Menu engineering in upscale restaurants

Paul Morrison Senior Lecturer, Department of Business, University of Queensland, Gatton, Australia

Profiles the development of menu-engineering models and, in particular, the movement supporting the quantification of all costs associated with the production of a menu item. Reports the findings of a study of upscale restaurant menu planners. While all menu planners adopted elements of menu engineering when planning menus, most rejected the opportunity to factor in non-material direct costs as a major component of determining menu content and prices. In particular, individual dish labour cost was not considered an important menu-planning criterion. Dishes which attracted low sales, but which planners felt added interest to the menu, were included on the menu. This supports the view of most advocates of quantitative menu analysis that the profitability of individual dishes on the menu is only one of several important criteria when designing the menu.

International Journal of Contemporary Hospitality Management
8/4 [1996] 17–24

[ISSN 0034-6658]

Introduction

Few menu analysis techniques have been embraced so readily and institutionalized as quickly as menu engineering. Menu engineering has been widely reported and discussed in the hospitality literature and has been frequently adopted as an integral part of the food service curricula in hospitality education worldwide. The term, made popular through Kasavana and Smith[1], has become the generic term used to describe menu cost/margin/volume portfolio analysis.

Initially, menu engineering promised a panacea for menus which were not realizing their profit potential. Menu engineering seemed, theoretically at least, to be capable of steering the menu towards optimum profitability; the perfect permutation of dishes which would greatly enhance the competitive edge of the business. The fact that menu engineering developed in parallel to the increasing availability of cost-effective, user friendly spreadsheets was a happy coincidence and one which made it attractive to hospitality academics. It took what the entrepreneurial chef had used intuitively for years and packaged it into a computerized, scientific model which everyone could understand.

This article aims to summarize the development of menu engineering and similar tools of menu analysis. It also reports on a 1995 study of menu planning criteria used by menu planners in a sample of mid to upscale Australian restaurants. A relationship is established with the published techniques and the practices of menu planners in this category of restaurant. The discussion includes an examination of the importance of labour as a key variable in determining the contribution margin of each menu item.

Menu engineering development

The original matrix approach of Miller[2] sought to identify menu items by their cost percentage and their proportion of total sales. Items with high popularity and a low cost percentage were classified as "winners" and those with low popularity coupled with a high cost percentage were called "losers". The dishes which fitted the other permutations of popularity to cost percentage were called "marginals". The profitability strategy that was advocated to menu planners was to improve the ratio of winners on the menu through a range of operational tactics concerning selling price, cost price and promotions.

Kasavana and Smith offered an alternative model to Miller. They preferred contribution margin (selling price less direct costs) and popularity as indicators of more desirable menu item characteristics, as opposed to food cost percentage and profitability. A comparison of the Kasavana and Smith and Miller matrices is shown in Figure 1.

Both of the above models were amended by Pavesic[3]. Pavesic reasoned that promoting the sale of a menu item which contributed to a large proportion of sales and had a low cost percentage, would be counter-productive if the item had a low selling price relative to substitute products on the menu. For example, if lasagne was a popular menu item and sold for $7.50 with a food cost of $1.50, the food cost percentage of 18.75 per cent, coupled with high popularity would classify it as a winner. A moderately popular stir fry combination selling for $11, with a food cost of $3.50 would have a food cost percentage of 31.81 per cent and would be classified as a marginal. If lasagne competed directly with stir fry, Miller's model indicated that sales of lasagne should be encouraged in preference to stir fry. i.e. winners should be promoted in preference to marginals. The weakness in the model is that the dollar gross profit of stir fry is $1.50 greater than the gross profit of lasagne, and, if all variables in the model remain static, (i.e. the sale of one item does not influence sales in other menu categories such as beverages or sweets), promoting the sale of lasagne would reduce total profitability because of a lower margin of profit as illustrated in Table I.

Weighting the contribution margin

Pavesic[3] factors two additional variables into his menu analysis model. He argues that if contribution margin is the key to profitable

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Figure 1
Comparison between Miller and Kasavana and Smith matrices

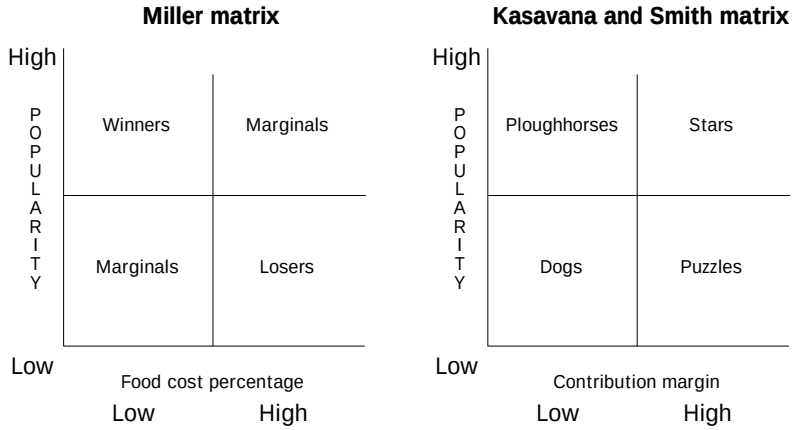


Table I
Profitability of lasagne compared with stir fry

Menu item	Food cost	Selling price	Gross profit	Food cost %	Sales volume	Classification
Lasagne	1.50	7.50	6.0	18.75	High	Winner
Stir fry	3.50	11.00	7.50	31.81	Moderate	Marginal

Note: The sale of the low volume stir-fry produces a greater unit dollar profit margin

menu items as advocated by Kasavana and Smith, dishes which demonstrate high contribution margins generally have higher selling prices, which has negative repercussions in a price sensitive market. The contribution margin model would direct the best strategy only when the market was growing and would tolerate high prices. If the market was flat owing to excess supply, or declining owing to reduced demand, high priced/high contribution margin dishes would appear less attractive to the customer. He contends that the food cost percentage and the contribution margin should be weighted by popularity, and that the most desirable menu items are those which have a high weighted contribution margin and low food cost percentage. Pavesic concludes that menu engineering could be used effectively for the management of both individual dishes and menu categories as well as all beverage items, but qualifies his endorsement of menu engineering by saying that it should only be used in combination with the many non-quantifiable items considered by menu planners.

Criticisms of early engineering models

Hayes and Huffman[4] and Atkinson and Jones[5] have drawn attention to the somewhat conflicting management strategies indicated by the early menu engineering matrix models. They have demonstrated that, given identical menus, costs and sales, some dishes could migrate between two or even three quadrants depending on the model used. In addition, the practice of positioning the axes on the matrix as averages of the food cost percentage, contribution margin or popularity, means that all dishes are positioned relative to one another so some dishes must always appear in the less favourable categories. If a dish eases from a less to a more favourable category, by definition other dishes slide from a more to a less favourable position on the matrix. Beran[6] states that, if the goal of menu engineering is to maximize contribution and therefore maximize profits, then the use of a mean for comparison is incorrect. "Since a mean is used as the separation point, by definition there must be some menu items below the mean and some above it, unless all items are equal."

Factoring in labour and other non-material variable costs

A major criticism levelled at the matrix models is that they assume that all non-material direct costs are equally related to all menu items. By using linear regression, labour, energy and other direct costs can be separated accurately into their fixed and variable components[7]. It is therefore theoretically possible to apportion these costs to

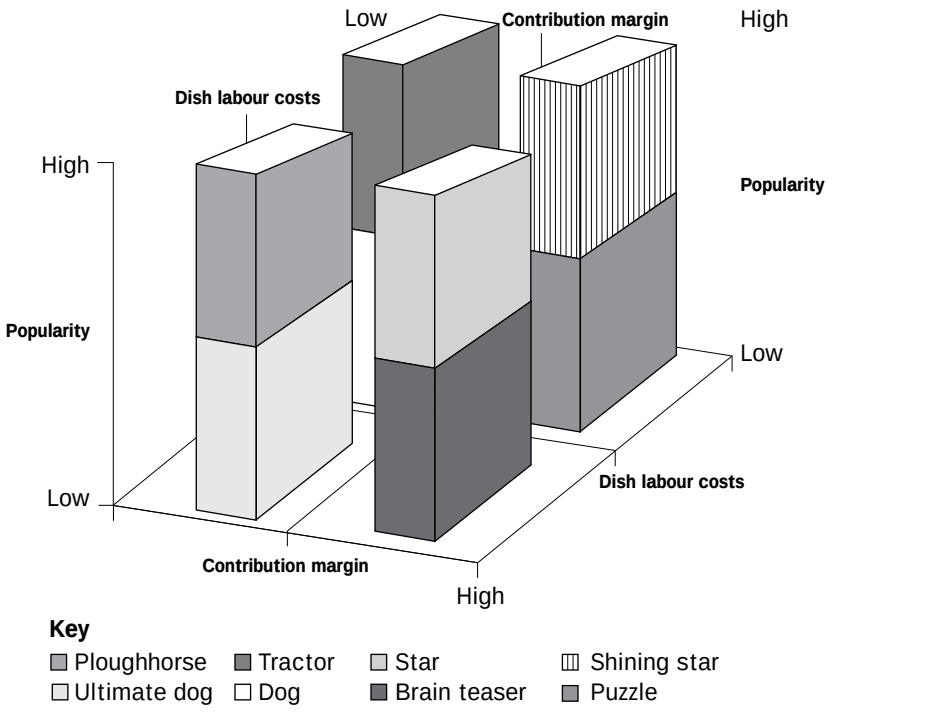
each menu item, thus establishing a net profit for individual dishes. The term "contribution margin" has also lacked clarity in some of the models. If contribution margin is taken to mean the difference between revenue and variable costs, then clearly all costs incurred in the production and service of an item should be factored in. If however the term "contribution margin" is interpreted as the difference between revenue and material cost (often described as gross profit), then those models which only isolate material cost are deficient. Dishes which are low in material cost and high in other variable costs appear to be more attractive than those dishes with high material costs and low variable costs. The problems become more apparent with the increasing trend towards purchasing pre-prepared foods. These value added foods are inherently more expensive than the sum of their raw material costs as they include the labour processing costs in the material purchase price. As their purchase price is considered a material cost in the conventional menu engineering matrix, they appear less attractive than dishes prepared completely on site, as the labour cost associated with on-site production is ignored.

Hayes and Huffman[4], Bayou and Bennett[8] and LeBruto *et al.*[9] have each addressed the question of improving the variable cost weakness but have tackled the refinement of the matrix models in different ways. LeBruto *et al.* have persisted with the matrix concept developing a refinement of the Kasavana and Smith model. Labour costs are included in their model by making a value judgement as to whether dishes have a high or low labour component. Eight possible dish classifications emerge as illustrated in Figure 3.

LeBruto *et al.*[9] argue that a three-dimensional matrix incorporating labour costs offers a more precise analysis and ultimately a better opportunity to achieve given financial objectives by serving fewer customers, as the menu is driven by a contribution margin approach.

Hayes and Huffman[4] avoid a matrix approach with its inherent problem of comparing averages and propose individual profit and loss statements for each competing item within each menu category. All direct costs are deducted from revenue and each dish is evaluated on its merits. As individual contribution to profit is only one of many factors to consider when designing a menu, Hayes and Huffman stress the need to monitor sales volume and consumers' perceptions of product quality. They emphasize that the objective of menu analysis should be to complement the strategic goals of the total operation.

Figure 3
Three-dimensional matrix with eight dish classification sectors



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Goal values

Hayes and Huffman favour the use of goal value (GV) analysis as a convenient means of discriminating between those items which make a greater contribution to profit and those that do not. The goal value of a menu item is quickly assessed by using the following equation.

GV = gross profit percentage
× number of portions sold [selling price
× (1 – total variable cost percentage)]

The goal value of the total menu can be established as a benchmark using the combined cost percentages, the average check and total number of covers. The goal value of each dish can be compared with that of the total menu and, if it falls below the benchmark, it then has to justify its existence against other criteria. Goal value can also be used as a means of projecting alterations to any of the variables in the formula to measure the effect of changes to menu prices, costs and choice. Management can then make a better informed decision on the wisdom of such alterations.

Bayou and Bennett[8] suggest that profitability analysis should move down the hierarchy beginning with the restaurant as a whole, moving to specific meal times, to menu or drinks categories and finally focusing on specific items within each menu or drink category as in Table II. Key performance measurements should relate to these levels and tactical pricing should focus on dish profitability.

The study

The purpose of the study reported here was to ascertain the criteria used by menu planners when determining their menu. The opportunity to investigate menu planning arose from a project which sought to investigate the use of game meats (kangaroo, emu, crocodile, buffalo and camel) on restaurant menus. Game meats have only recently been available for sale on restaurant menus and they are still a low-volume, novelty item. The image and stronger flavours of game meats currently confine their use to the more adventurous palates of customers in medium to upscale restaurants. Kangaroo meat excepted, material costs are high and the low volume incurs higher than average labour and ancillary direct costs. Under traditional menu engineering models, most game meat dishes would be classified as problems, losers, dogs or ultimate dogs. If the conventional wisdom of menu engineering is applied then these dishes would be removed or repositioned by price, menu graphics or copy. By interviewing menu planners about the role of game meat dishes on their menus, it would be clearer whether the principles of menu engineering were being applied in practice in upscale restaurants.

Method

An exploratory study was undertaken to ascertain menu planners' attitudes towards game meats. The study took place between September 1994 and January 1995. The survey entailed an in-depth personal interview with restaurant menu planners. The use of personal interview was favoured as it allowed for a more detailed assessment of the operational procedures and practices of menu planners, particularly when terminology can be interpreted in different ways. This meant that the statistical benefits of having a large sample were sacrificed in favour of ensuring that the meanings of the responses recorded were as close as possible to the meaning intended by the respondent.

A list of members of the Restaurant and Caterers Association of Queensland (RCAQ) was used as the basis of the sample. The RCAQ is the largest professional employer association representing the restaurant trade in Queensland. Their membership is representative of the industry, apart from underrepresentation in the ethnic restaurant sector which comprises 25 per cent of the restaurants in the state. Forty-five restaurants recommended by the RCAQ as likely game meat users were contacted in the Brisbane Central Business District. Each was sent a letter of

Table II
Levels of profitability analysis

Level of restaurant segment	Restaurant segments	Time frame for analysis
Most comprehensive	The whole restaurant	Both short and long term
⇓	Individual business	
⇓	operations or meal segments	Both short and long term
⇓	Menu categories	Both short and long term
Least comprehensive	Individual menu items	Both short and long term

introduction which was followed by a telephone call to arrange an appointment to conduct the interview. Twenty-one restaurants participated. The findings from the sample should not be taken as representative of all south-east Queensland restaurants but provide an insight into the thinking of menu planners in a particular class of restaurant and a useful basis on which to design a more representative study in the future.

Results and discussion

Average check

Eighty per cent of restaurants had average food checks greater than A$30 and 60 per cent had average food checks greater than A$40. In Brisbane, this level of average check would indicate a mid to upscale restaurant.

Job titles of "menu planners"

The menu planners in 16 of the 21 participating restaurants classified themselves as head or executive chefs. The remainder were managers or owners working closely with their chefs. Menus were exclusive to each restaurant. This intimate linkage between menu planner and production manager is one which is likely to be more prevalent in upscale restaurants than in other restaurant sectors. In the budget chain restaurant, fast food and retail catering sectors, the product is produced to a precise formula. Operatives' jobs are deskilled and most decisions programmed. Further decisions regarding the food to be offered, the methods of production and the selling price are normally taken at a more senior management level. The scientific application of menu engineering techniques in upscale restaurants is therefore tempered by the joint roles of menu planner and artisan chef where gastronomic considerations may conflict with financial objectives in the short term. It may well be easier for senior management in low to medium check food service operations to apply menu engineering strategies and make menu planning decisions based on quantitative evidence, as they are distanced from the product. To them the menu is more a company product list than a personal statement of gastronomic values.

Frequency of menu change

Only one restaurant had a daily menu change and two restaurants changed every 28 days. Most of the remaining restaurants favoured menu changes at periods of between three and six months. This menu stability suggests that almost all menus in the upscale restaurants examined were good candidates for menu analysis. Following a menu profitability analysis, fine tuning of the menu would be feasible, as the effects of changes to individual items on other items could be monitored over an extended period of time.

Criteria considered when designing dishes to appear on the menu

Menu planners were asked to rate the importance of the following menu planning criteria (adapted from [10]) on a five-point scale with 1 denoting "unimportant" and 5 denoting "very important".

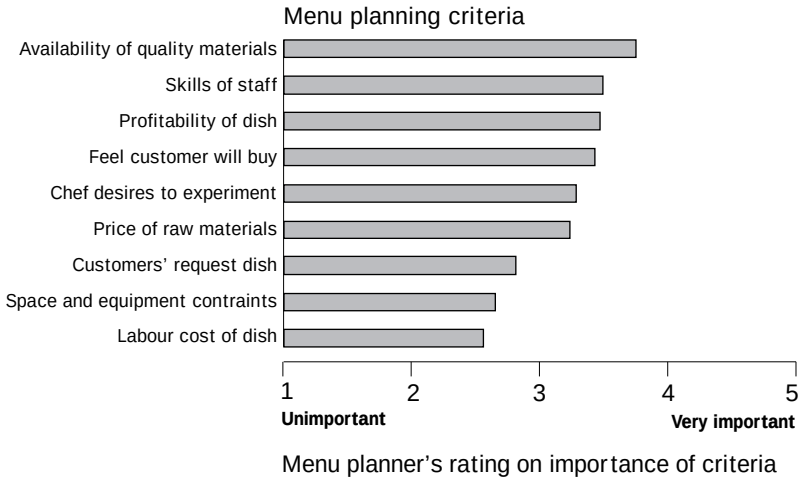
- cost of raw materials involved in menu item;
- labour cost of menu item;
- probable profitability of menu item;
- their own desire to experiment with different foods;
- skills of staff needed to produce menu item;
- availability of suitable materials for menu item;
- space and equipment constraints for menu item;
- customers have requested the menu item;
- their expectation that customers will buy the menu item.

The average of the ratings are ranked in Figure 4.

The gastronomic quality and originality of dishes were considered to be very important to all the menu planners and they generally saw themselves as "value adding" high quality foods into attractive composite dishes; hence the premium on the "availability of quality materials" criterion. Although profitability of each dish was rated highly, "profit" was interpreted as gross profit (selling price less theoretical material cost) rather than the profit once all direct costs had been deducted. The menu planners in the sample were therefore very conscious of their obligations to control food costs, but other direct costs seemed of much less relevance, even though planners could influence all direct costs with the content of their menu. Labour input was the lowest ranked variable in terms of importance. Unlike food cost control, responsibility and reward for efficient labour management was not seen as the prime responsibility of menu planners. This conflicts with the menu analysis models of Hayes *et al.*[4], Bayou *et al.*[8] and LeBruto *et al.*[9], which all stressed the importance of including labour as a major criterion when deciding what to include on the menu.

Labour or payroll costs are often thought to be as important as material costs, on the grounds that payroll cost percentage is often similar to material cost percentage. However, as most food and beverage payroll costs are incurred front of house, in supervisory

Figure 4
Relative importance of different criteria when planning a menu in upscale restaurants



positions and in ancillary departments, this relationship between menu items and payroll is misleading. Even if a menu became much more labour intensive to produce, it would only make a marginal difference to overall food and beverage payroll costs as service and ancillary payroll would remain unchanged. For example, using estimated Australian hospitality industry averages for upscale restaurants, payroll and material costs on sales of $9,595 would be divided as illustrated in Table III.

If labour intensive dishes are replaced by non-labour intensive dishes, resulting in production payroll costs being reduced by 25 per cent, then net profit would increase from $1,100 to $1.363.75, i.e.: under 15 per cent of sales. If a similar reduction of 25 per cent were initiated in food costs as a result of judicious menu engineering, then net profit would increase from $1,100 to $1,875, i.e.: over 19 per cent of sales. See Table IV.

Table III
Division of costs by proportion in upscale restaurant sector

Payroll	$	Percentage of sales
Management / control	479	5
Purchasing / stores	191	2
Production	1,055	11
Service	1,246	13
Cleaning / ancillary	479	5
Total	3,450	36
Materials	3,000	31.3
Non-material / costs	2,045	21.3
Net profit	1,100	11.4
Sales	9,595	100.0

The profit multiplier (sensitivity of profit to a change in a particular variable) impact of a reduction in production labour costs is therefore low when compared to a similar percentage reduction in food costs. This outcome supports the views of Miller[2] and Kasavana and Smith[1],and although customers may not order a game meat dish, the inclusion of game dishes adds "pizzazz" to the menu and a different dimension to the meal experience.

The most common strategies for coping with low margin and unpopular dishes were to:

- subsidize lower margin dishes from higher margin dishes; and
- promote the sale of less popular dishes by personal selling, better merchandising and re-naming/repackaging less popular dishes.

The elimination of less profitable but interesting dishes was seen as a last resort.

These points endorse strategies advocated by menu engineering theorists for the treatment of low-volume items at both high and low contribution margins. However, in the sample studied, the analysis of menu profitability was done primarily by feel and intuition and, if related to Bayou *et al.*'s[7] hierarchy, the hard number crunching stopped at the specific meal segment of profitability. Below that level, estimated gross profits were all that was considered essential.

Conclusion

In the restaurants surveyed, there was no evidence that menu planners undertook a formal menu analysis, comparing the performance of each dish with others on the

Table IV
Comparison of the impact on net profit of a 25 per cent change in production payroll costs and food costs

Payroll	$	Percentage of sales	Impact on profit by reducing production payroll by 25 per cent	Impact on profit by reducing food costs by 25 per cent
Management / control	479	5	479.00	479.00
Purchasing / stores	191	2	191.00	191.00
Production	1,055	11	791.25	1,055.00
Service	1,246	13	1,246.00	1,246.00
Cleaning / ancillary	479	5	479.00	479.00
Total	3,450	36	3,186.25	3,450.00
Materials	3,000	31.3	3,000.00	2,250.00
Non-material / payroll costs	2,045	21.3	2,045.00	2,045.00
Net profit	1,100	11.4	1,363.75 (14.9%)	1,850.00 (19.3%)
Sales	9,595	100.0	9,595.00	9,595.00

menu either by matrix analysis or marginal analysis. However, each menu planner did claim to know the profitability of each dish and, where unit or total profitability was low, justified their continued inclusion on the menu on other grounds. This strategy is compatible with all published advocates of menu analysis who recognize that, where a dish cannot be adequately justified on the grounds of unit or total contribution to profit, it can be justified on other criteria. The criteria may be very subjective, but still very important to the menu planner.

Accuracy of costing

Fifteen respondents claimed to know the material cost of each dish within 10 per cent accuracy while the remainder claimed an intuitive feel for the cost of each dish. It appears that some restaurants had only a rough idea of the costs of production. Only one of the restaurants used a stock control system tied to point of sale machines which would facilitate the accurate determination of material costs. The variability of food inputs, both in terms of purchase price and adherence to specifications, meant that methods and costs of production did not appear to be highly standardized.

Application of menu engineering techniques

The principles behind the treatment of different dish categories (stars, etc.) were understood by all chefs. Game meat dishes all fell into puzzles/marginals or losers/dogs categories as their volume was low, material cost high and contribution margins restricted by the selling prices of competing dishes on the menu. However, there was a strong body of opinion that to stimulate customers' interest, menus were obliged to feature dishes which:

- were less profitable;
- offered lower margins because the customer would resist prices above a certain level; and
- were necessary to add variety to the menu.

Despite the evidence that game meats do not contribute significantly to profit, menu planners felt that they were important to the overall appeal of the menu. The matrix models of Miller, Kasavana and Smith, LeBruto *et al.* and Pavesic[1-3,9] were not used as menu analysis tools but the principles behind the positioning of dishes and the strategies to deal with desirable or less desirable positions were implemented to a degree. The importance of non-food operational costs in the income statement approach of Bayou and Bennett was not supported. Of the menu analysis techniques discussed, the variables influencing the goal value approach of Hayes and Huffman appeared to have the widest acceptance, in that menu planners used the following information when deciding what to do with particular menu items:

- the individual food cost percentage of each dish;
- the number of units sold;
- the selling price of each dish;
- the total food cost percentage for the menu;
- an appreciation of the non material costs involved in producing a dish.

"Goal value" as a defined figure was not used by menu planners but the rationale behind the establishment of a benchmark with which to compare individual menu items was understood and adopted. As Hayes and Huffman note, menu analysis will always involve educated guessing and all a quantitative approach can do is help to improve the accuracy of the guesses. Isolating individual dish labour costs and other non-food variables was seen as impractical by the upscale

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restaurant menu planners investigated. Given the low profit multiplier of these variables when compared to food costs, this strategy seems to be financially as well as practically justifiable.

While a pilot survey of the type undertaken can give useful insights into how menu analysis is being applied in upscale restaurants, a major question that requires further investigation concerns the reasons why menu planners do not totally embrace menu engineering, given the advanced state of information technology and the theoretical benefits of menu engineering in financial terms. This reticence on behalf of menu planners may well reflect the priorities of the artisan chef who, when being interviewed, demonstrates a craftsperson's pride in their work. Product quality is clearly more important to them than short-term cost/profit objectives. It may well be that economic rationalism is tempered by these issues which mean that menu engineering is seldom more than a partial, selective process.

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