Research Report

Management accounting practices in the UK food and drinks industry

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Executive summary

Management accounting evolution
Since the early 1980s a number of ‘innovative’ management accounting techniques have been developed such as activity-based techniques (costing, budgeting and management), strategic management accounting and the balanced scorecard. It is believed that these ‘new’ techniques have been introduced to overcome a claim that ‘outdated’ management accounting practices had provided misleading information for planning, controlling, decision making and communication. Changes in the business environment have almost always been cited as the impetus for firms to implement more advanced practices and adapt their management accounting systems. The International Federation of Accountants (IFAC) (in its statement on Management Accounting Concepts) describes the development of management accounting as an evolution in four stages:

• Stage 1 (pre-1950) – cost determination and financial control.
• Stage 2 (by 1965) – provision of information for management planning and control.
• Stage 3 (by 1985) – reduction of resources waste in business process.
• Stage 4 (by 1995) – creation of value through effective use of resources.

Each stage is characterised by adopting a number of new management accounting practices (MAPs) in addition to reshaping and adaptation of the old practices to fit with the new in addressing a new set of conditions in the business environment. Much has been written about individual new MAPs throughout the 1990s and early 2000s. However, little empirical evidence exists on the actual combination of new and old MAPs in the UK.

The nature and structure of the study
With an annual turnover of some £70 billion, the food and drinks industry is the largest in the UK’s ‘manufacturing’ sector. Despite this, little is known about the specific management accounting practices employed across the industry.

This study aims to report the results of a large scale empirical survey about the current usage of MAPs in the UK food and drinks industry. In particular the survey aims to explore how ‘sophisticated’ MAPs across the industry are. In this context we measure the sophistication as a move towards the implementation of MAPs related to the latest stage of management accounting evolution. The study also reports on how MAPs are influenced by three groups of contingent factors. These are:

• External factors (perceived environmental uncertainty and customers’ power).
• Organisational factors (competitive strategy, decentralisation and firm’s size).
• Processing factors (complexity of processing system, product perishability, total quality management, just-in-time system, and advanced manufacturing technology).

The report comprises seven chapters. The first chapter gives background to the research project and its aims. Previous literature is reviewed in the second chapter and two research questions are articulated. In Chapter 3 the design of the empirical study is described. Management accounting practices employed by responding food and drinks companies are summarised in Chapter 4 while the classification of companies into the four stages of management accounting evolution is undertaken in Chapter 5. In Chapter 6 we investigate the relationship between the level of MAPs sophistication and the three groups of contingent factors. The last chapter summarises the findings and considers their implications.
Findings and implications
Our findings are based on analysis of 245 questionnaires completed by management accountants and production managers. The food and drink processing companies to which these respondents are attached have a range of characteristics including:

- An average value of total assets of £27.5 million but wide dispersion around that.
- A moderately high level of perceived environmental uncertainty.
- Being part of a value chain in which their customers, often supermarkets, have considerable power.
- Tending, on the spectrum of competitive strategy, towards product differentiation rather than cost leadership. This is supported by a high level of product diversity and complexity.
- A moderately high level of monitoring and control of quality.
- No strong evidence of decentralisation and delegation or of the application of advanced (automated) manufacturing (processing) technologies.
- A high level of perishability of product which corresponds with moderately high engagement with JIT.

Analysis of the accounting practices suggests that the management accounting systems employed in many food and drinks companies are not particularly sophisticated. When cluster analysis is applied to group respondent firms according to their scores on the four stages of management accounting sophistication 19% of firms were found to be in Stage 1 of evolution, 41% in Stage 2, 30% in Stage 3 and only 13% in Stage 4. We conclude that management accounting systems in many UK food and drinks companies are moving, but only slowly, from a simple or naive role of cost determination and financial control towards a more sophisticated role of creation of value through effective resource use.

Budgeting, product profitability and financial performance measurement remain the central pillars – 98% of companies use budgeting for planning, 97% use budgeting for cost control, 97% do product profitability analyses, and 93% apply financial measures in performance evaluation. At the other end of the scale some of the newer management accounting practices are less widely used than might be assumed from a reading of the textbooks; for instance 55% of companies have never used activity-based costing, 63% have never used EVA or residual income, and 37% have never used DCF. Taking the industry as a whole, there is little evidence of management accounting directly connected with 'value creation'. There are however indications that increased use may be expected of techniques relating to cost of quality information, non-financial measures relating to employees, and the analysis of competitors' strengths and weaknesses.

We suggest that many companies might benefit from benchmarking themselves against the MAPs in different stages of evolution and adopting those 'more advanced' practices that are appropriate to their particular circumstances. Use of contingency theory shows that more sophisticated management accounting is positively associated with the following characteristics: size, decentralisation, powerful customers, advanced processing technology, JIT and TQM. For educators, professional bodies and society generally the implication is that the gap between what purports to be 'best practice' and actual practice shows that there is considerable room for improved dissemination of concepts and techniques.
1. Introduction

During the 1980s Kaplan, in his review of The Evolution of Management Accounting (1984) and with Johnson in the Relevance Lost book, levelled strong criticism at the management accounting practices of the day. He claimed that:

‘Virtually all of the (management accounting) practices employed by firms today and explicated in leading cost accounting textbooks had been developed by 1925 ... there has been little innovation in the design and implementation of cost accounting and management accounting control systems.’ (Kaplan, 1984, p.390)

Furthermore, it was argued that the practices were inappropriate and, more specifically, that they:

• did not meet the needs of the contemporary manufacturing and competitive environment
• provided misleading information for decision-making purposes
• had become subservient to financial accounting requirements
• focused almost entirely on internal activities with little attention given to business’s external environments.

Since then, and perhaps in response to these criticisms, a number of innovative management accounting techniques have been developed across a range of industries. The most notable contributions are activity-based techniques which include activity-based costing, activity-based budgeting and activity-based management, strategic management accounting and the balanced scorecard. These new techniques have been designed to support modern technologies and new management processes, such as total quality management and just-in-time production systems, and the search for a competitive advantage to meet the challenge of global competition.

It has been argued that these ‘new’ techniques have affected the whole process of management accounting (planning, controlling, decision-making, and communication) and have shifted its focus from a ‘simple’ or ‘naive’ role of cost determination and financial control, to a ‘sophisticated’ role of creating value through the use of resources. Before exploring these shifts in the context of the food and drinks industry, we consider the development of sophistication of management accounting generally.

In 1998 the International Federation of Accountants (IFAC) issued a statement describing the development of management accounting through the following four sequential stages:

2. Provision of information for management planning and control (by 1965).
4. Creation of value through effective resources use (by 1995).

1.1 Stage 1. Cost determination and financial control
IFAC describes management accounting before 1950 as a technical activity necessary for the pursuit of organisational objectives. It was mainly oriented towards the determination of product cost. Production technology was relatively simple, with products going through a series of distinct processes. Labour and material costs were easily identifiable and the manufacturing processes were mainly governed by the speed of manual operations. Hence, direct labour provided a natural basis for assigning overheads to individual products. The focus on product costs was supplemented by work on budgets and financial control of production processes. Such development stemmed primarily from practical innovations by managers and engineers (Ashton, Hopper and Scapens, 1995).

The strong position held by Western countries in international markets made their products highly regarded. They could be sold relatively easily, and competition on the basis of either price or quality was relatively low. There was little innovation in products or production processes as existing products sold well and the production processes were well understood. Accordingly, management was concerned primarily with internal matters, especially production capacity. The use of budgeting and cost accounting technologies was prevalent in this period. However, the dissemination of cost information tended to be slight, and its use for management decision-making poorly exploited (Ashton et al., 1995).

1.2 Stage 2. Provision of information for management planning and control
In 1950s and 1960s the focus of management accounting was shifted to the provision of information for planning and control purposes. It is seen by IFAC as a management activity, but in a staff role. It involved staff (management) support to line management through the use of such technologies as decision analysis and responsibility accounting. Management controls were oriented towards manufacturing and internal administration rather than strategic and environmental considerations. Management accounting, as part of a management control system, tended to be reactive, identifying problems and actions only when deviations from the business plan took place (Ashton et al., 1995).

1 See, for example, Drury (1996).

1.3 Stage 3. Reduction of resource waste in business processes

The world recession in the 1970s, following the oil price shock, and the increased global competition in the early 1980s threatened the Western established markets and led to a decline in their protected markets. The increased competition was accompanied and underpinned by a rapid technological development which affected many aspects of the industrial sector. The use, for example, of robotics and computer-controlled processes improved quality and, in many cases, reduced costs. Also developments in computers, especially the emergence of personal computers, markedly changed the nature and amount of data which can be accessed by managers. Thus the design, maintenance and interpretation of information systems became of considerable importance in effective management (Ashton et al., 1995).

The challenge of meeting global competition was met by introducing new management and production techniques, and at the same time controlling costs, often through reduction of waste in resources used in business processes (IFAC, 1998). In many instances this was supported by employee empowerment. In this environment there is a need for management information, and decision making, to be diffused throughout the organisation. The challenge for management accountants, as the primary providers of this information, is to ensure through the use of process analysis and cost management technologies that appropriate information is available to support managers and employees at all levels.

1.4 Stage 4. Creation of value through effective resources use

In the 1990s world-wide industry continued to face considerable uncertainty and unprecedented advances in manufacturing and information-processing technologies (Ashton et al., 1995). For example the development of the world-wide web and associated technologies led to the appearance of E-commerce. This further increased and emphasised the challenge of global competition. The focus of management accountants shifted to the generation or creation of value through the effective use of resources, through the use of technologies which examine the drivers of customer value, shareholder value, and organisational innovation (IFAC, 1998).

The four stages of the evolution of management accounting described by the IFAC statement are illustrated in Figure 1.
A critical difference in the shift between Stage 2 and Stages 3 and 4 is the change in focus away from information provision and towards resource management, in the form of waste reduction (Stage 3) and value creation (Stage 4). However, the focus on information provision of Stage 2 is not lost, but is refigured in Stages 3 and 4. Information becomes a resource, along with other organisational resources; there is a clearer focus on reducing waste (in both real and financial terms) and on leveraging resources for value creation. Accordingly, management accounting is seen in Stages 3 and 4 as an integral part of the management process, as real time information becomes available to management directly and as the distinction between staff and line management becomes blurred. The focusing of the use of resources (including information) to create value is an integral part of the management process in contemporary organisations.

1.5 Research objective and method
The aim of this study is to investigate the current state of management accounting practices in the UK food and drinks industry and explore its ‘sophistication level’. In this context sophistication refers to the capability of a management accounting system to provide a broad spectrum of information relevant for planning, controlling, and decision-making all in the aim of creating or enhancing value. Increased sophistication is manifested by a move from the stage of cost determination and financial control to the stage of creation of value. We survey the perceived value of ‘newer’ management accounting techniques and the extent to which they are becoming more widely used. In particular we explore whether, and to what extent, the sophistication of a management accounting system is related to the following possible explanatory variables:

- external factors: environmental uncertainty; customers’ power
- organisational factors: competitive strategy; structure; size
- processing factors: system complexity; extent of implementation of advanced manufacturing technology; implementation of total quality management techniques; implementation of just-in-time techniques and product perishability.

Previous non industry-specific studies (e.g., Chenhall (1997); Chenhall and Morris (1986); Chia (1995); Chong (1996); Chong and Chong (1997)) have found relationships between the performance of strategic business units and these factors. However, they have all investigated the relationship between the factors and performance. None has investigated the effect of management accounting practices (MAPs) on these relationships or looked at them in the UK context.

The UK food and drinks sector provides the context for this research. It is the largest industry sector in the UK; Mann et al. (1999b) indicate that it provides employment for over three million people from primary producers to manufacturers and retailers, and it accounts for 9% of gross domestic product. Despite this the sector is under-researched in the management accounting field. It is of particular interest because, according to Heasman and Henson (1997), the industry is ‘over-regulated’ with regulations mainly related to the quality of products. On this basis we expected to find an emphasis on total quality management and an adoption of advanced manufacturing and processing techniques which may influence management accounting practices.

1.6 Outline of the report
This report consists of seven chapters. The second chapter presents a brief industry context and the research questions addressed in this study. Chapter 3 describes the design of the empirical study. The survey findings related to management accounting practices in the UK food and drinks industry are summarised in Chapter 4. As this study aims to investigate the relationship between the sophistication of management accounting practices and some potential explanatory variables it was necessary to classify the responding companies into groups according the sophistication level of their management accounting practices; this classification is illustrated in Chapter 5. Chapter 6 investigates whether or not relationships exist between management accounting sophistication and external, organisational and processing factors within UK food and drinks companies. The final chapter concludes the report with a summary of the findings.
As stated earlier, the food and drinks industry is the single largest manufacturing sector in the UK. Its turnover in 2003 was about £67.6 billion representing 15% of total manufacturing. The industry employs some 500,000 people or 13.1% of the whole UK manufacturing workforce. A total contribution of £20 billion GVA (Gross Value Added) is made to the UK economy. Despite its significance little attention was given to the performance of the industry until 1996 when the ‘Food and Drinks Industry Benchmarking and Self-Assessment Initiative’ was launched. This initiative was managed by Leatherhead Food Research Association and supported by the Ministry of Agriculture, Fisheries and Food and the Department of Trade and Industry, aimed to improve the competitiveness of the UK food and drinks industry by increasing the awareness and use of practical business improvement techniques.

The self-assessment programme of the initiative aims to encourage and enable companies to assess their management systems and business performance against a European Business Excellence Model. The self-assessment is carried out by means of a questionnaire comprising 85 questions.

By reference to 50 responses a major finding in 1997 was that only 18% of the food and drinks companies were developing their management systems along the lines of business excellence. Most were applying traditional methods of management, not learning from the experiences of best-in-practice companies, and not applying a systematic approach to achieving business improvement. This was considered to be causing low financial returns right across the industry. Data from cross-industry companies show that food industry performed the least well.

It has also been concluded that the food industry needs to be more progressive and more willing to learn and apply new methods. Mann et al. concluded that, while the food industry is strong in resource and process management, its companies have less well developed management systems than other industries and were not as good at meeting financial targets using appropriate non-financial indicators, and were less likely to benchmark their results. This was partly attributed to a lower level of exposure to international competition than other industries. Likewise, Ratnatunga, Hooley and Pike, on the basis of 21 in-depth interviews with senior executives in the food industry, found that 'almost half of the responding firms did not involve accountants in choosing alternatives in the marketing mix, and almost a quarter used them only as information providers.'

Mann et al. followed up their 1999a survey with an investigation of the ‘best practices’ employed by nine companies that scored well in the Business Excellence Model, and concluded that the industry needs to be more progressive and more willing to learn and apply new methods. In particular, companies require leaders who develop policies and strategies that really address the needs of the customer (and do not just provide what they think the customer wants) and utilise the full potential of their employees. Performance against policies and strategies needs to be monitored using a performance measurement system that addresses all the financial and non-financial measures that are critical to an organisation’s success. These should include measures of customer satisfaction, employee satisfaction and impact on society. It is only by doing this that long-term financial success will be achieved.


2 The European Business Excellence model is divided into two groups – the enablers and results. The enablers are primarily looking at how the organisation is managed, and the results look at the achievements of the organisation. This model considers the management of the organisation in terms of leadership, policy and strategy, people management, resources and processes (enablers) and then considers the results achieved in terms of customer satisfaction, people satisfaction, impact on society and business results (for more details see Mann and Adebanjo (1997)).
A significant body of research has been published over the years in the field of management accounting. Aside from the very limited literature on accounting in the food sector, two streams of research are of particular relevance to this study. The first stream reports on the use of various management accounting techniques and practices; for example, Chenhall and Langfield-Smith (1998), Ghosh and Chan (1997), Guilding, Lamminmaki, and Drury, (1998), Luther and Longden (2001), Wijewardena and Zoysa (1999), Yohikawa (1994) and Drury et al. (1993). This study is informed by and extends such research.

The other related stream of research has examined the relationship of characteristics of management accounting information with a range of underlying (or contingent) factors. This type of research is broadly based on contingency theory, which has been applied as a means of explaining variations in the management accounting practices adopted by different organisations. Its premise is that there is no unique set of management accounting practices that suits all organisations; different organisations will adopt a particular set of management accounting practices which is appropriate to their circumstances. The idea attracted many researchers to attempt to identify the most important contingencies and to assess their impact on the design of management accounting systems. Three main categories of factors can be identified from the extant literature. These categories are shown below together with some of the most important individual component factors:

- **external factors**: environmental uncertainty
- **organisational factors**: competitive strategies, structure (decentralisation), firm’s size
- **manufacturing or processing factors**: system complexity, advanced manufacturing technology, the implementation of total quality management or of just-in-time.

Our study is distinguished from earlier contingency studies in several ways.

First, our emphasis is on individual management accounting practices as outcomes, rather than on broad characteristics of management accounting information such as scope or timeliness.

Secondly, we consider the contingency-type associations in the context of UK companies. Previous research has not investigated the relationship between the explanatory factors and management accounting practices in the UK. Our in-depth investigation of one particular industry allows us both to come to detailed conclusions about that specific sector as well as giving us the basis for making broader generalisations about UK industry. Inevitably some sector-specific issues arise but, given its size and scope, the food and drinks sector of the economy is a good representative, having many similarities with other processing and manufacturing sectors.

Thirdly, previous work has only investigated a limited number of contingent factors at a time. Our work responds to Chenhall and Langfield-Smith’s (1998) call for ‘future studies (which) add to our understanding of the research problem by considering the role of additional relevant variables.’ (p.259).

Finally, it looks at a broad set of management accounting practices (budgeting, performance evaluation, costing, decision-making, communication and strategic analysis). Anderson and Lanen (1999), for example, support the need for this type of research:

‘Clearly greater understanding of both individual practices and macroscopic relationships among practices is needed. However, we found very little of the latter in the extant literature …’ (pp.408-9).

In summary, our aim is to address the following two questions:

1. How ‘sophisticated’ are management accounting systems in the UK food and drinks industry?
2. To what extent are UK management accounting practices influenced by external factors, organisational factors, and ‘processing’ factors.

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3. Empirical research design

An empirical study was conducted to address the research questions stated in the previous chapter. The design of the study is explained in this chapter which is divided into the following sections:

- Data collection method.
- Sample frame and size.
- The questionnaire design.
- Responses to questionnaire.
- Evaluation of non-response bias.
- Measurement of contingent variables.

3.1 Data collection method
A postal questionnaire was used to collect empirical data. This facilitated access to a large number of respondents and thus provided sufficient data for statistical analysis, without undue cost. Such a large number would be difficult to achieve through face-to-face interviews because of the constraints of time and cost. In addition, the time and other pressures on management accountants and production managers would have severely restricted the number willing to be interviewed. Nevertheless, a limited number of face-to-face interviews were carried out. First, to pilot the questionnaire before sending it out, and secondly, to follow-up the questionnaire in order to check the reliability of the survey results and to seek further explanation of some of the responses.

Five face-to-face pilot interviews (three management accountants and two production managers) were undertaken before the questionnaire was sent out in July 2001. These interviews were divided into three parts; in the first part interviewees were asked to give a brief description of their companies and their main responsibilities. They were then presented with the draft questionnaire and asked to answer the questions and comment on their clarity and relevance. Finally, comments were sought on the general design of the questionnaire and its content and, in particular, whether there were any other questions that they may have expected to see. The interviews took between 45 and 90 minutes and were tape recorded and transcribed. After each interview the questionnaire was modified to reflect the comments received from the interviewees. The questionnaire was also reviewed by seven academics.

Another set of interviews was carried out in February and March 2002 to follow up issues arising out of the analysis of responses to the actual questionnaire instrument. The six interviewees were all key personnel responsible for running and managing the management accounting and production systems in their companies. They were selected from those who had responded to the questionnaire and our interviews aimed to check the reliability of the questionnaire responses and to gain more insights into the survey results.

3.2 Sample frame and size
One aim of this survey was to study the relationship between management accounting practices and specified manufacturing procedures. It was therefore appropriate to investigate a sample of manufacturing or processing companies. In order to remove irrelevant distractions arising out of variations between industries, we decided to concentrate on the food and drinks sector which is suitably large, broad and therefore reasonably representative.

After reviewing a number of available databases, 'FAME' (Financial Analysis Made Easy) was found to be the most appropriate for choosing a sample frame. It provides extensive information about public and private British companies.

A number of criteria were used in selecting companies for inclusion in the sample:

- a 1992 SIC UK industry code of ‘15’ (manufacture of food products and beverages)
- employment of at least 30 people
- being active and independent companies
- having a registered office address in England, Scotland or Wales.

A total number of 658 companies satisfied these criteria and constituted the sample frame for this research.

The information gathered includes data related to practices of management accounting, data on strategic business units’ (SBUs’) structure and performance and information related to products processed/manufactured. Difficulty was anticipated in obtaining all this information from any one single company employee. Accordingly, two versions of the questionnaire were sent to each sampled company. The first version was addressed to the person leading the management accounting function (MA) while the second version was to be completed by the production manager (PM).

First of all, a letter was sent to the company secretary of the 658 companies in May 2001. This was an attempt to increase the response rate by obtaining the names of the most appropriate persons to complete the questionnaire. Two letters were returned by the post office stamped ‘addressee has gone away’ and six companies asked to be removed from our sample leaving 650 potential responses. By the end of June names of 148 persons responsible for heading the management accounting function and of 85 production managers, or equivalent, were received.

1 This search was conducted on 5 April 2001.
2 A pre-paid SAE was enclosed with the letter.
Both versions of the questionnaire were sent to all 650 companies. The questionnaires were addressed to the names that had been obtained or, in cases where they had not been obtained, for the attention of ‘The Management Accountant’ and ‘The Production Manager’.

### 3.3 The questionnaire design

A covering letter was included as a part of the questionnaire. It explained the purpose of the study, the importance of answering the questions, and assured the confidentiality of the information provided. The respondent was also asked if s/he was willing to participate in follow-up interviews and whether s/he would like to be sent a copy of summarised survey results. By using window envelopes and sticking the address label on the covering letter, it was possible to identify the respondents. This was essential in order to make follow-up telephone calls, and it also allowed us to obtain secondary data from the FAME database.

As stated earlier two versions of the questionnaire were administered. The MA’s version was divided into three sections. The first section included questions related to the management accounting practices of the SBU. These were grouped under five headings: budgeting, performance evaluation, costing system, strategic analysis and information for decision-making. Under each heading, respondents were asked to rate the extent of usage and importance of a range of techniques in their SBUs. A separate question was included to rate the importance of four modes of communicating management accounting information. The second section contained questions that measured the perceived environmental uncertainty, degree of centralisation, strategic orientation and the respondent’s perception of their SBU’s performance. The final section asked for demographic information about the respondent.

The PM’s version was also divided into four sections. The first section included questions related to processing factors: complexity of processing system, total quality management, just-in-time, and product perishability; also questions related to the extent of concentration of customer base. The second and third sections were similar to those in the MAs’ questionnaire. The final section included questions related to measuring the extent of the PM’s satisfaction with the firm’s management accounting system.

### 3.4 Responses to questionnaire

As stated earlier the two versions of the questionnaire were sent to 650 companies in the food and drinks industry in the first week of July 2001. Three weeks later a second copy of the questionnaire was sent to all non-respondents. By the end of first week of September, we received 194 responses (96 from MAs and 98 from PMs). Of these responses, 25 completed questionnaires were received from both the MA and PM of the same company. In the last week of September, follow-up telephone calls were made to all non-respondents of the companies from which we had received only one completed version. All other non-respondents were sent a third copy of the questionnaire.

By the end of October, a total of 280 questionnaires were returned giving a response rate of 21.5% (280/1300). Of these 31 were blank because of company policy not allowing responses to surveys or the company was small/ceased/in the middle of a merger. The net response rate was thus about 20% (249 completed questionnaires / 1250 potential respondents). A further five responses were judged invalid because of a large portion of the questionnaire was not completed. Hence 245 usable completed questionnaires were used in the analysis giving a net usable response rate of 19.6% which was considered acceptable. Of these usable completed questionnaires 122 were MA version and 123 PM version. Forty eight companies completed both versions of the questionnaire.

### 3.5 Evaluation of non-response bias

A potential threat to the conclusions of a postal survey is non-response bias. In order to assess the possibility of the existence of such bias, comparisons between the sample frame and the responding companies using t-tests on company size were conducted. Company size was measured by turnover, fixed assets, and number of employees for the year ended 2001. There was no significant difference between the two samples for each size measure. Further, the answers to the main questions in the questionnaire from respondents who further replied without the follow-up telephone calls, were compared with the answers from respondents who replied only after the follow-up telephone calls. Again, there was no significant difference between these two groups of answers.

From the above, it can be concluded that the two samples are drawn from the same population and the existence of non-response bias is not likely to be a threat to the conclusions based on the actual sample.
3.6 Measurement of contingent variables

Our study examined a number of potentially causal (or explanatory) variables through two different questionnaires sent to each company. In this way we ensured that the information we sought was provided by a knowledgeable person in the firm. Four variables were measured in both versions. These variables are perceived environmental uncertainty, competitive strategy, firm’s structure (decentralisation) and perceived performance. An average of the two responses was used in the analysis. The measures of customer power, processing system complexity, AMT, TQM, JIT and product perishability were derived from the questionnaires sent to production managers while the measure of size was derived from published sources. Although reporting of values these contingent variables is not an objective of this study, the descriptive statistics are shown in Table 3, as they will be referred to and discussed in Chapter 6.

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. of responses</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
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<tbody>
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<td>Perceived environmental uncertainty</td>
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<td>4.03</td>
<td>0.84</td>
<td>1.00</td>
<td>5.85</td>
</tr>
<tr>
<td>Customers’ power</td>
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<td>4.20</td>
<td>1.04</td>
<td>1.18</td>
<td>7.00</td>
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<tr>
<td>Competitive strategy</td>
<td>93</td>
<td>0.18</td>
<td>0.52</td>
<td>-1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Firm structure – decentralisation</td>
<td>117</td>
<td>3.63</td>
<td>1.37</td>
<td>1.00</td>
<td>6.80</td>
</tr>
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<td>Size – total assets (in million)</td>
<td>114</td>
<td>27.5</td>
<td>77.67</td>
<td>0.50</td>
<td>750</td>
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<td>Complexity of processing system</td>
<td>120</td>
<td>4.31</td>
<td>1.17</td>
<td>1.00</td>
<td>7.00</td>
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<td>AMT</td>
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<td>1.09</td>
<td>1.00</td>
<td>6.00</td>
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<tr>
<td>TQM</td>
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<td>4.03</td>
<td>1.03</td>
<td>1.67</td>
<td>5.94</td>
</tr>
<tr>
<td>JIT</td>
<td>121</td>
<td>4.20</td>
<td>0.62</td>
<td>2.67</td>
<td>6.00</td>
</tr>
<tr>
<td>Product perishability</td>
<td>120</td>
<td>4.62</td>
<td>2.08</td>
<td>1.00</td>
<td>7.00</td>
</tr>
</tbody>
</table>

The descriptive statistics in Table 1 above show that the companies surveyed have a range of characteristics including:

- An average value of total assets of £27.5 million but wide dispersion around that.
- A moderately high level of perceived environmental uncertainty.
- Being part of a value chain in which their customers, often supermarkets, typically have considerable power.
- Tending, on the spectrum of competitive strategy, towards product differentiation rather than cost leadership. This is supported by a high level of product diversity and complexity.
- A moderately high level of monitoring and control of quality.
- No strong evidence of decentralisation and delegation or of the application of advanced (automated) manufacturing (processing) technologies.
- A high level of perishability of product which corresponds with moderately high engagement with JIT.

In Chapter 4, which follows, we turn to the measurement and descriptive statistics of the management accounting practices – which are the dependent (outcome) variables of this study.
4. Survey findings concerning the use and importance of management accounting practices

As explained in Chapter 3, questionnaires were mailed to the management accountant and the production manager of 650 companies. In total, 245 usable completed questionnaires were received and analysed. Of these, 122 were replies to the MA version questionnaire and 123 were of the PM version. In this chapter we report and comment upon summary statistics of the responses to those questions that asked about management accounting practices. These data are of interest in their own right and also provide input to Chapter 5 in which we assess the sophistication of management accounting in the UK food and drinks industry.

In the MA version, respondents were asked to indicate the frequency of production or use of 38 management accounting practices (MAPs) using a five point Likert-type scale (1 indicating never and 5 indicating very often). They were also asked to rate the importance of each technique/practice using either ‘not important’, ‘moderately important’ or ‘important’. The 38 MAPs were classified into five groups: costing system, budgeting, performance evaluation, information for decision making, and strategic analysis. In addition separate questions were asked concerning the communication of management accounting information. The results of each group are reported in turn as follows.

4.1 Costing systems

Traditional absorption costing systems have long been subject to criticism. Two long-standing issues of debate have been the choice of appropriate overhead recovery rates i.e. plant-wide or more specific, and secondly the controversy about the need to recover (or absorb) overheads at all. The public marginal costing versus absorption costing debate ‘ran out of steam’ with the adoption of SSAP 9 but we explore our expectation that the separation between fixed and variable costs is ‘very much alive’ in internal reporting practice. During the last two decades the problems of traditional absorption costing were again brought under the spotlight. The main focus of criticism was that these systems do not accurately measure costs for decision making purposes. Activity-based costing (ABC) was introduced as a technique to help organisations overcome this problem. Also, target costing2 and the ‘costing of quality’ were introduced as tools for confronting increased competition. Costs of quality are typically classified into four groups: prevention, appraisal, internal failure and external failure. Providing information related to quality costs is important when making decisions between differing quality-related alternatives.

To find out the extent to which practitioners applied their costing system to provide more accurate cost information for decision making purposes, respondents were asked to indicate how often are seven techniques related to costing systems. The responses are summarised in panel A of Table 2. The data on frequency of usage needs to be interpreted with caution. Some MAPs are conventionally only carried out infrequently e.g. activity-based budgeting is perhaps an annual exercise. So, for instance, it is possible that some respondents may have answered ‘very often’ to such a question if, when they do prepare budgets (albeit infrequently) they always use the activity-based approach; others may have answered the question more at face value3. Such problems of interpretation almost inevitably arise when questionnaires are used on a broad set of themes. This is partly mitigated by our supplementing the question of usage with that of importance. These data are shown on the left-hand side of Table 2.

From the right-hand side it can be seen that 48% (29% + 19%) of the companies either often or very often distinguish between variable/incremental costs and fixed/non-incremental costs for decision making purposes. The importance of this separation was acknowledged by 83% of respondents rating it as either moderately important or important. By contrast a relatively small number indicated high usage of the three techniques (plant-wide, multiple-rate or ABC) for allocation of overhead to cost objects. Even though it can be argued that plant-wide, departmental and activity-based techniques are mutually exclusive, nevertheless the figures indicate that overhead allocation does not appear to be done very frequently. The combination of these two findings suggests that variable (or direct) costing is much more common than various forms of absorption costing. While absorption (including ABC) costing has a relatively low usage rating, it nevertheless seems to have considerable importance; 44%, 51% and 46% of respondents rated the three forms either moderately important or important. Respondents are aware of the importance of overhead allocation techniques but many believe that it is not worth implementing them frequently. This may indicate that they are seen to be important in non-routine ‘costing studies’ carried out from time to time. Likewise the costing of quality is seen to be extremely important but not very frequently calculated. Finally, advanced modelling of cost relationships and behaviour is neither seen to be important nor often used.

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2 To set a target cost, companies need first to determine a target price based on competition and marketing factors. The target price should be set at a level that permits the company to achieve a desired market share and sales volume (Drury et al., 1993). Then a desired profit margin is deducted from the target price to determine the target cost, which becomes the goal to achieve by generating alternative acceptable product designs.

3 We thank one of the anonymous reviewers for drawing this to our attention.
4.2 Budgeting

The literature of management accounting emphasises that budgeting is an essential technique for planning and controlling the activities of an organisation (Drury et al., 1993). The implementation of ABC was followed by the introduction of activity-based budgeting (ABB). In the questionnaire we asked respondents to rate the usage and the importance of budgeting for planning, budgeting for controlling costs, activity-based budgeting, budgeting with ‘what if’ analysis, flexible budgeting, zero-based budgeting and budgeting for long-term (strategic) planning. Panel B in Table 2 summarises the responses.

The survey shows that budgeting is either often or very often used for planning and for controlling costs by an overwhelming 84% and 73% respectively. Taken together, budgeting for planning and control was considered either important or moderately important by more than 90% of respondents. It can be concluded that almost all companies use budgeting for planning and control. Many companies (32%) use flexible budgeting but 29% clearly do not flex their budgets at all! ‘What if’ budget analysis is clearly very important but, as expected, is only applied from time to time.

ABB was considered either moderately important or important by the majority of respondents (63%). However, only 19% of respondents were using it often or very often. When ABC and ABB were cross-tabulated we found that all companies which reported high level of usage for ABC did the same for ABB. It may be concluded that companies start implementing ABC and then they use the activities analysis performed during ABC implementation to prepare their budgets. One would not expect zero-based budgeting to be applied very frequently but it was perhaps surprising to see that it is also seen to be largely unimportant (58% of respondents). Finally, 83% rated budgeting as an important part of their long-term strategic planning.

<table>
<thead>
<tr>
<th>How important?</th>
<th>How often used?</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>NI</td>
</tr>
<tr>
<td>Panel A. Costing system</td>
<td></td>
</tr>
<tr>
<td>A separation is made between variable/incremental costs and fixed/non-incremental costs</td>
<td>116</td>
</tr>
<tr>
<td>Using a plant-wide overhead rate</td>
<td>115</td>
</tr>
<tr>
<td>Departmental or multiple plant-wide overhead rates</td>
<td>113</td>
</tr>
<tr>
<td>Activity-based costing (ABC)</td>
<td>114</td>
</tr>
<tr>
<td>Target costs</td>
<td>112</td>
</tr>
<tr>
<td>The cost of quality</td>
<td>111</td>
</tr>
<tr>
<td>Regression and/or learning curve techniques</td>
<td>111</td>
</tr>
<tr>
<td>Budgeting for planning</td>
<td>120</td>
</tr>
<tr>
<td>Budgeting for controlling costs</td>
<td>120</td>
</tr>
<tr>
<td>Activity-based budgeting</td>
<td>116</td>
</tr>
<tr>
<td>Budgeting with ‘what if analysis’</td>
<td>118</td>
</tr>
<tr>
<td>Flexible budgeting</td>
<td>117</td>
</tr>
<tr>
<td>Zero-based budgeting</td>
<td>117</td>
</tr>
<tr>
<td>Budgeting for long-term (strategic plans)</td>
<td>117</td>
</tr>
</tbody>
</table>

n = number of respondents
NI = not important = 1
MI = moderately important = 2
I = important = 3
S1 = never
S2 = rarely
S3 = sometimes
S4 = often
S5 = very often
### Table 2. Management accounting practices and techniques summary statistics shown by percentage of respondents

<table>
<thead>
<tr>
<th>How important?</th>
<th>Panel C. Performance evaluation</th>
<th>How often used?</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
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<td>MI</td>
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<tr>
<td>118</td>
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<td>15</td>
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<td>116</td>
<td>23</td>
<td>37</td>
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<td>116</td>
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<td>114</td>
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<td>29</td>
</tr>
<tr>
<td>113</td>
<td>43</td>
<td>48</td>
</tr>
</tbody>
</table>

**Panel D. Information for decision-making**

<table>
<thead>
<tr>
<th>How important?</th>
<th>Information for decision-making</th>
<th>How often used?</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
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<td>MI</td>
</tr>
<tr>
<td>116</td>
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<td>36</td>
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<tr>
<td>115</td>
<td>3</td>
<td>24</td>
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<td>116</td>
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<td>114</td>
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<td>113</td>
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<td>45</td>
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<td>34</td>
<td>45</td>
</tr>
<tr>
<td>114</td>
<td>42</td>
<td>40</td>
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</table>

**Panel E. Strategic analysis**

<table>
<thead>
<tr>
<th>How important?</th>
<th>Strategic analysis</th>
<th>How often used?</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>NI</td>
<td>MI</td>
</tr>
<tr>
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<tr>
<td>111</td>
<td>75</td>
<td>19</td>
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<tr>
<td>114</td>
<td>20</td>
<td>40</td>
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<tr>
<td>112</td>
<td>52</td>
<td>28</td>
</tr>
<tr>
<td>113</td>
<td>63</td>
<td>28</td>
</tr>
<tr>
<td>111</td>
<td>48</td>
<td>36</td>
</tr>
<tr>
<td>115</td>
<td>17</td>
<td>50</td>
</tr>
</tbody>
</table>

**Legend**

- **n**: number of respondents
- **NI**: not important = 1
- **MI**: moderately important = 2
- **I**: important = 3
- **S1**: never
- **S2**: rarely
- **S3**: sometimes
- **S4**: often
- **S5**: very often
4.3 Performance evaluation

The choice of measures to guide and evaluate the performance of business units is one of the most critical challenges facing organisations (Ittner and Larcker, 1998). Management accounting should report all relevant information related to the evaluation of business units’ performance. Performance measurement systems which focus solely on financial measures such as profits, return on investment, standard costs and variance analysis have been widely criticised (e.g. Ittner et al., 1997; Kaplan and Norton, 1996; Shields, 1997). The criticisms arise because these measures are distorted by external reporting conventions, they promote short-termism and accounting manipulation, and do not take into consideration the cost of capital or non-financial (‘leading’) measures such as customer satisfaction, labour efficiency, innovation in production.

To incorporate the cost of capital into financial measures, a variety of ‘economic value’ measures have been introduced (Ittner and Larcker, 1998). Residual income was developed in 1950s but more recently the ‘Economic Value Added’ or EVA, was promoted by Stern Stewart & Co as a proprietary adaptation of residual income (Ittner and Larcker, 1998). EVA, can be defined as adjusted operating income minus a capital charge, and implies that a manager’s action only adds economic value when the resulting profits exceed the cost of capital. Stern Stewart recommend about 160 adjustments that firms can make to their accounting systems in order to eliminate the perceived distortions created by external accounting rules and to approximate the accounting profit to ‘economic’ profit (Ittner and Larcker, 1998).


Traditional financial measures are usually compared with previous periods’ performance to identify whether there is an improvement or deterioration. The underlying assumption that the previous period is an appropriate comparator can lead to the entrenchment of problems and inefficiencies. To overcome this, the concept and practice of benchmarking was introduced and made popular as an organisational improvement tool by Xerox (Ghibadian, Gallear, Viney and Liu, 2001). Benchmarking is based on identifying a best practice either internally or externally and then studying how this can be used to improve current and future performance. In the UK food industry the benchmarking of business management systems and performance has been promoted by the Leatherhead Food Research Association with the active support of various government departments (See Mann et al, 1999a).

To ascertain the extent to which management accounting systems provide different performance measures we asked respondents to rate the usage and importance of five groups of measures: financial measures; EVA (residual income); benchmarks, and non-financial measures related respectively to customers, to operations and innovation, and to employees. Panel C of Table 2 shows the results.

As expected, the majority of respondents (78%) rated financial measures as important and about the same percentage reported frequent usage of these measures. Non-financial measures related to customers and to operations and innovation are clearly very influential with 87% and 77% respectively scoring them as at least moderately important. However, a significant minority of companies (38% for both categories of measures) produce such measures either never or rarely. The non-provision of employee related measures is even more marked, with 41% of respondents answering never. The results show also that neither EVA, nor benchmarking have gained popularity yet among UK food and drinks companies.

4.4 Information for decision-making

One of the early stated objectives of management accounting was to provide relevant information for internal decision making. For regular or short-term decisions management accountants can use cost-volume-profit (CVP) analysis, product profitability analysis, customer profitability analysis, and stock control models. For capital investment decisions management accountants can produce accounting rates of return and payback periods as well as more sophisticated signals based on discounted cash flow, e.g. net present value and internal rate of return. Also, management accounting systems can provide information on non-financial factors, such as quality of output, flexibility of processes and lead-times, that could affect capital investment projects. Finally management accountants can use risk analysis techniques such as probability analysis, computer simulation and ‘what if’ analysis.

Summaries of the responses to questions about decision-making MAPs are shown in Panel D. It can be seen that product profitability analysis and customer profitability analysis are often or very often calculated in the majority of companies — 69% and 51% respectively. Respondents also rated these analyses as important — 72% and 59% respectively. CVP analyses is seen to be important or moderately important by 86% of respondents and is also surprisingly frequently produced — 44% indicating that such analyses are used at least often. Stock control models are largely moderately important and sometimes used.
Regarding capital investment decisions, 41% of respondents used traditional accounting measures such as accounting rate of return and payback period to evaluate major capital projects while the equivalent figure for discounted cash flow models, such as internal rate of return and net present value, is only 19%. This apparent scepticism of ‘advanced’ investment appraisal is confirmed by the figure of 42% answering that calculating the cost of capital was not important! Non-financial factors relating to capital projects are perceived to be either important or moderately important by 82% of respondents, but only 33% of companies often or very often report and document such factors. Finally ‘what if’ analysis is the most popular technique in evaluating the risk of projects though only 22% of respondents used it often or very often.

4.5 Strategic analysis

Traditional management accounting systems have been criticised because they focus on reporting information related to internal processes with little attention being given to the external environment and the effect of competitors’ decisions and cost structures on current and future processes of the business. The externally oriented approach has been known as ‘strategic management accounting’, a term that first appeared as the title of an article by Simmonds in 1981. However, there is no agreed conceptual framework for what constitutes strategic management accounting (Tomkins and Carr, 1996; Lord, 1996, Guilding, Cravens and Tayles, 2000, Roslender and Hart, 2003). In this study we explore three characteristics of strategic management accounting identified by Guilding et al., (2000). They are environmental or marketing orientation, focus on competitors, and long-term, forward-looking orientation. Eight strategic practices were given to respondents who were asked to indicate how often they use them as well as their importance. Panel E in Table 2 shows the results.

It can be seen that only long-range forecasting was often or very often done by most (43%) of the companies. This was followed in frequency by the analysis of competitive position (33%) and the analysis of competitors’ strengths and weaknesses (21%). It may be concluded that companies are, at present, more interested in conventional long-range (forward-looking) planning and lateral competitive analyses than in contextual stakeholder, industry, life-cycle or value chain analyses. The high scoring of importance, relative to frequency of use, of analyses of competitive position (and competitors’ strengths and weaknesses) and of value chains suggests that the application of these practices will become more widespread and frequent.

4.6 Communication of management accounting information

A survey by Drury et. al. (1993) identified the most significant management accounting problems. Three of these, related to the timing of the information reported by management accounting systems, were: providing accurate and timely information on-line to the shop floor, improved timeliness in reporting data, and changing the information gathering system so that it becomes real-time and interfaces with other systems.

To explore this issue, management accountants were asked to assess the importance, to their business, of four levels of accessibility of internal reports. The results are shown in Table 3. They indicate that it is important to provide detailed management accounting information on a systematic, regular, short-term basis (91% of respondents). The ability to provide detailed information immediately on request was rated important or moderately important to 86% of respondents (but the ‘3 rating’ is down from 91% to 37%). Immediate updating and the provision of real-time information was important to only 11%. However, this and the prior statistic may have been biased downward by the word ‘detailed’. In any event, even if detailed real-time reporting is not widespread, it is clear that organisational changes have altered information dispersion channels; 48% of respondents indicated that it is important that detailed management accounting information is reported direct to line manager. This confirms the anecdotal evidence that there is now widespread ‘ownership’ of management accounting which is increasingly less subject to ‘filtering and analysis’ by accounting specialists.

### Table 3. Communication of management accounting information

<table>
<thead>
<tr>
<th>% of respondents</th>
<th>n</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>Mean</th>
<th>Std. dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed management accounting information is available on a systematic, regular, short-term basis (e.g. weekly or monthly)</td>
<td>119</td>
<td>1</td>
<td>8</td>
<td>91</td>
<td>2.90</td>
<td>0.33</td>
</tr>
<tr>
<td>Detailed management accounting information is available immediately upon request</td>
<td>118</td>
<td>14</td>
<td>49</td>
<td>37</td>
<td>2.24</td>
<td>0.68</td>
</tr>
<tr>
<td>Detailed management accounting information is updated and made available on a real-time basis</td>
<td>118</td>
<td>41</td>
<td>48</td>
<td>11</td>
<td>1.70</td>
<td>0.66</td>
</tr>
<tr>
<td>Detailed management accounting information is reported direct to line managers</td>
<td>117</td>
<td>17</td>
<td>35</td>
<td>48</td>
<td>2.31</td>
<td>0.75</td>
</tr>
</tbody>
</table>

n number of respondents  NI not important = 1  MI moderately important = 2  I important = 3
5. A taxonomy of management accounting systems and the classification of respondent companies

This chapter addresses the first research question of this research project; that is, the investigation of the 'sophistication level' of the UK food and drinks industry. Thereafter, in Chapter 6, we focus on the relationship between management accounting characteristics and potential 'contingent variables'.

It was stated earlier that sophistication of a management accounting system refers to the capability of the system to provide a broad spectrum of information relevant for planning, controlling, and decision-making all in the aim of creating or enhancing value. To measure the sophistication level we adopted the four stage of management accounting evolution model introduced by IFAC (1998). Although the IFAC statement identified the broad characteristics of each stage, it did not provide specific illustrations of management accounting practices (MAPs) related to the various stages. As a central part of this project we attempt to link specific MAPs to particular stages of evolution. In order to do this we have reviewed literature related to the development of management accounting (Kaplan, 1984; Allott, 2000; Ferrara, 1995; Scapens, 1991; Garrison, Noreen and Seal, 2003) and identified important characteristics of each stage. These relate to: the approximate periods in history with which a stage is principally associated; the typical 'organisational positioning', or location, of management accounting at that stage; the principal role of management accounting, and, finally, the main focus of management accounting's attention. Table 4 shows our understanding of the characteristics of management accounting systems in each stage of evolution.

<table>
<thead>
<tr>
<th>Table 4. Characteristics of management accounting practices in four stages of evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stage 1</strong> Cost determination and financial control (CDFC)</td>
</tr>
<tr>
<td>Where positioned in organisation: Similar to company secretarial.</td>
</tr>
<tr>
<td>Role: A necessary technical activity in 'running' an organisation.</td>
</tr>
<tr>
<td>Main focus: Cost determination and controlling expenditure.</td>
</tr>
</tbody>
</table>
Using the characteristics in Table 4 we have then used our judgement\textsuperscript{1} to classify each MAP into a stage of the evolution. We interpret the four stages as four levels of sophistication of MAS with Stage 1 representing a lack of sophistication and Stage 4 the highest level of sophistication. The internal consistency of MAPs included in each stage was confirmed by means of Cronbach's alpha\textsuperscript{2}. It should be remembered that each stage of evolution encompasses the practices in the previous stage in addition to the new set. For example Stage 2 includes all MAPs included in Stage 1 as well as those arising at Stage 2. In Table 5 the 38 MAPs first shown in Table 2 (categorised by type, e.g. costing, budgeting etc.) are now re-organised into categories representing each stage of evolution. As well as showing the descriptive statistics of usage and importance derived from the questionnaire responses, we present a composite statistic which we style 'emphasis'. The absolute values of emphasis are not especially meaningful but if high, relative to others, they do indicate that the technique in question is both important and frequently applied while the opposite is true for techniques with very low emphasis values.

\begin{table}[h]
\centering
\begin{tabular}{lcccccc}
\hline
& \textbf{Importance$^a$} & & \textbf{Usage$^b$} & & \textbf{Emphasis$^c$} \\
& \textbf{Mean} & \textbf{std. dev.} & \textbf{Mean} & \textbf{std. dev.} & \textbf{Mean} & \textbf{std. dev.} \\
\hline
\textbf{Cost determination and financial control (CDFC)} & & & & & & \\
Using a plant-wide overhead rate & 1.61 & 0.76 & 2.12 & 1.42 & 4.34 & 4.54 \\
Budgeting for controlling costs & 2.66 & 0.62 & 4.12 & 1.05 & 11.25 & 4.28 \\
Flexible budgeting & 2.05 & 0.78 & 2.70 & 1.40 & 6.32 & 4.82 \\
Performance evaluation based on financial measures & 2.71 & 0.59 & 4.08 & 1.20 & 11.43 & 4.42 \\
Evaluation of major capital investments based on payback period and/or accounting rate of return & 2.32 & 0.73 & 3.24 & 1.32 & 8.16 & 4.79 \\
\hline
\textbf{Provision of information for management planning and control (IPC)} & & & & & & \\
A separation is made between variable/incremental costs and fixed/non-incremental costs & 2.32 & 0.74 & 3.30 & 1.27 & 8.43 & 4.73 \\
Using departmental overhead rates & 1.67 & 0.74 & 2.12 & 1.30 & 4.36 & 4.03 \\
Using regression and/or learning curve techniques & 1.17 & 0.45 & 1.24 & 0.61 & 1.64 & 1.83 \\
Budgeting for planning & 2.68 & 0.63 & 4.33 & 0.91 & 11.88 & 4.05 \\
Budgeting with 'what if analysis' & 2.15 & 0.71 & 2.88 & 1.17 & 6.94 & 4.26 \\
Budgeting for long-term (strategic) plans. & 2.33 & 0.75 & 3.05 & 1.25 & 7.76 & 4.45 \\
Performance evaluation based on non-financial measures related to operations & 2.16 & 0.78 & 2.97 & 1.40 & 7.33 & 4.98 \\
Cost-volume-profit analysis for major products. & 2.36 & 0.72 & 3.14 & 1.26 & 8.17 & 4.63 \\
Product profitability analysis & 2.69 & 0.54 & 3.90 & 1.07 & 10.91 & 4.04 \\
Stock control models & 2.16 & 0.74 & 2.83 & 1.26 & 6.69 & 4.40 \\
Evaluation of major capital investments based on discounted cash flow method(s) & 1.92 & 0.77 & 2.32 & 1.31 & 5.27 & 4.47 \\
Long-range forecasting & 2.33 & 0.69 & 3.17 & 1.28 & 8.00 & 4.64 \\
\hline
\end{tabular}
\caption{Classification and descriptive statistics of management accounting practices}
\end{table}

\textsuperscript{1} In arriving at this classification we consulted widely with academic colleagues and participants at conferences where early drafts of this paper were presented.

\textsuperscript{2} The statistic is based on the extent to which individuals' scorings are consistent when responding to 'linked' questions. Values of 0.60 or higher are generally considered to provide an acceptable level of data reliability. The results are shown in Appendix III and it can be seen that alpha for each stage is acceptable.
<table>
<thead>
<tr>
<th>Table 5. (continued)</th>
<th>Importance&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Usage&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Emphasis&lt;sup&gt;c&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>std. dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>Reduction of waste in business resources (RWR)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity-based costing</td>
<td>1.57</td>
<td>0.69</td>
<td>1.83</td>
</tr>
<tr>
<td>Activity-based budgeting</td>
<td>1.81</td>
<td>0.73</td>
<td>2.34</td>
</tr>
<tr>
<td>Cost of quality</td>
<td>1.73</td>
<td>0.70</td>
<td>2.05</td>
</tr>
<tr>
<td>Zero-based budgeting</td>
<td>1.54</td>
<td>0.70</td>
<td>1.99</td>
</tr>
<tr>
<td>Performance evaluation based on non-financial measure(s) related to employees</td>
<td>1.75</td>
<td>0.64</td>
<td>2.09</td>
</tr>
<tr>
<td>Evaluating the risk of major capital investment projects by using probability analysis or computer simulation</td>
<td>1.37</td>
<td>0.59</td>
<td>1.48</td>
</tr>
<tr>
<td>Performing sensitivity ‘what if’ analysis when evaluating major capital investment projects</td>
<td>1.87</td>
<td>0.73</td>
<td>2.38</td>
</tr>
<tr>
<td>Creation of value creation through effective use of resources (CV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target costing</td>
<td>1.79</td>
<td>0.77</td>
<td>2.36</td>
</tr>
<tr>
<td>Performance evaluation based on non-financial measure(s) related to customers</td>
<td>2.32</td>
<td>0.71</td>
<td>3.04</td>
</tr>
<tr>
<td>Performance evaluation based on residual income or economic value added</td>
<td>1.43</td>
<td>0.62</td>
<td>1.63</td>
</tr>
<tr>
<td>Benchmarking</td>
<td>1.65</td>
<td>0.64</td>
<td>1.97</td>
</tr>
<tr>
<td>Customer profitability analysis</td>
<td>2.53</td>
<td>0.65</td>
<td>3.46</td>
</tr>
<tr>
<td>For the evaluation of major capital investments, non-financial aspects are documented and reported</td>
<td>2.19</td>
<td>0.72</td>
<td>2.94</td>
</tr>
<tr>
<td>Calculation and use of cost of capital in discounting cash flow for major capital investment evaluation</td>
<td>1.75</td>
<td>0.74</td>
<td>2.10</td>
</tr>
<tr>
<td>Shareholder value analysis</td>
<td>1.32</td>
<td>0.59</td>
<td>1.50</td>
</tr>
<tr>
<td>Industry analysis</td>
<td>1.41</td>
<td>0.61</td>
<td>1.65</td>
</tr>
<tr>
<td>Analysis of competitive position</td>
<td>2.19</td>
<td>0.75</td>
<td>2.89</td>
</tr>
<tr>
<td>Value chain analysis</td>
<td>1.69</td>
<td>0.79</td>
<td>2.10</td>
</tr>
<tr>
<td>Product life cycle analysis</td>
<td>1.46</td>
<td>0.66</td>
<td>1.65</td>
</tr>
<tr>
<td>The possibilities of integration with suppliers’ and/or customers’ value chains</td>
<td>1.68</td>
<td>0.74</td>
<td>2.08</td>
</tr>
<tr>
<td>Analysis of competitors’ strengths and weaknesses</td>
<td>2.17</td>
<td>0.69</td>
<td>2.66</td>
</tr>
</tbody>
</table>

<sup>a</sup> Based on 3-point scale (1 = not important, 2 = moderately important, 3 = important).
<sup>b</sup> Based on 5-point scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often).
<sup>c</sup> The means of the emphases (usage – importance) for each firm – not the product of the mean usage and the mean importance.

3 Surprisingly, perhaps, this would give different figures.
5.1 Discussion of levels of importance, usage and emphasis
Looking first for the extreme positions apparent from Table 5 we find four management accounting practices which are indisputably widely used and important. Two in the category relating to cost determination and financial control are budgeting for controlling costs and performance evaluation based on financial measures. The other two relate to provision of information for planning and control and are budgeting for planning and product profitability analysis.

At the other end of the scale, are six well known practices that may be dismissed as peripheral. They are two ‘operations research type’ practices regression and learning curve techniques, and risk evaluation with probabilities and simulation and four more modern techniques that are associated with ‘strategic management accounting’ i.e. the analysis of economic value, shareholder value, industry analysis, and product life-cycles. This basic ‘high-low’ snapshot indicates that traditional management accounting seems ‘alive and well’. The observation is supported by taking the means, by category, of the values reported for individual practices; these are shown in Table 6 below. It can be seen that the mean values for practices in categories CDFC and IPC are noticeably higher than those for less traditional categories RWR and CV.

The next level of our analysis of the Table 5 data was to compile two lists with all 38 practices ranked in order of perceived importance and usage respectively. From this we identify those practices for which the ranking of ‘importance’ is three or more places different from the ranking of ‘usage’. On the assumption that, over time, the ranking of usage will, in many cases, move towards the ranking of importance, our interpretation is that practices ranked markedly higher in terms of ‘importance’ than ‘usage’ are likely to become more widespread and vice versa. On this basis we make the predictions shown in Table 7.

Table 6. Mean values of importance and usage of MAPs

<table>
<thead>
<tr>
<th>Category/stage of evolution</th>
<th>Importance of MAPs (scale 1-3)</th>
<th>Usage of MAPs (scale 1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost determination and financial control (CDFC)</td>
<td>2.27</td>
<td>3.25</td>
</tr>
<tr>
<td>Information for planning and control (IPC)</td>
<td>2.16</td>
<td>2.94</td>
</tr>
<tr>
<td>Reduction of waste of resources (RWR)</td>
<td>1.66</td>
<td>2.02</td>
</tr>
<tr>
<td>Creation of value (CV)</td>
<td>1.83</td>
<td>2.29</td>
</tr>
</tbody>
</table>

Table 7. Prediction of the usage of MAPs

<table>
<thead>
<tr>
<th>MAPs that may be phased out</th>
<th>MAPs that may be increasingly adopted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant-wide overhead rates</td>
<td>CDFC</td>
</tr>
<tr>
<td>Separation between fixed and variable costs</td>
<td>IPC</td>
</tr>
<tr>
<td>Departmental overhead rates</td>
<td></td>
</tr>
<tr>
<td>Non-financial measures related to operations</td>
<td>RWR</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CV</td>
</tr>
</tbody>
</table>

The next level of our analysis of the Table 5 data was to compile two lists with all 38 practices ranked in order of perceived importance and usage respectively. From this we identify those practices for which the ranking of ‘importance’ is three or more places different from the ranking of ‘usage’. On the assumption that, over time, the ranking of usage will, in many cases, move towards the ranking of importance, our interpretation is that practices ranked markedly higher in terms of ‘importance’ than ‘usage’ are likely to become more widespread and vice versa. On this basis we make the predictions shown in Table 7.

4 Those with mean ‘emphasis’ values, across the whole sample, above 10 (out of a possible 15).
Before considering the specific data shown in Table 7 it is worth noting that the practices with higher ranking of usage than importance dominate the more traditional ‘cost determination and financial control’ (CDFC) and ‘information for planning and control’ (IPC) categories. By contrast the practices showing markedly higher importance than usage dominate the ‘younger’ categories ‘reduction of waste’ (RWR) and ‘creation of value’ (CV).

The lower ordering of importance than usage for plant-wide and departmental overhead rates is not surprising and can be attributed to the costing advances related to ABC. The increasingly common multiple cost driver analyses related to ABC perhaps also explains the predicted demise of the fixed – variable costs distinction. However, it is curious that, despite the move to cost drivers other than volume, respondents still rate CVP analysis as a practice whose importance exceeds its usage.

Another interesting, contrasting ‘pairing’ concerns non-financial measures of performance. While those relating to employees (e.g. productivity, or value added per employee) are seen to be more important than presently used, the opposite applies to non-financial measures of operational performance such as waste, or schedule adherence. This may be attributed partly to the undoubted existing relevance of non-financial performance measures in the food industry (they rank 12th out of 38 in terms of use) and partly to the increased emphasis currently being placed on employee empowerment and devolution of accountability.

DCF investment appraisal, despite its steady infiltration through the 20th century into corporate financial management, is still ranked more important than widely used. This supports various research findings that, at the final level of evaluation, decisions are often made on the basis of strategic rather than financial analysis.

Finally, our results show that both the calculation and reporting of the cost of quality and the analysis of competitor strengths and weaknesses are likely to become more widespread. These practices reflect the increased competitive and regulatory pressures faced by organisations. Henchion and McIntyre (2005, p.419) state that ‘the environment is becoming increasingly competitive and regulated, basic pre-conditions of trade are becoming more demanding raising costs and other resource requirements, and thereby barriers to entry, and the basis for competition is changing’. We find clear support for our study’s central theme of the ongoing evolution of management accounting.

5.2 Classification of firms into management accounting evolution stages
The principal aims of this study are to explore the sophistication of current MAPs and to examine whether there are relationships between their sophistication and potential explanatory factors. To this end, it was necessary to classify respondent firms into their respective evolutionary stage and then to analyse the characteristics of each group. This prepares the way for us to find out (in Chapter 6) whether there are relationships between each stage of evolution and the explanatory variables.

Classification of individual firms into stages of management accounting evolution was based on their emphasis on MAPs using cluster analysis. For each firm, an average (composite) score was calculated for the set of MAPs (see Table 5) related to:

- cost determination and financial control (CDFC)
- management planning and control (IPC)
- reduction of waste in business resources (RWR)
- creation of value through effective resource use (VC).

Thus each of the 113 firms had a score for each of four composite predictor variables CDFC, IPC, RWR and VC, and these were used in a statistical procedure to sort firms into four groups A (containing 30 similar firms), B (21 firms), C (47 firms) and D (15 firms). The mean scores of variables within each cluster are presented in Table 8. The results show that the four variables played significant roles in correctly classifying 95.5% of the firms into their respective groups. Thus, the cluster solution was regarded valid.

5 This flexible ‘modern’ interpretation of CVP analysis, with a range of cost drivers, was discussed in Luther and O’Donovan (1998).

6 A confirmation of the statement by Mann et al (1999a) that ‘the food industry is strongest at resource and process management ... these areas typically need strong control to ensure that the supply chain, from raw materials to manufacture and to delivery to the consumer is met.’ (p.13)


8 Cluster analysis is a statistical technique which classifies a large set of objects (people, firms, etc.) into distinct subgroups based on predictor variables. If the cluster analysis is successful it should produce homogenous groups with respect to the group’s scores on the predictor variables (Coolidge, 2000, p.267).

9 For full details on the application of cluster analysis to these data see Abdel-Kader and Luther (2005).
Having established the theoretical validity of the cluster analysis, the next step involved labelling the clusters on the basis of our interpretation of the shared characteristics of its components. This was done by matching the clusters to related stages of evolution (Stage 1, Stage 2 etc.). According to IFAC’s theoretical model of management accounting evolution, companies in Stage 1 have more emphasis on CDFC (cost determination and financial control) and less emphasis on the practices in other sets (i.e. those relating to IPC, RWR and CV). Companies in Stage 2 place emphasis on practices in both CDFC (cost determination and financial control) and in IPC (provision of information for management planning and control) and less emphasis on practices in the other two sets (RWR and CV). Companies in Stage 3 have emphasis on CDFC (cost determination and financial control), IPC (provision of information for management planning and control) and RWR (reduction of waste in business resources) and less emphasis on the fourth set CV (Creation of value through effective resources use). Finally, companies in Stage 4 have more emphasis on all four sets of CDFC, IPC, RWR and CV.

An inspection of the mean scores of CDFC, IPC, RWR and CV in Table 8 provides bases for preliminary labelling of the empirically derived clusters. Mean scores of firms in Cluster B are the lowest for all sets (CDFC, IPC, RWR and CV) – this suggests that Cluster B represents Stage 1 of the evolution of management accounting. Companies in Cluster C have higher mean scores for all of CDFC, IPC, RWR and CV than those of Cluster B. Thus, Cluster C can represent Stage 2 of the management accounting evolution.

Clusters A and Cluster D have higher mean scores for all sets of CDFC, IPC, RWR and CV than those of Clusters B and C. Also, mean scores of CV in both Clusters C and D are higher than those of RWR. Because the mean scores of all four sets of CDFC, IPC, RWR and CV in Cluster D are higher than those in Cluster A, we have considered that Cluster D best represents Stage 4. Thus, Cluster A represents Stage 3.

It can be seen from Table 8 that of the 113 firms, 19% (21) are in Stage 1, 41% (47 firms) are in Stage 2, 27% (30) are in Stage 3 and 13% (15) in Stage 4 of management accounting evolution. About 40% of firms have management accounting systems in either Stage 3 or Stage 4 of IFAC’s evolution. We can conclude that management accounting systems in many firms of the UK food and drinks industry are moving from simple or naive role of cost determination and financial control towards a more sophisticated role of creation of value through effective resource use. However, the characteristics of each group of firms should be further investigated. This will be done in the next chapter.

### Table 8. Classification of companies using hierarchical cluster analysis

<table>
<thead>
<tr>
<th>Clusters*</th>
<th>A (n = 30)</th>
<th>B (n = 21)</th>
<th>C (n = 47)</th>
<th>D (n = 15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDFC</td>
<td>9.74</td>
<td>5.94</td>
<td>8.29</td>
<td>10.53</td>
</tr>
<tr>
<td></td>
<td>(2.11)</td>
<td>(3.67)</td>
<td>(2.49)</td>
<td>(1.88)</td>
</tr>
<tr>
<td>IPC</td>
<td>8.87</td>
<td>4.54</td>
<td>6.77</td>
<td>10.14</td>
</tr>
<tr>
<td></td>
<td>(1.24)</td>
<td>(1.96)</td>
<td>(1.58)</td>
<td>(1.34)</td>
</tr>
<tr>
<td>RWR</td>
<td>5.10</td>
<td>2.01</td>
<td>2.83</td>
<td>6.50</td>
</tr>
<tr>
<td></td>
<td>(1.27)</td>
<td>(1.11)</td>
<td>(1.15)</td>
<td>(1.22)</td>
</tr>
<tr>
<td>CV</td>
<td>5.98</td>
<td>3.06</td>
<td>4.36</td>
<td>8.89</td>
</tr>
<tr>
<td></td>
<td>(0.99)</td>
<td>(1.88)</td>
<td>(1.29)</td>
<td>(1.14)</td>
</tr>
</tbody>
</table>

Values in the table are mean scores of variables within clusters (standard deviation).

*113 companies included in the analysis, 9 companies were not included because of missing at least 2 values.
In Chapter 5, responding companies have been classified into four groups according to the sophistication level of their MAPs. This chapter now addresses the second research question; that is, investigation of the effect of three sets of possible explanatory factors – external, organisational and processing factors – on the level of MAP sophistication. The potential effects looked for are the eight principal contingent factors in the established literature (see Chapter 2) plus two further possible influencing factors specific to the food industry (customer power, and product perishability) which were brought to our attention. All possible effects are examined by testing whether or not there are differences among the four groups of companies in relation to each factor. The non-parametric Kruskal-Wallis one-way ANOVA test was used. The results are summarised in Table 9 and discussed in the following sections.

6. External factors

6.1 Perceived environmental uncertainty (PEU)

Many researchers have investigated the relationship between the perceived environmental uncertainty and characteristics of management accounting. For example, Gordon and Naryanan (1984) argued that decision makers attempt to find a match between the extent of information processing demanded by the environment and the process capabilities of the organisation. As environment grows more uncertain, more information must be processed by decision makers. Gordon and Naryanan (1984) found that external, non-financial and ex ante information is considered to be increasingly important when perceived environmental uncertainty increases. Similarly, Chenhall and Morris (1986) found a positive relationship between PEU and need for information that has broad scope. Gul and Chia (1994) explain that when PEU is low, management is able to make relatively accurate predictions about the market, while when PEU is high management may require additional information to cope with complexities of the environment. Consequently, more sophisticated reports from MAS can help to reduce uncertainty and improve managerial decision making (Chong & Chong, 1997).

The results of Kruskal-Wallis one way ANOVA for PEU shown in Table 9 suggest that there is a significant difference among companies in the four groups in relation to PEU. This can be explained as companies moving from less sophisticated MAPs (Stage 1 or Stage 2) to more sophisticated MAPs (Stage 3 or Stage 4) when they perceive high environmental uncertainty.

Table 9. Results of Kruskal-Wallis test – the effect of explanatory factors and MAP sophistication

<table>
<thead>
<tr>
<th>External factors</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Chi-square</th>
<th>df</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived environmental uncertainty</td>
<td>46.79</td>
<td>50.56</td>
<td>66.58</td>
<td>63.53</td>
<td>6.968</td>
<td>3</td>
<td>.073</td>
</tr>
<tr>
<td>Customers’ power</td>
<td>15.33</td>
<td>16.55</td>
<td>36.32</td>
<td>38.44</td>
<td>26.098</td>
<td>3</td>
<td>.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organisational factors</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive strategy</td>
<td>41.10</td>
<td>42.72</td>
<td>41.75</td>
<td>50.37</td>
<td>1.435</td>
<td>3</td>
<td>.697</td>
</tr>
<tr>
<td>Decentralisation</td>
<td>31.45</td>
<td>54.86</td>
<td>61.53</td>
<td>74.20</td>
<td>17.943</td>
<td>3</td>
<td>.000</td>
</tr>
<tr>
<td>Size (total assets)</td>
<td>40.76</td>
<td>51.41</td>
<td>64.66</td>
<td>74.67</td>
<td>12.783</td>
<td>3</td>
<td>.005</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Processing factors</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity of processing system</td>
<td>27.33</td>
<td>24.55</td>
<td>26.32</td>
<td>18.69</td>
<td>1.955</td>
<td>3</td>
<td>.582</td>
</tr>
<tr>
<td>AMT level</td>
<td>17.94</td>
<td>14.73</td>
<td>39.41</td>
<td>35.81</td>
<td>29.452</td>
<td>3</td>
<td>.020</td>
</tr>
<tr>
<td>TQM</td>
<td>13.44</td>
<td>17.17</td>
<td>38.05</td>
<td>36.63</td>
<td>27.402</td>
<td>3</td>
<td>.001</td>
</tr>
<tr>
<td>JIT</td>
<td>17.61</td>
<td>14.93</td>
<td>38.45</td>
<td>37.00</td>
<td>28.913</td>
<td>3</td>
<td>.000</td>
</tr>
<tr>
<td>Product perishability</td>
<td>24.11</td>
<td>24.83</td>
<td>29.00</td>
<td>17.94</td>
<td>2.986</td>
<td>3</td>
<td>.394</td>
</tr>
</tbody>
</table>

1 In the computation of the Kruskal-Wallis test, for a specific variable, all scores of all groups are ranked in a single series. The lowest score is replaced by rank 1, the next lowest score is replaced by rank 2 and the largest score is replaced by rank N, where N is the total number of independent respondents in all the groups. The sum of ranks in each group is then calculated and divided by the total number of respondents within each group to obtain the average rank. The Kruskal-Wallis test assesses the differences between the average ranks to determine whether they are significant or not. SPSS 11 was used to analyse the survey data.

2 This factor is generally measured as the level of uncertainty subjectively perceived by decision makers. The approach is advocated by Gordon and Naryanan (1984) who argued that ‘the driving force behind decisions related to organization structure and information characteristics seems to be the key individuals’ perception of uncertainty in the environment’ (p.42, emphasis added).
6.1.2 Customers’ power
Interviewees advised us that customers’ power is an important variable affecting many aspects of the operations of companies that depend on few customers such as the large supermarket chains. This is confirmed by previous food sector research – Fearne and Hughes (1999) reported that four retailers accounted for two thirds of UK grocery sales. To our knowledge no previous study has investigated the effect of customers’ powers on the sophistication level of MAPs. From the discussion with interviewees we were led to believe that companies facing high levels of customer power might use more sophisticated MAPs to improve their decision making process and control. This should help companies to keep their demanding customers satisfied.

Customers’ power was measured based on four questions related to the percentage of sales value sold under their own brand, how much difficulty they would have in finding alternative business if a customer changed to a different supplier and how much power food and drink producers had to alter contracts with their customers. An average of the four questions was used in the analysis.

From Table 9, it can be seen that there are significant differences between the four groups of companies in relation to customers’ powers. This leads us to conclude that companies move from naive stages of management accounting evolution (Stage 1 or Stage 2) to more sophisticated stages of 3 and 4 as their power relative to their customers diminishes.

6.2 Organisational factors
6.2.1 Competitive strategy
Two competitive strategies are considered in this research; cost-leadership and differentiation. Companies adopting a cost-leadership strategy aim to provide products with the lowest possible cost relative to their competitors. Companies adopting a differentiation strategy focus on creating distinctive features, customer service, brand image or performance.

Govindarajan (1986, p.848) argues that a successful differentiator will seek approaches that lead to a price premium greater than the differentiating cost. Considering that there are numerous ways of achieving and maintaining uniqueness in the marketplace, a differentiator will require a relatively large information-processing capacity to deal with the many available options. By contrast, a strategy of cost leadership implies tight control systems. For a cost leadership strategy to be successful, managers must direct their attention to the internal aspects of their SBUs, primarily to the production and engineering functions.

The logic of the differentiation strategy requires that a firm chooses attributes on which to differentiate itself that are different from its rivals. The options available to a differentiator, with respect to what unique product feature to offer, would normally be greater than those available in the case of a cost leadership strategy. Thus, information processing requirements will be greater in the case of SBUs following a differentiation strategy than in the case of SBUs following a cost leadership strategy (Govindarajan 1986, pp.848-9).

Drury and Tayles (2000, p.33) argue that companies following a differentiation strategy need a sophisticated cost system that accurately measures the costs of product and volume diversity arising from following such a strategy. Without a sophisticated system companies run the risk of not being able to determine whether the higher revenue generated from their products or services exceeds the extra costs associated with differentiation. They used measures of product diversity as a proxy for a differentiation strategy. They could not, however, find evidence to suggest that competitive strategy influenced the sophistication of costing system.

In this research we used a scale developed by Govindarajan and Fisher (1990) and asked respondents to indicate the percentage of their business unit’s total sales accounted for by products representing use of either cost-leadership or differentiation strategy. The weighted average of the percentages was used as a measure for SBU’s strategy.

The Kruskal-Wallis test shows no significant difference between the four groups of companies (based on MAP sophistication) in relation to their competitive strategies, see Table 9. Our result therefore confirms Drury and Tayles’ (2000) conclusion.

6.2.2 Firm structure – decentralisation
Chenhall and Morris (1986) define decentralisation as the level of autonomy delegated to managers. It provides managers with greater responsibility over planning and control activities and greater access to information not available to ‘the centre’. For decentralised companies to succeed, they need to design a management accounting system that provides relevant information to support managers in their planning, controlling and decision-making. To examine whether the sophistication level of MAPs is affected by decentralisation, respondents were asked five questions to indicate the degree of delegation of authority by the chief executives of their firms. An average of their answers was used in running the Kruskal-Wallis test.

The results, in Table 9, indicate that there are significant differences between the four groups of companies in their relation to decentralisation. The results suggest that companies with more delegated managerial structures may need more sophisticated MAPs to provide managers with enhanced relevant information for the planning, controlling and decision making for which they are responsible.
6.2.3 Size
Organisation size is an important factor that affects both structure and other control arrangements. It is generally expected that larger organisations are able to adopt more sophisticated MAPs than smaller organisations. Otley (1995) reported that evidence of the impact of size on control techniques was found in studies of management accounting systems following merger. Moving from naive stage of MAPs to a more sophisticated stage requires resources and specialists only affordable by large organisations. Accordingly we expect large companies will adopt sophisticated MAPs.

Total assets of each responding company was used as a measure of the company’s size. It was converted to the logarithm of nominal values to dilute the extreme variability in size and achieve a more normal distribution (Govindarajan, 1988). The results of Kruskal-Wallis tests shown in Table 9 indicate that there are indeed significant differences between the four groups of companies in relation to their size. This result confirms the expectation that more sophisticated MAPs are likely to be implemented by large companies.

6.3 Processing factors
Manufacturing is not a word usually applied to the production of food and drink. However, the actual activities encompassed within the term manufacturing are very broad and many of them are similar to the activities of processing and producing food and drink. This is supported by the fact that the benchmarking initiative for the food industry and many of them are similar to the activities of processing factors. Chemical as opposed to organic. For this reason the debate about management accounting and manufacturing factors is equally applicable to food and drink processing factors.

Dean and Snell (1996, p.459) reported that ‘for 30 years following World War II, the manufacturing function was virtually ignored by top management, and consigned to backwaters of day-to-day operations’. To improve the manufacturing performance, contain costs with rising labour rates, and to gain competitive advantage an enormous change has been witnessed in western manufacturing. Advanced manufacturing technology (AMT), total quality management (TQM) and just-in-time (JIT) are the most notable changes in manufacturing during the last few decades. Such innovations emphasise a need for continuous improvement activities; the need to constantly enhance operating processes from the levels achieved in prior years (Kaplan and Atkinson, 1998).

Kaplan and Atkinson (1998) argue that these new manufacturing technologies are different from the stable environment of mass production of standardised products for the first seven decades of the twentieth century. The changes require management accounting systems to be designed to support, not inhibit, the drive for excellence. In the new environment, many companies found that their traditional cost accounting measures were inhibiting the introduction of innovative processes and technologies. For example, measures of profitability and of individual worker efficiency and machine utilisation encouraged the production of items in advance of when they are needed. This however conflicted with goals of improved quality and responsiveness to customers, of increased throughput and reductions in defects, waste and working capital. Measurement systems had to evolve to support efforts to increase quality and productivity, to move to just-in-time and computer-integrated production systems, and to help justify investment in new technologies.

6.3.1 Complexity of processing system
Complexity can be measured by the diversity of product lines, processes and volume. Krumwiede (1998) found evidence that complexity is positively correlated with the decision to implement ABC. Since activity-based costing represents one element of a sophisticated management accounting systems we would expect complexity to be associated with stages of MAP sophistication. However, a Kruskal-Wallis one way ANOVA on our data (Table 9) does not support this; we find no significant difference of complexity among the four MAP sophistication levels.

6.3.2 Advanced manufacturing technology (AMT)
One of earliest contingent variables to be associated with the design of management accounting systems was the type of manufacturing technology. For example, a positive association was found between the degree of automation in the manufacturing process and the formality of budget systems use (Otley, 1995). Hoque, Mia and Alam (2001) argue that traditional performance measures are narrow in focus, historical in nature and in many cases incomplete. Organisations that adopt AMT need a multidimensional performance (financial and non-financial) measurement system that should provide managers with continuous signals as to what is most important in their day-to-day activities and where efforts must be directed.

We measured AMT using a scale developed by Dean and Snell (1996). Respondents were asked to respond, on seven-point scales, to 14 questions thereby indicating the level of application of AMT in their companies. The questions related to technologies such as MRP II, computer-aided design, computer numerical control, flexible manufacturing systems, robotics, automated materials handling, computer-aided inspection and planning. An average of a respondent’s scores across all the 14 questions was used as a measure for the AMT level. The low end of the measure indicates a low level of AMT and vice-versa.

3 See Mann et al (1999a).
To examine whether there is a relationship between automation and the sophistication level of MAPs, a Kruskal-Wallis test was carried out. The results of this test, shown in Table 9, indicate that there are significant differences between the four groups of companies in relation to their AMT level. This result suggests that sophisticated MAPs are more likely to be implemented by companies with AMT.

**6.3.3 Total quality management (TQM)**

TQM was measured using an instrument developed by Snell and Dean (1992) and modified by Sim and Killough (1998). Respondents were asked to rate the extent of usage of several aspects of total quality management.

Six of the questions were administered by a seven-point scale and the seventh question asked about the proportion of the plant’s employees for whom quality is a major responsibility. The percentage reported was divided by 14.3 in order to convert the percent to a scale of 1-7. Each respondent’s scores were averaged across the seven questions for a measure for their company’s TQM level. The low end of the measure indicates a low level of TQM and vice-versa.

The results of the Kruskal-Wallis test in Table 9 are consistent with those relating to AMT; i.e. a significant difference was found between companies with different level of MAP sophistication.

**6.3.4 Just in time (JIT)**

JIT was also measured using an instrument developed by Snell and Dean (1992) and modified by Sim and Killough (1998). Respondents were asked nine questions to rate, on a seven-point scale, the level of JIT adoption. An average of a respondent’s scores across all the nine questions was used as a measure for the JIT adoption level. The low end of the measure indicates a low level of JIT adoption and vice-versa.

The results, shown in Table 9, are similar to those concerning AMT and TQM. There are significant differences between companies with different level of MAP sophistication.

**6.3.5 Product perishability**

This is the second question added to the questionnaire as a response to comments by production managers in the pilot interviews. Product perishability was measured by asking respondents to indicate the extent to which this characteristic dictated the way they run their business. The expectation was that sophisticated MAPs would be implemented in companies with a perception that product perishability dictates the way business is run. However, the results of the Kruskal-Wallis test do not support this expectation; there were no significant differences among the four groups of companies in this regard.
7. Summary and conclusions

In the early part of this report we have described the nature and objectives of our large scale empirical study of management accounting practices in the UK food and drinks industry. Our findings are based on analysis of 245 questionnaires completed by management accountants and production managers. The processing companies to which these respondents are attached have a range of characteristics including:

- An average value of total assets of £27.5 million but wide dispersion around that.
- A moderately high level of perceived environmental uncertainty.
- Being part of a value chain in which their customers, often supermarkets, have considerable power.
- Tending, on the spectrum of competitive strategy, towards product differentiation rather than cost leadership. This is supported by a high level of product diversity and complexity.
- A moderately high level of monitoring and control of quality.
- No strong evidence of decentralisation and delegation or of the application of advanced (automated) manufacturing (processing) technologies.
- A high level of perishability of product which corresponds with moderately high engagement with JIT.

We believe that these characteristics are reasonably representative of the UK food and drinks industry generally.

7.1 Limitations of the study

The considerable diversity within the food and drink sector became apparent through the course of the project. The operations and management accounting of, for instance, those companies that process products for sale to the retail trade differ markedly from those of that deal with the public; likewise, there are problems in comparing firms with total assets of £5m against those of £500m. There is an inevitable trade-off between the benefits of the relevance that come with wide scope and the greater accuracy that can come with a narrower focus. We recognise this limitation but maintain that most of our analyses and prescriptions have relevance across many organisations in the sector, and some of the findings are appropriate even more broadly in other industry sectors.

A second potential limitation arises out of the nature of a postal questionnaire research approach. Findings can potentially be distorted by careless or superficial questionnaire completion, by respondents misunderstanding the questions or by an unconscious bias related to good intentions rather than actual state of affairs.

Thirdly, there are avenues that, with the benefit of hindsight, could usefully have been pursued. These include the extent to which there is monitoring of the effectiveness of various forms of marketing expenditure, consideration of casualisation of labour and outsourcing, supply chain management, and matters relating to new product development – all very relevant issues in this sector.

Finally, we have attempted, in reporting on this CIMA-funded project, to severely restrict the coverage of the prior research which informed this study, and also the technical explanations of our research approach and statistical analysis. Our intention has been to provide a summary which gives sufficient detail to allow an understanding of what was done and provide assurance of appropriate academic rigour, without preventing the report from being readily accessible to practitioners.

7.2 Management accounting practices (MAPs)

We have provided, in Chapter 4, summary statistics of the importance of various practices or techniques together with the frequency with which they were used. Some notable findings derived from responses from management accountants in food and drink companies are identified below.

- The separation of costs into variable and fixed components was acknowledged to be at least moderately important by 83% of respondents and in almost half the companies the distinction is often or very often applied. This contrasted with lower levels of importance and usage of ABC and other full costing techniques. 19% of respondents indicated that they very often separate costs into incremental and non-incremental costs while the equivalent combined frequency for use of departmental and plant-wide overhead rates is only 18%.
- Budgeting for planning and control is either important or moderately important for more than 90% of companies. It was interesting that a high proportion (29%) do not flex or amend their budgets for changes in volumes or other factors, but work only with fixed budgets. This is mitigated by the result that 'What if' budget analyses are applied at least 'sometimes' by 67% of respondents. Activity-based budgeting, in common with activity-based costing, has higher ratings of importance than actual usage.

1 See for instance Fearne and Hughes (1999), Wright and Lund (2003), Grunert et al (2005), Henchion and McIntyre (2005), and Rudd et al (2001, p.659) who report that ‘only 13% of new product development projects lead to a successfully launched product’. 2 Based upon a comparison of important or moderately important as against very often, often and sometimes.
• Over three quarters of companies consider financial measures of performance to be fully important. Non-financial performance measures are also highly important, especially in connection with customer satisfaction. However, despite this importance, some 40% of companies reported that they never or rarely actually used non-financial measures of performance in connection with customers, operations, innovation or employees. We get here an impression that the balanced scorecard is more talked about than applied, and that performance measurement is still very much dominated by financial figures.

• CVP analysis is considered to be at least moderately important by a high proportion of respondents – a finding which ties in with the prominence, mentioned above, that is given to splitting costs into fixed and variable. As expected, the majority of companies apply product profitability analysis frequently. What is perhaps more interesting is that 51% indicated that customer profitability analyses are conducted either often or very often. This lends support to the conclusion of Fearne and Hughes (1999, p.12) that ‘As retailers become increasingly dependent on fewer larger players, so supply chain efficiencies will become increasingly driven by the suppliers who are best placed to identify the costs of operating parallel systems.’

• We found scepticism about DCF investment appraisal as compared with earnings-based or payback methods. This finding was corroborated by the fact that 42% of respondents indicated that calculation of cost of capital was not important in their companies. Non-financial factors relating to capital projects are perceived to be either important or moderately important by 82% of respondents, but only 33% of companies often or very often report and document such factors – a finding which may be biased by the fact that major capital investments are rare.

• Strategic analysis techniques ‘come across’ as moderately important but are mostly not very frequently applied. The high ranking of importance, relative to the ranking of frequency of use, of analyses of competitive position (and competitors’ strengths and weaknesses) and of value chains suggests that the application of these practices may become even more common.

An extra dimension of analysis is to divide practices into those that are used, regardless of indicated frequency, and those that are never used. This shows that 98% use budgeting for planning, 97% use budgeting for cost control, 97% do product profitability analyses, 93% apply financial measures in performance evaluation, and 91% carry out analyses of customer profitability.

We derived a composite statistic of MAP ‘emphasis’ by multiplying scores of importance and usage. As an absolute measure emphasis is not especially meaningful. However it does provide a useful guide – for any practice to score highly on emphasis it must be both considered important and also often used. These composite emphasis statistics were presented in Table 5. The following practices are shown to have pre-eminent emphasis: Budgeting for planning and for controlling costs, Product profitability analysis, and Performance evaluation based on financial measures. We conclude that traditional management accounting is still very much alive and well in UK food and drinks companies.

In Table 7 we have tentatively suggested various MAPs which will become increasingly used and those that will gradually be phased out. We have done this by identifying practices where the ranking of importance is significantly higher (or lower) than the present ranking of usage. The data suggests that, of the more sophisticated techniques, increased use may be expected of the following:

• information concerning the cost of quality
• non-financial measures relating to employees
• analysis of competitors’ strengths and weaknesses.

7.3 The level of evolution of management accounting in UK food and drink firms
The International Federation of Accountants has described the evolution of management accounting and identified four stages of development or sophistication: Stage 1 is principally concerned with ‘cost determination and financial control’, Stage 2 with ‘provision of information for management planning and control’, Stage 3 with ‘reduction of waste of business resources’ and Stage 4 with ‘creation of value through effective resource use’. In Chapter Five we have ‘fleshed out’ the IFAC model by classifying each individual MAP into one of the developmental stages.

We applied cluster analysis to group our 113 respondent firms according to their scores on the four stages of management accounting sophistication. About 19% of firms were found to be in Stage 1 of evolution, 41% in Stage 2, 30% in Stage 3 but only 13% in Stage 4. We conclude that management accounting systems in many UK food and drinks companies are moving, but only slowly, from a simple or naive role of cost determination and financial control towards a more sophisticated role of creation of value through effective resource use.

3 To allow for the possibility of ‘noise’ that might have arisen out of respondents’ differing interpretation of questions about frequency. We are grateful to one of the anonymous reviewers for suggesting this extra analysis.
7.4 Relationships between management accounting sophistication and contingent factors

The classification of sample companies into levels of management accounting sophistication allowed us to then investigate the relationship between management accounting practices and potential explanatory variables.

Results reported in Chapter 6 show significant differences between the degree of environmental uncertainty perceived by respondents and the level of sophistication of their companies’ management accounting. This confirms earlier, non-industry-specific, studies. In addition, we found management accounting to be more highly evolved in companies facing powerful customers. Customer power is particularly relevant to food and drinks processors because of the concentration of the food and drink retail sector. Producers dominated by their supermarket chain customers appear to find it necessary to invest in more advanced management accounting.

We also tested for the influence of organisational factors on management accounting. Our survey had indicated that UK food and drinks processors tend towards a product differentiation, rather than cost leadership, strategy. Various authors have argued persuasively that differentiators require more sophisticated management accounting. However, in common with Drury and Tayles (2000) we found no evidence that competitive strategy has any influence. A second potentially influential organisational factor that was investigated was the extent of firms’ decentralisation and delegation. We believed that more delegated managerial structures may need more sophisticated MAPs to provide managers with enhanced relevant information for the planning, controlling and decision making for which they are responsible. This expectation was upheld by the statistics. Management accounting practices are subject to economies of scale, and investment in sophisticated systems can more readily be justified in large businesses. Again, this expectation was upheld in the food and drinks companies.

The final set of contingent factors relate to companies’ processing technologies. Prior broadly-based research has shown that relationships generally exist between the application of new manufacturing technologies and the sophistication of management accounting practices. From tests reported in Chapter 6 we conclude that sophisticated MAPs exist in companies which have made significant investment in processing automation, in TQM and in JIT. We did not however find that either processing complexity or the extent to which product perishability dictated the way a business was run, had any association with management accounting evolution.

A summary of our exploration of relationships between management accounting sophistication and possible explanatory variables is given in the table below.

<table>
<thead>
<tr>
<th>Table 10: Effects of contingent factors on food and drinks industry management accounting sophistication</th>
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<tbody>
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<td><strong>External factors</strong></td>
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<td>Perceived environmental uncertainty</td>
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<tr>
<td>Customers’ power</td>
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<tr>
<td><strong>Organisational factors</strong></td>
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<tr>
<td>Competitive strategy</td>
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<tr>
<td>Decentralisation</td>
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<td>Size (total assets)</td>
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<td><strong>Processing factors</strong></td>
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<td>Complexity of processing system</td>
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<td>AMT</td>
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<td>TQM</td>
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<td>JIT</td>
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<td>Product perishability</td>
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‘Highly significant’ indicates a statistical confidence of 95% and ‘significant’ indicates 90% confidence.
7.5 Implications
The aim of this study has been to investigate the current state of management accounting practices in the very large but under-researched UK food and drinks industry and explore its 'sophistication level'. Increased sophistication is manifested by a move across the spectrum from cost determination and financial control towards the creation of value. The results of our in-depth investigation covering budgeting, performance evaluation, costing, decision-making, communication and strategic analysis lead us to conclude that the typical food and drink firm is positioned at a mature Stage 2 or early Stage 3 of IFAC’s four stage classification. Budgeting, product profitability and financial performance measurement remain the central pillars, while some of the 'newer' management accounting techniques are less widely used than might be assumed from the reading of textbooks.

It is sometimes argued that rationality and 'economic Darwinism' mean that the accounting practices that are in current use are those that are best suited to current circumstances. If that is so then no ready prescriptions come out of this study except that what is written in textbooks, taught in higher education and examined by professional institutes should simply concentrate on propagating more faithfully what is practised.

A more balanced position is to recognise that evolution (encompassing both adaptation to changing environments and also real progress or improvements) is a gradual process. If this is the case then it is appropriate to recommend that practitioners identify and follow the example of those organisations in the vanguard of change which represent new and better practices. As stated by Mann et al (1999b, p.238) ‘For the food industry to move forward ... more companies should consider using self-assessment as a method for identifying improvement opportunities and assessing their progress towards business excellence.’ This may be increasingly imperative for the UK food sector if trade liberalisation continues to lead to greater international competition. Given that there is some validity in this approach, we recommend that companies benchmark themselves against the MAPs in different stages of evolution and consider adopting 'more advanced' practices (such as the value creation ones). Our recommendation comes with the caution that Stage 4 is clearly not appropriate for all companies. For educators, professional bodies and society generally the implication is that the gap between what purports to be 'best practice' and actual practice suggests that there is considerable room for improved dissemination of concepts and techniques.

One way for practitioners to focus on which management accounting practices might be particularly useful in their companies is by reference to our contingency results. It can be seen from the summary Table 10 that our findings have particular implications for companies that display some or all of the following characteristics: large, decentralised, having powerful customers, or applying advanced technology or TQM or JIT 'philosophies'.

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4 'The food industry has not been exposed to the same degree of international competition as some other industries' (Mann et al 1999a, p.19)
Bibliography


Allott, A. (2000), Management Accounting Change, Management Accounting, UK, July/August, pp. 54-55.


Ernst and Young LLP, (1995), Activity-Based Costing: usage and trends in the food industry, Ernst and Young, USA.


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