling Price</th>
<th>Variable Cost %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Club Sandwich</td>
<td>21.88%</td>
<td>424</td>
<td>9 €</td>
<td>30.25%</td>
</tr>
<tr>
<td>Lamb Chops</td>
<td>36.8%</td>
<td>87</td>
<td>15 €</td>
<td>30.25%</td>
</tr>
<tr>
<td>Ravioli</td>
<td>20.99%</td>
<td>59</td>
<td>13 €</td>
<td>30.25%</td>
</tr>
<tr>
<td>Chicken Risotto</td>
<td>25.41%</td>
<td>50</td>
<td>15.5 €</td>
<td>30.25%</td>
</tr>
<tr>
<td>Veal Carpaccio</td>
<td>33.86%</td>
<td>81</td>
<td>15 €</td>
<td>30.25%</td>
</tr>
<tr>
<td>Homemade Burger</td>
<td>27.89%</td>
<td>449</td>
<td>9.5 €</td>
<td>30.25%</td>
</tr>
<tr>
<td>Beef Fillet</td>
<td>41.76%</td>
<td>220</td>
<td>21.5 €</td>
<td>30.25%</td>
</tr>
<tr>
<td>Sea Bass Fillet</td>
<td>32.7%</td>
<td>251</td>
<td>18.5 €</td>
<td>30.25%</td>
</tr>
<tr>
<td><strong>Overall Menu Goal Value</strong></td>
<td><strong>36%</strong></td>
<td><strong>203</strong></td>
<td><strong>13.6 €</strong></td>
<td><strong>30.25%</strong></td>
</tr>
</tbody>
</table>

*Table 12 Goal Value Analysis Data of Restaurant B*
c. Implications of Goal Value Analysis

Goal Value Analysis constitutes a reliable “multi-dimensional” analysis method, as it provides the food service manager with a rounded and coherent view of the menu performance. Things are clearer in terms of input, as four values influence the final result equally, providing a sufficient field of action, in order to enhance individual profitability. The combination of variable cost, selling price, sales volume and labor cost, enable the food service manager to locate the problem more accurately and adopt a different and more suitable solution, depending on the value or values that should be increased. Furthermore, the manager has more flexibility, as scores indicate performance in pure numbers, avoiding classification, which “forces” him to follow a specific course of action, each time. Scoring under average does not necessarily imply failure; it is a matter of fact, to define what the tactical “response” should be.

Apart from sales volume, which cannot be directly changed, but rather directly influenced, the Food and Beverage Manager may attempt different approaches. Concerning value A, he or she may consider dropping the food cost, claiming that food quality will not be (considerably) affected. It is undoubtedly a matter of the Hotel itself; Hotel A, more than Hotel B, is not able to have a noticeable quality decrease, as this will have major implications in its brand name and its future sales and prosperity. Depending on the specifics of each dish, smaller or more significant alterations can be

<table>
<thead>
<tr>
<th>Rank</th>
<th>Menu Item</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Goal Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Club Sandwich</td>
<td>424</td>
<td>9 €</td>
<td>[1 - (0.2188 + 0.3025)]</td>
<td>1427.03</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Homemade Burger</td>
<td>449</td>
<td>9.5 €</td>
<td>[1 - (0.2789 + 0.3025)]</td>
<td>1287.55</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sea Bass Fillet</td>
<td>251</td>
<td>18.5 €</td>
<td>[1 - (0.327 + 0.3025)]</td>
<td>1157.84</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Beef Fillet</td>
<td>220</td>
<td>21.5 €</td>
<td>[1 - (0.4176 + 0.3025)]</td>
<td>771.05</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Overall Menu Goal Value</td>
<td>202</td>
<td>13.62 €</td>
<td>[1 - (0.36 + 0.3025)]</td>
<td>597.2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Ravioli</td>
<td>59</td>
<td>13 €</td>
<td>[1 - (0.2099 + 0.3025)]</td>
<td>295.48</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Veal Carpaccio</td>
<td>81</td>
<td>15 €</td>
<td>[1 - (0.3386 + 0.3025)]</td>
<td>288.41</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Lamb Chops</td>
<td>87</td>
<td>15 €</td>
<td>[1 - (0.368 + 0.3025)]</td>
<td>271.75</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Chicken Risotto</td>
<td>50</td>
<td>15,50 €</td>
<td>[1 - (0.2541 + 0.3025)]</td>
<td>256.31</td>
<td></td>
</tr>
</tbody>
</table>

Table 13 Goal Value Analysis Results of Restaurant B
made, always keeping an eye on quality, in any case. Regarding a potential labor cost
decrease, three are the actions that may be taken. The establishment may decide to
employ more skilled personnel, but less in number, try to purchase ingredients that are
ready to use or require little preparation, in order to shorten cooking times or
restructure its operational processes, either by employing more effective cooking
methods, or by obtaining state-of-the-art kitchen machinery and utensils, in order to
secure efficiency, improving the kitchen turnover. Finally, in terms of price, it lies upon
the elasticity of demand. A Food service Manager that keeps sales records of previous
years and meanwhile has good knowledge of the catchment area and the offering of
the hotel, possesses the flexibility to “test” the price elasticity. This model enables him
or her totally in this direction, as, by choosing the right variables, it is possible to
calculate the unknown ones and make “educated guesses”. The latter has serious
implications also in strategic planning and scenario making, a function that is not
possible with the M.E.M. and its enhanced version.

V. Conclusion

1. Summing-up

Menu Analysis stands as one of the most crucial aspects of what is called Menu
Management, a holistic approach regarding planning, designing, pricing and analyzing
the menu itself. Food service managers should analyze the profitability of their offering
frequently, as the analysis process has a central role in the whole procedure, being the
essential “reality check”. It facilitates measurement of current and overtime
performance, enables practitioners to plan in a more oriented and advised way and
also to “indulge” more in their professional “habitat”, getting to know their menu and
its implications more. Moreover, it empowers them to experiment with on a daily
basis, in order to fully comprehend and devise their cost-equation.

It is not a matter of more and less correct methods and models on cost
analysis; it is a matter of how much a Food service Manager wants to delve into the
data. The various profitability analysis models provide different outputs, depending on
the complexity of inputs. As such, M.E.M., although still used by many establishments
and by the two Hotels researched, due to its understandability and ease to use, it will always endow the specific values, which the researcher chooses as input, defying other data. A model that favors specific variables, based on a contribution margin analysis, cannot reveal the real profitability of a menu item, unless operating and labor costs are considered and limited variable interdependency is avoided. The enhanced M.E.M., on the other hand, although it takes labor costs into account, does not make any calculations upon them, but a rather qualitative estimation. This may assist in decision-making, to some extent, but does not provide a stable basis for calculations in real numbers, as profit measurement should be done accordingly. Until a concrete, qualitative method of labor measurement is established, the theoretical assumptions of LeBruto, Quain and Ashley do not possess a substantial practical utility.

On the other hand, Goal Value Analysis, by taking more values into account, aims to make more precise calculations and provide a more concrete picture, from a cost standpoint. Although scores are very convenient, in order to determine performance and benchmark, they tell little about profitability in monetary terms, however. Furthermore, Goal Value Analysis considers variable costs, namely labor, as remaining stable, which in practice, does not take place. Furthermore, the model becomes unnecessarily complicated for a hotel restaurant, if approached as initially described by Hayes and Huffman (1985), depicting, however, costs in a very reliable and accurate way, overall. Utilization of the approaches by Bayou and Bennett (1992) and Dopson and Hayes (2016), is more suitable to food service outlets of hotels, as the latter calculate their fixed and non-food related variable cost, except labor, not allocating it to individual departments.

The three models have evaluated the menus differently and their results underline their differences explicitly, as represented in Tables 14 and 15. Regarding Restaurant A, Simple and enhanced M.E.M. categorize four items as desirable, two in need of improvement and two as undesirable, whilst Goal Value Analysis classifies three dishes as desirable, one as improvement-bound and four as undesirable. On the other hand, for Restaurant B, the two versions of M.E.M. assess four items as desirable, three items that are in need of improvement and one as undesirable, while
Goal Value Analysis indicates that four items are desirable and four are undesirable; no items fall into a marginal state, as the undesirable items score relatively low values.

<table>
<thead>
<tr>
<th>Category</th>
<th>Simple and enhanced M.E.M.</th>
<th>Goal Value Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desirable</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Needs Improvement</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Undesirable</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

*Table 14 Model Classification Comparison of Restaurant A items*

<table>
<thead>
<tr>
<th>Category</th>
<th>Simple and enhanced M.E.M.</th>
<th>Goal Value Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desirable</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Needs Improvement</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Undesirable</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

*Table 35 Model Classification Comparison of Restaurant B items*

Although eliminating or re-shaping menu items is an “in-concreto” procedure and raw numbers do not take into consideration real-life situations and marketing aspects, such as clientele, need for menu diversity and the necessity for loss leaders existence, the three models unambiguously depict what can be done. More variables result in more actual results and by extension, in more advised decisions. Still, all the values that the

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13 17 Goal Value Analysis Classification classifies as “undesirable” anything that scored less than the ¼ of the dishes ranked as first. Restaurant A classification, regarding “Needs Improvement” class, refers to Beef Carpaccio, which is marginally lagging behind overall menu goal value.
model Hayes and Huffman managed to devise are “pure” cost and sales data, which keep the analysis entrenched in strictly quantitative factors.

2. Recommendations

As food-service managers plan, they should consider many factors, both quantitative and qualitative. In order to grasp the whole picture, therefore, profitability should be measured upon more criteria, which will provide even more reliable and palpable results. This is bound to be achieved only by the analysis of multifaceted data, and this is the point at which the food service manager needs to exercise his or her experience, judgement and statistic skills.

This work aims to devise a multi-dimensional and holistic, non-parametrical model, that surmounts the interdependency of two-dimensional matrices and incorporates various factors, aiming for a more accurate profitability measurement. The model will surpass the limitations of Menu Engineering, whilst incorporating more determinants than Goal Value Analysis, namely more than four variables and not only quantitative ones. This theoretical model will be a Multifactor Menu Analysis, partly based on multivariate regression and partly on Data Envelopment Analysis. Developed in 1978 by William Cooper, in order to measure the efficiency of government and non-profit operations, D.E.A., is a non-parametrical model that accounts both for controllable and non-controllable variables. It produces a single relative to best index, based on efficiency scores, allowing for comparison against the best-performing rather than average menu items (Taylor, et al., 2009), thus being very much in line with the basic ideas of the benchmarking concept (Sigala, et al., 2005), avoiding average numbers.

Three steps should be taken, in order to perform the Multifactor Analysis. Firstly and most importantly, all variables that influence menu profitability should be documented, such as gross profit, weighted average gross profit, (standard) food cost, sales volume, labor cost, other food- and non-food related variable costs, fixed costs of the establishment, guest satisfaction and productivity. Secondly, after having defined all the determinants in a clear way, a multivariate regression test should be carried
out, in order to choose the appropriate inputs, which have a close correlation in menu profitability. Finally, the D.E.A. can be conducted, by employing appropriate mathematical formulas in order to define menu profitability and evaluate the menu items, against the “best-in-class” dishes.
VI. Works Cited


