Factors affecting the development of sophisticated database marketing systems.

Thesis

UNRESTRICTED

FACTORS AFFECTING THE DEVELOPMENT OF SOPHISTICATED DATABASE MARKETING SYSTEMS

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Marketing Thesis
The Open University Business School
March 1998

Authors no. M7187704
Date of submission: 24th November 1997
Date of award 22nd February 1998

Thesis presented in fulfilment of the requirements for the degree of Ph.D

IN MEMORY OF MY PARENTS

Lily Emily and Alfred Henry Lewington - without whose encouragement to remain dedicated and stay the course in life's tasks this thesis would not have materialised.

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ACKNOWLEDGEMENTS

I would like to acknowledge the help and support of the following:

My supervisors Professor Leslie de Chernatony and Ann Brown for their moral support, constructive criticism, and continuous encouragement throughout the years of my study.

My wife, Barbara, and my children, John Paul and Emily, for their tolerance and understanding of my commitment to complete this work.

My good friend, Joe Hupert, for proof reading my thesis, and discussing my research ideas as they developed.

My family and friends in England for their encouragement and hospitality over the past six years, particularly my aunt and uncle, Sheila and Eddie Lewington.

My friends in St. Louis and colleagues at Maryville University for their continuous support and encouragement.

The Library Staff at City University Business School, Washington University (St. Louis), London Business School, Maryville University (St. Louis), and The Open University.

The many managers and presidents of catalogue companies across America who participated in this study.

DECLARATION

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ABSTRACT

In the late 1980s, companies in a wide variety of industries began to implement segmented marketing strategies using database marketing (DBM) systems. Several surveys noted that some organisations were developing sophisticated DBM systems to achieve competitive advantage, while others, in similar marketplaces, seemed unable, or unwilling, to exploit the potential benefits of these powerful systems. Alternatively, evidence from industrial reports suggested that most companies were failing to fully exploit the capabilities of their systems. Hence, this research was designed to determine the factors affecting levels of sophistication in database marketing (DBM) systems.

First, theories from marketing and information systems were synthesised to develop a generic model of DBM systems. Next, notions about the sources of competitive advantage were reviewed to identify potential factors promoting the development of sophisticated DBM systems. This review resulted in four such factors being hypothesised: market orientation as a specific organisation culture, database size (i.e. number of customers) as a key resource, locus of control of the senior marketing manager as an important individual characteristic, and the difference between consumer and business markets as a factor in firms' external environment.

Empirical data were collected from two random samples of senior marketing managers in US catalogue companies using postal surveys. Data from the first sample (36 observations) were used to develop a valid and reliable construct to measure the level of sophistication in DBM systems. Further data were collected from a second random sample using two further postal surveys (69 observations), which confirmed and replicated the results obtained from the first sample.

Overall, the research findings show that the development of sophisticated DBM systems is positively associated with two factors: market orientation of organisation culture, and database size. The other two factors - locus of control and type of market - failed to show any association with the level of sophistication in DBM systems. Further data analyses revealed a strong association between the elements of sophisticated DBM systems and marketing notions of sources of competitive advantage.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Technological advances in the 1980s and 90s created a "virtuous spiral" (Madnick 1991, p. 29) of information management economics. These incessant innovations in information technology (IT) greatly reduced the costs of capturing, storing and manipulating data. Information, the lifeblood of every organisation, became affordable in large quantities for businesses of nearly all sizes. This encouraged many companies to pursue " ... a memory of the customer relationship" (Blattberg and Deighton 1991, p. 6) through the extensive collection of customer data. These new marketing approaches using an organisational memory of customer characteristics and buying behaviour were simply described as Database Marketing (DBM).

Historically, the basic philosophy of DBM was founded in the direct marketing industry (Petrison et al. 1993), and this has created some confusion about the nature of DBM systems. The centuries old mail order business required that direct marketers store and maintain mailing lists of their customers for operational purposes. The evolution of database technology enabled some organisations to capture ever more detailed data on their customers, and ultimately databases became the major source of marketing information for segmented direct marketing programmes. However, it was not until the late 1980s that texts and papers began to recognise the potential of DBM to provide marketing information which companies might use to gain a variety of competitive advantages (Stone and Shaw 1987, Rapp and Collins 1987, Shaw and Stone

1988a, Fletcher et al. 1990). Unfortunately, the barriers and problems which must be overcome in order to develop sophisticated marketing information systems are equally well articulated (Jobber and Watts 1987, Proctor 1991, Kench and Evans 1991). The rapid adoption of the DBM approach required an urgent study of the factors affecting the development of sophisticated DBM.

The brief overview above outlines the background to this research. The first section explains the importance of information and DBM in modern markets. This leads to a section that justifies the need for research to provide a greater understanding of sophisticated DBM systems, and hence identifies the main research objectives. Next, three sections provide a brief overview of the research methodology, the results obtained, and the main limitations of the study. The final section presents synopses for each of the following nine chapters. Readers seeking to examine the core of this dissertation are directed to four chapters: chapter 3 defines a three-element model of sophisticated DBM systems; chapter 7 describes the process of developing a construct to measure the level of sophistication in DBM systems; chapter 9 analyses the results of the empirical research; chapter 10 draws conclusions from the study, interprets the managerial implications of the study, and provides direction for future research.

1.2 DATABASE MARKETING: DERIVING COMPETITIVE ADVANTAGE FROM MARKETING INFORMATION

The aspiration of any marketing information system (MkIS) should be to increase the efficiency and effectiveness of the exchange process through improved decision making. Parkinson (1994) believes effective computer-based approaches to marketing information management can have a major influence on a company's ability to assess and respond to its competitive position. Other authors (Fletcher 1990, Piercy and Evans 1994) view information as the key "marketing asset" that must be developed as a prerequisite to gaining competitive advantage. Cox and Good's (1967) paper asked many questions which are still relevant. How sophisticated should the system be? How should marketing managers be involved in system development? What should the MIS cost? What is the value of the information obtained?

In theory, the economic value of a MkIS can be evaluated on the basis of its capability to increase the productivity of the exchange process through improved marketing decisions. In reality, attempts to measure, or predict, the value of MkISs have been problematic (Glazer 1991), especially when determining whether an information system is of "strategic value" in the sense that it delivers competitive advantage. This makes it difficult for organisations to assess the financial returns from investments in sophisticated MkISs. Consequently, as investments in information systems take on strategic dimensions, the use of short-term accounting methods (i.e. payback, ROI) become less appropriate as measures of investment effectiveness. (Hinton and Kaye 1996).

Many organisations' investment dilemmas stem from the ambiguous nature of the information required for marketing decisions, making it difficult to specify IT configurations that deliver increased profitability from better marketing decisions. A retrospective review of Gorry and Scott Morton's (1971) classic framework for decision support systems reveals an almost total concentration on operations and accounting systems - they clearly classified marketing decisions as "unstructured." Twenty years later, Dubelaar et al. (1991) presented an equally discouraging outlook for the potential use of expert systems and artificial intelligence, describing it as the "cold fusion" of marketing. It would be unfair to confine the problems of obtaining value and competitive advantage from information systems (IS) to marketing; unfortunately, the risks and disappointments of IT investments in all business functions are well known (Galliers 1991).

Such obstacles, however, have not deterred companies from increasing their investments in DBM. Many deploy DBM to exploit the marketing opportunities presented in Porter and Millar's (1985) classic paper on deriving competitive advantage from IT. The main opportunities are given in the following five quotations.

> "The increasing flexibility in performing many value activities combined with falling costs of designing products has triggered an avalanche of opportunities to customize and to serve small market niches." (p. 156)
>
> "...[information] technology increases a company's ability to coordinate its [marketing] activities regionally, nationally, and globally." (p. 157)
>
> "Broad-line companies are increasingly able to segment their offerings in ways that were previously feasible only for focused companies." (p. 157)
>
> "Companies also are increasingly able to create and sell to others information that is a by-product of their operations." (p. 158)
>
> ".... information technology creates new businesses within old ones." (p. 158)

Their paper does not recognise, or specifically refer to, the concepts of DBM, but they created a future vision that is being implemented by marketers. DBM is one of the major tools enabling companies to translate competitive strategy into a practical action plan. A number of prominent DBM cases illustrate how companies have invested in Porter and Millar's vision: the opportunity to improve sales and marketing productivity through automation (Moriarty and Swartz 1989); strategic data alliances between General Motors and Household Credit Services that launched GM into the loyalty card business (Lowen 1993): and integrating of the Financial Times global database of 420,000 senior executives (Gardner 1995) are just a few of the many examples that could be cited (see Section 4.7).

Furthermore, the DBM approach has been embraced by marketers with a need for information systems to cope with the challenges of shorter product life-cycles (Lambin 1993), fragmenting markets (Mueller-Heumann 1992), and increased competition (Mazur and Hogg 1993). Some of the main benefits being exploited by marketers using effective DBM systems are:

- improved accuracy in market segmentation (Ventresca 1991), which reduce the ambiguity of marketing mix decisions;
- on-line market research that relates consumer characteristics to actual purchase behaviour (Charnes et al. 1985), facilitating market modelling and heuristic problem solving;
- accurate measurement and control of marketing plan performance (Bruns and McFarlan 1987).

Finding an appropriate definition to encapsulate such a versatile marketing approach proved difficult. This is because well structured DBM systems are used for a wide variety of research, planning and control activities at both tactical and strategic levels. Roberts' (1992) paper on the strategic benefits of DBM attempted a comprehensive definition of DBM:

> "Databased marketing is the application of statistical analysis and modeling techniques to computerized, individual-level data sets. It is used to support the development of cost-effective marketing programs that communicate directly with identified customers and prospects, and to track and evaluate the results of specific promotional efforts. Databased marketing implies planned communication with individually targeted customers and prospects over an extended period of time to promote repeat purchases of related goods and services." (p. 52)

This definition fails to express the true information and research capabilities of DBM in consumer and business marketing, as two key elements of DBM are not fully exposed. DBM's capabilities to *accurately measure* and *test* the effectiveness of different marketing mix approaches are important benefits which are well understood by sophisticated direct marketers. The problems of defining DBM systems are addressed in greater detail in chapters 2 and 3.

This section has briefly outlined how information derived from effective DBM systems can be used to attain competitive advantage. However, it is clear that deriving competitive advantage from DBM systems is not a simple process, as organisations must match the sophistication of information technology (IT) applications to the complexities of their marketplaces. The growing use and availability of direct marketing techniques, difficulties in defining investments in DBM systems, and lack of understanding of the DBM approach are highlighted in the next section as justification for this research.

1.3 THE NEED FOR THIS RESEARCH

The need for this research was justified using academic literature, industrial reports and statistics from UK and US publications. In the 1990s, it became clear that higher levels of sophistication in DBM capabilities were necessary to support the use of targeted direct communications and selling. When reviewing the status of UK DBM practice, Fletcher et al. (1990) concluded with this statement:

> "DBM will soon become not a way of gaining competitive advantage but an essential element of business practice to be ignored at a firm's peril. If DBM is to be implemented effectively by marketers then research is required to identify the constraints upon its adoption and the necessary evolutionary stages which may exist. This will help the company identify the type and level of sophistication of customer information required so as to match it with the necessary technical and marketing skills necessary to exploit this knowledge." (p. 13)

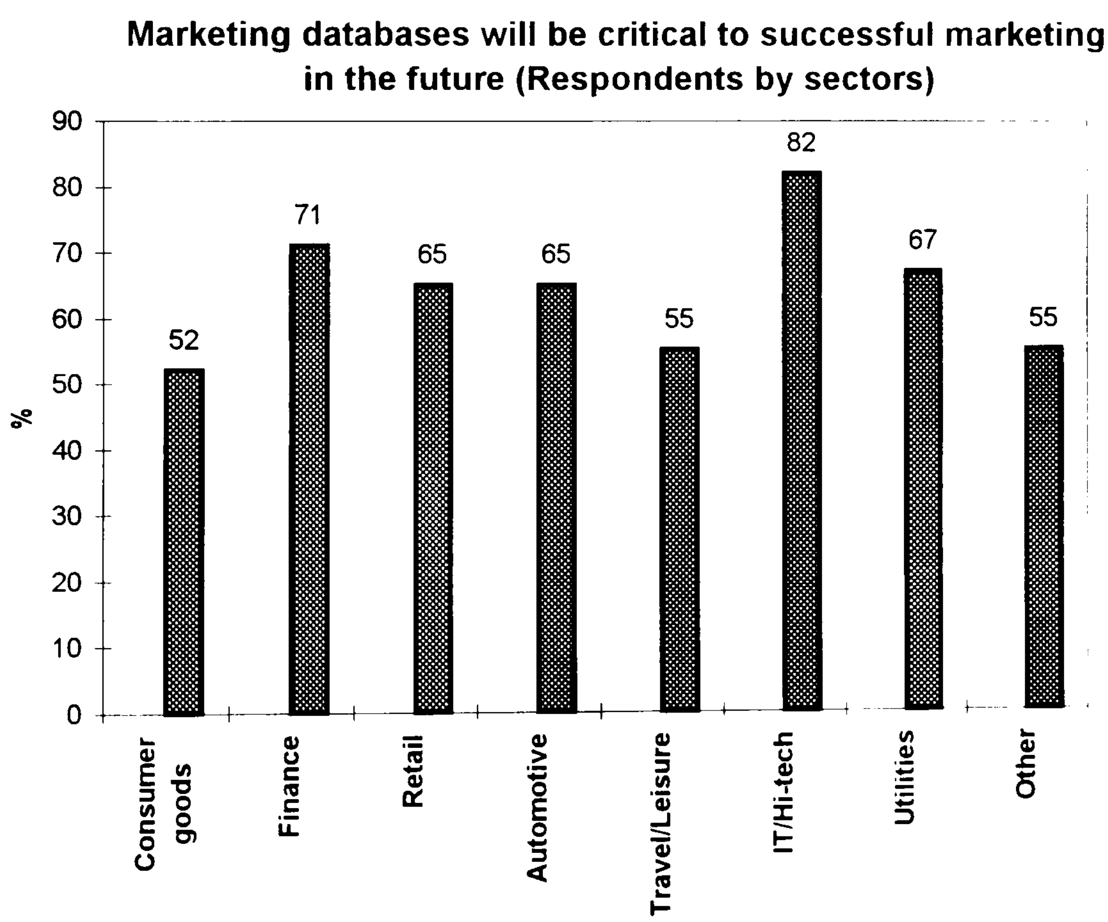
Unfortunately, their prophetic statement has not been generally recognised by marketing researchers. Recently, Detienne and Thompson (1996) observed that the term "database marketing" had hardly appeared in some of the most prestigious marketing journals (e.g. *Journal of Marketing*, *Journal of Marketing Research*). This is indicative of the dearth of quality research which still inhibits a greater understanding of DBM systems.

Nevertheless, this has not diminished the interest of many major organisations in DBM's potential applications. The Henley Centre's *Dataculture* (1995) research report, sponsored by a variety of leading organisations (e.g. Royal Mail, The Automobile Association, Legal and General), provided many useful perspectives on the current and future roles of DBM. The report estimated the level of investment in DBM, and observed that only a small number of companies were able to successfully exploit these investments.

"… our estimates indicate a total annual expenditure of some £7 billion per year in the UK. However, our research shows that only a tiny minority of companies - perhaps around 7% at most - are really organised to maximise the benefits of the database marketing approach." (p. 1)

"It is not clear that understanding, skills or investment will be sufficient for companies to reap the benefits of database marketing. If past performance is anything to go by, it is unlikely that any more than a tiny minority of companies will be among the advanced, leading edge and responsible users." (p. 5)

Moreover, DBM is no longer the preserve of direct marketers; as the approach is becoming more widely used in all business sectors. Henley's survey revealed an overwhelming 87% of respondents agreed that DBM will be critical to successful marketing strategy in the future (Figure 1.1).



Source: *Dataculture*, The Henley Centre/DMA (1995), p. 23.

Figure 1.1 Respondents' Perceptions of the Importance of DBM by Sector

The use of direct mail for communications and selling is continuing to expand. Industry statistics for UK mail volume (Table 1.1) display the overall growth in the period 1990-95. Likewise, the use of telemarketing is growing, and this growth will accelerate as long distance call costs continue to decline (Table 1.2). Furthermore, the use of professional telemarketing agencies is growing, a clear indication of the capital intensity of developing telecommunications systems that are integrated with DBM capabilities.

Year	1990	1991	1992	1993	1994	1995
Consumer	1,544	1,435	1,658	1,772	2,015	2,198
Business	728	687	588	664	715	707
Total	2,272	2,122	2,246	2,436	2,730	2,905

Source: DMIS, Datamonitor (1996), p. 40.

Table 1.1 UK Direct Mail Volume of Inland Items by Receiver (millions), 1990-95

Year	1990	1991	1992	1993	1994	1995
Agency	45.7	51.4	57.1	61.8	66.5	71.1
In-house	19.3	20.6	17.9	14.9	11.8	10.9
Total	65.0	72.0	75.0	76.7	78.3	82.0

Source: DMIS, Datamonitor (1996), p. 59.

Table 1.2 UK Outbound Telemarketing Expenditure (£ millions), 1990-95

In the US, the direct purchases of both consumers and businesses have also been increasing (Table 1.3). These statistics must be viewed in the context of other in-home shopping innovations that have emerged over the last decade. New media options such as home shopping networks (TV), catalogues on CD-ROM, and Internet marketing are all supported by DBM systems to provide customer information.

Year	1990	1994	1995	1996 Projected	2000 Projected
Consumer	29,605	36,223	38,634	40,829	51,925
Business	17,465	22,265	23,985	25,574	33,777
Total	47,070	58,488	62,619	66,403	85,702

Source: DMA [US] Statistical Fact Book (1996), p. 331.

Table 1.3 Value of US Catalogue Sales by Market ($ Billions)

Kench and Evans' (1991) study of five traditional MkISs revealed the need for improved customer information systems. Encapsulated in this quote is the growing impetus for companies to develop increasingly sophisticated DBM systems:

> "It was surprising how universally true it was that although companies knew comparatively little about their potential customers they did not know that much about their actual customers." (p. 22)

Clearly, companies were developing sophisticated DBM systems as a source of greater information about their customers and prospects. As a guide to developers of DBM systems, Cox and Good (1967) made an observation about marketing information systems that has stood the test of time, technology, and organisational complexity:

> "Someone must decide on the level of sophistication of the MkIS to be developed. This decision should, of course be based on a review of the company's needs and the costs of meeting them." (p. 151)

Once again, "level of sophistication" is seen as an important issue in decisions relating to both DBM and MkISs. Academics and managers need a greater understanding of the different levels of sophistication in order to articulate DBM systems' design among IT specialists and marketers. In later chapters, this research observes and documents companies that have developed sophisticated DBM systems while others remain confined within a "mailing list malaise" - an unsophisticated use of a data-poor database. This raised the main research question:

What are the factors, if any, promoting or inhibiting a company's ability to develop sophisticated DBM systems?

Academics and practitioners clearly need to know more about the construction, use and development of sophisticated DBM systems. Considering the complexity of DBM, the need for a generic model would appear to be an essential foundation for greater understanding and research; interestingly, an extensive literature search failed to reveal any attempt at such a model. Potentially, the development of a generic model would fulfil two important research functions. First, it would provide a greater understanding of the potential capabilities and functioning of DBM systems. Second, it could be used to define the domain of DBM systems; specifically, it would provide the foundation for empirical research to create a construct to measure levels of sophistication in DBM systems. The development of such a measure would be a prerequisite to further empirical research into the factors promoting or inhibiting the development of DBM systems. Identifying these factors could provide important insights for companies needing to gain greater value from, and attain competitive advantage through, the use of DBM. These observations and research needs shaped the research objectives stated below.

1. To present and define the key elements that comprise a generic model of sophisticated DBM systems.
2. To develop, from empirical data, a reliable and valid construct to measure the level of sophistication in DBM systems.
3. To determine, through empirical research, the factors promoting or inhibiting the development of sophisticated DBM.
4. To explain, from the empirical study, how sophisticated DBM enables companies to achieve competitive advantage.

1.4 OVERVIEW OF THE METHODOLOGY

One of the first texts on DBM (Shaw and Stone 1988b) explained many capabilities and applications of these systems; unfortunately, it did not provide the researcher with an overall model, references, or links to marketing theory. Consequently, the first phase of the research focused on constructing a generic model of DBM systems from marketing and IS theory. The literature review and discussions with marketing managers resulted in a generic model that defined three elements of sophisticated DBM systems. The three main elements were described as a data rich database, market modelling capabilities, and feedback from extensive performance measures.

Papers and texts suggested that DBM systems, in common with other marketing information systems, were being developed to a wide variety of levels of sophistication. Four factors affecting the sophistication of DBM systems were isolated using economic, marketing and IS notions of factors which were believed to yield competitive advantage. The selected factors defined four measurable factors as follows:

- market orientation as the specific *culture* of an organisation;
- size of the database (i.e. number of customers) representing a key *resource*;
- locus of control as a *personal difference* in marketing managers that motivates increased information demands;
- type of market (i.e. consumer versus business) representing forces in a company's *external environment*.

The findings of this research are based upon data collected from marketing managers in the US mail order catalogue industry. This industry sector was chosen as the sampling frame because it meets a number of important research criteria. First, the concepts of DBM evolved from the needs of this industry in the late 1970s.

Historically, cataloguers have often been the earliest users of direct marketing innovations supported by DBM systems. Second, every catalogue company must have some form of DBM system, even if it is only for the operational purpose of storing their mailing list. Finally, the industry has a large and diverse universe of markets from which it was feasible to observe the full spectrum of levels of sophistication in DBM systems. The geographic locations of catalogue companies dictated the use of a postal questionnaire as the most effective method of data collection.

Developing a postal questionnaire required that the generic model of DBM be operationalised as questions and scales for measurement purposes. A variety of questions and scales were examined and refined with the help of practicing catalogue marketing managers. This consultation resulted in 81 response items in 7 categories, which comprehensively defined the domain of DBM; unfortunately, this was not an efficient measurement tool. Furthermore, these questions had to be combined with other questions and constructs to measure firms' market orientation and individuals' locus of control in order to test the hypotheses. Meeting all of these requirements resulted in a lengthy questionnaire. The need to create a valid and reliable measure of level of sophistication of DBM systems, which would reduce the length of the questionnaire, determined that the survey would have to be conducted in two stages.

Conducting the survey in this way required the random selection of two mutually exclusive samples of marketing managers in catalogue companies across the US. Both samples were selected using a uniform distribution random number generator (1 to 7091). The resulting numbers were matched to 7,091 companies listed in *The Directory of Mail Order Catalogs* (1995).

Cover letters, questionnaires and pre-paid return envelopes were mailed to the first sample (353) in April 1996. Useable responses (36) to the DBM questions were processed using Churchill's (1979) eight-step process for construct development. The first part of this procedure applied a reliability theory measure as a criterion for reducing the number of question items. Specifically, the process required that question items be eliminated until Cronbach's (1951) alpha coefficient was maximised. Adopting this approach reduced the number items from 81 to 27. These 27 items produced a construct with very high reliability. Churchill's procedure specifies several methods of validity testing after reliability was established, the construct was subjected to, and met, tests of content, criterion-related, and convergent validity. Employing this empirical procedure ensured that the resulting 27-item construct represented a reliable and valid measure of the level of sophistication in DBM systems.

The questionnaire was modified to incorporate the reduced number of items to measure DBM sophistication. Then, these revised, shorter questionnaires, cover letters and pre-paid envelopes were mailed to the second sample (360) of catalogue companies in October 1996. Using a shorter questionnaire increased the number of responses from the second sample to 51. This response rate from the second sample was further improved by re-mailing non-respondents in January 1997, which garnered 26 more responses. This produced an overall response of 24% to the second random sample. Data analyses from each of the three mailings revealed highly consistent results for the construct and hypotheses.

1.5 SUMMARY OF THE RESEARCH FINDINGS

The results, as considered in chapter 9, revealed two factors that were associated with the development of sophisticated DBM systems. Market-oriented culture and database size were the two organisational factors linked to sophisticated DBM systems. A market-oriented culture nurtures the development of sophisticated DBM systems through a shared set of values that seeks higher levels of market performance. Theory suggests that this cultural orientation focuses the organisation on achieving competitive advantage through customer satisfaction, strong interfunctional coordination, and market sensing capabilities which constantly monitor profitability.

Size of database was the second factor positively associated with sophisticated DBM systems. Possession of a large database of customers could be considered as a key source of competitive advantage in itself. Organisations with a need to maintain effective customer relationships with a large number of customers will develop sophisticated DBM capabilities. Size of database is a surrogate variable for several other factors affecting the sophistication of DBM activities. First, these companies have greater experience, from business longevity, of managing interactive communications with customers through DBM activities. Second, they have greater opportunities to further segment their markets. Finally, large revenues and high dependence on database operations encourage substantial investments in DBM.

Conversely, two other factors that were tested had no association with the level of sophistication in DBM systems. Theory on the human component of competitive advantage suggested that inner-directed managers would seek greater informational control over their marketing activities by developing sophisticated DBM systems. Even though an analysis of respondents revealed most that held highly influential management roles, the survey revealed little impact of the locus of control trait on sophistication of DBM activities. The ability of managers to engender, support and sustain a market-oriented culture would seem to be more important than individual personality traits.

Similarly, the external market environment had little or no association with the sophistication level of DBM systems; specifically, no differences were found whether companies marketed to consumers or businesses. These findings suggest that internal company factors (i.e. culture and size) dominate in the development of DBM systems, with little impact from forces in the external competitive environment.

1.6 LIMITATIONS OF THE STUDY

There are many factors that managers and organisations must consider when developing their DBM systems. Scientific inquiry requires researchers to make assumptions about the structure of their investigations, as Popper (1961, p. 106) observes: "A science needs points of view, and theoretical problems." The search for greater knowledge about the complex factors affecting levels of sophistication in DBM systems will contain some limitations as determined by the research process. Making these assumptions explicit will assist future researchers in determining whether the tentative empirical generalisations of this research are pertinent to their investigations. The limitations of the study are as follows.

1.6.1 Study Related to the US Mail Order Catalogue Industry

The survey collected empirical data about DBM and company practices from marketing managers operating in the US catalogue industry. This is the world's largest catalogue market with gross revenues of $66.4 billion in 1996 (DMA Statistical Fact Book 1996). The size of market and competitive nature of the American marketplace should encourage companies to develop the sophistication of their DBM systems. Equally, the marketing method of mail ordering goods from catalogues is well established in Europe and some countries on the Pacific Rim (e.g. Australia). Companies in European markets have similar DBM environments, and although the postal systems are comparable, the geographic distances are much greater in the US. However, when examining the literature it would appear that similar DBM capabilities and facilities (e.g. geodemographic coding, see Evans 1994) are available in both Europe and the US.

1.6.2 Information Technology Limitations

In the main, this research does not examine DBM systems in relation to specific hardware or software configurations. As stated earlier in this chapter, the virtuous spiral of IT has removed many of the barriers present in mainframe computer environments. Microprocessors and low-cost servers have made powerful hardware affordable for every company. The kinds of database software (i.e. flat file, hierarchical, network, relational, object-oriented) deployed were not explicitly considered as a factor in the level of sophistication of DBM systems. This author's observations of many DBM systems suggest that the level of IT employed is an *inherent* factor in the sophistication level of the DBM system i.e. those companies with the most sophisticated DBM systems have achieved this by deploying the latest innovations in IT.

1.6.3 Privacy Issues

The increasing deployment of sophisticated DBM has raised many consumer privacy issues (Nowak and Phelps 1992, Patterson et al. 1996). In general, personal data are freely available in the US, where the government, many states, and a multi-billion dollar list industry serve companies' data needs. In the UK, government legislation restricts the use of personal data (i.e. Data Protection Act 1984); however, this legislation does not fully prohibit the sale or swapping of data. The increasing use of DBM for all forms of direct marketing, particularly telemarketing, has raised consumers and politicians' concerns about privacy issues. Consequently, both the US government and European Commission have considered legislation to restrict the availability and use of consumer data. Clearly, privacy issues could affect DBM practices in the future, but they are not considered as a significant factor in this research.

1.6.4 Links to Financial Performance

This research cites many links between the notions of sophisticated DBM systems and the marketing concepts of competitive advantage. Throughout this thesis a number of examples of DBM's capabilities to deliver outstanding financial performance are given, and Chapter 4 cites a case to illustrate how sophisticated DBM systems have delivered competitive advantage for Dell Computer in the highly competitive personal computer market. The author recognises that cases are anecdotal, and not specifically related to other measurements in the research. Therefore, a triangulation with financial performance should be produced to confirm links with competitive advantage, but when this research was commenced there were no quantitative constructs for measuring the sophistication of DBM systems. Consequently, attempting a full triangulation of sophistication of DBM systems with appropriate financial measures would have greatly increased the data collection dimensions, and hence, was deemed beyond the scope of this research. This is an area recommended for future research (see Section 10.10.1).

1.7 ORGANISATION OF THE THESIS

This section provides an overview of the thesis structure, and a brief synopsis of each chapter as a guide to the topics covered in the remainder of this thesis. The first four chapters explain DBM in the context of its background and historical concepts, a generic model defining its main elements, and its fit with the notions of competitive advantage. Chapters 5 and 6 provide a rationale for research hypotheses and methodology. The final four chapters explain how the data were collected and analysed, and the meaning of the results in terms of marketing theories of competitive advantage.

Chapter 2: The Evolution, Growth and Present Status of DBM

This chapter briefly reviews the historical development of direct marketing and information technology in order to chronicle the background to DBM. Next it is explained how the virtuous spiral of information technology in the 1980s encouraged the development of increasingly sophisticated DBM systems. Finally, a section uses case analysis to examine how the strengths of DBM can be used to gain competitive advantage, and reviews some of the factors inhibiting DBM's full exploitation.

Chapter 3: Defining the Elements of Sophisticated DBM Systems

A comprehensive review of the DBM literature was used to synthesize a generic model of sophisticated DBM systems. The generic model has three elements: a data-rich information environment, a market modelling facility, and feedback from performances measures. A parsimonious approach was adopted in the model's design, so that it could be used to assist managers' understanding of the interactions and processes necessary to create effective DBM systems. The three-element model forms the foundation for the construct development process in chapter 7.

Chapter 4: Attaining and Sustaining Competitive Advantage Through Database Marketing

General, marketing and IS theories of competitive advantage are examined in the context of DBM's capability to deliver improved business performance. The review suggests a high degree of congruence between the notions of competitive advantage and the capabilities of sophisticated DBM systems. A brief case from the highly competitive PC market is used to illustrate the competitive advantages which can be derived from sophisticated DBM systems.

Chapter 5: Factors Affecting the Development of Sophisticated DBM Systems

The foundations of competitive advantage are employed as a conceptual framework to advance theories about four factors affecting the development of sophisticated DBM systems. These four factors provide a conceptual representation of company culture, organisational resources, an individual trait (i.e. locus of control) of the marketing manager, and impact of the external environment. Four hypotheses were defined to cover important, but very different, factors affecting marketing information systems from both theoretical and pragmatic perspectives.

Chapter 6: Research Design

This chapter articulates the research design methodology used for hypothesis testing. Several alternative research designs were considered as they related to causal studies. The nature of the data to be collected, geographic dispersion of companies, and similar research studies suggested the use of a postal questionnaire as the most effective method of data collection. A variety of potential sampling frames were considered, and the rationale for selecting catalogue marketers is given. The methods for selecting a representative sample of catalogue companies are then discussed. Finally, the structure of the questionnaire is defined, and the procedures for operationalising the dependent and independent variables are described.

Chapter 7: Fieldwork I: Developing a Construct to Measure the Sophistication of DBM Systems

Level of sophistication in DBM systems was operationalised using the three-element model described in chapter 3. The methodologies recommended in Churchill's eight-step procedure for domain specification, purification, reliability and testing were rigorously applied to empirical data collected from US catalogue companies. A reliable and valid multi-factor, multi-item construct was developed to measure different levels of sophistication in DBM systems.

Chapter 8: Fieldwork II: Data Collection and Evaluation

This chapter explains how the questionnaire was adapted for the second phase of fieldwork. Some attention is given to improving postal survey response rate when collecting a second data sample. Parametric and nonparametric methods were applied to examine the three phases of data collection, carried out over a period of a year, for consistency and bias.

Chapter 9: Data Analysis and Research Findings

The results of the survey are presented for each of the four hypotheses. The results show that market orientation and larger databases generally promote the development of sophisticated DBM systems. Exhaustive analyses of the other two hypotheses, related to the locus of control of marketing managers and external market environments, failed to reveal any impact on the level of sophistication in DBM systems.

Chapter 10: Conclusions

The final chapter draws conclusions about the model, constructs, and hypotheses. Specifically, the implications of the positive effects of market-oriented culture and database size are considered; equally, the minimal effects of individual managerial traits and external market factors are explained in the context of other recent research. A section explains how sophisticated DBM systems can be used to produce sustained competitive advantage based upon theories of the "learning organisation." The implications of the results for marketing management are considered, and directions for future areas of DBM research are proposed.

CHAPTER 2

THE EVOLUTION, GROWTH AND PRESENT STATUS OF DATABASE MARKETING

2.1 INTRODUCTION

This chapter combines historical reviews of direct marketing and information technology to describe the evolution of database marketing (DBM) systems. The needs of direct marketers are viewed as the primary impetus promoting the inception and development of DBM systems. Lower information technology (IT) costs have encouraged a wide variety of organisations to develop marketing strategies based upon DBM systems, which require the capture and manipulation of large volumes of customer data. This has encouraged some organisations to develop sophisticated DBM systems that yield competitive advantage; but others, in similar marketplaces, are still wedded to outdated "mailing list" applications of DBM.

An American perspective predominates in the historical reviews of direct marketing and information technology as innovations in both disciplines were most aggressively developed within the US economy. Modern direct marketing was founded during the settlement of the American west in the late 1800s, creating numerous remote markets for which mailed advertising was the most efficient form of communication. While electronic computers were developed in parallel in Britain (i.e. EDSAC) and America (i.e. ENIAC), the first major installed base (IBM 650s) was in the US (Clifton, 1983). Conversely, the emerging competitive advantages of DBM were first recognised in comprehensive papers and texts by British authors (e.g. Fletcher 1990, Shaw and Stone 1988b).

The first section of this chapter describes the growth of direct marketing, and specifically, the mail order catalogue industry that originated the need to store data on remote customers. The further impetus of electronic data processing and communications technology in the post World War II era is then examined. The next section discusses the problems of defining the DBM approach, which straddles two disciplines and has a wide variety of applications. The final section examines how DBM is being used to attain competitive advantage using case examples from the literature review, and then examines the main factors inhibiting the development of effective systems.

2.2 THE DIRECT MARKETING FOUNDATIONS OF DATABASE MARKETING

This section provides a brief historical review of marketing practices that preceded the evolution of DBM systems. DBM is strongly linked with, and often used synonymously with, the methodology of direct marketing. Philosophically, direct marketing is the oldest form of exchange process, as prior to the industrial revolution most goods were produced locally and sold directly to consumers, whereas DBM is a relatively new (i.e. post-World War II) methodology. Conceivably, it is possible to undertake direct marketing activities without the support of database information systems; however, most companies rely heavily on these systems to maximise the productivity of direct marketing communications. Hence, tracing direct marketing's evolution explains the background to the contemporary role of DBM systems, and the remainder of this section deals with this topic.

2.2.1 A Brief History of Direct Marketing

Baier (1983) cites Gutenberg's invention of movable type in the mid-fifteenth century as facilitating the production of the first trade catalogues. One of the earliest examples was a gardening catalogue issued in England by William Lucas in 1667. Benjamin Franklin, US deputy postmaster general 1753-74, reportedly produced some of the earliest mail order catalogues to promote "near 600 volumes in most faculties and sciences" in 1774 (Smith 1920). But it would be another century before mail order became a serious alternative to traditional retail distribution systems.

The industrial revolution created a source of economically priced, mass produced, household items. At the same time settlers were beginning to populate the rural western states of America, which created a new, and potentially large, market for mail order. In 1872 Aaron Montgomery Ward exposed this market when he mailed a simple price list of household items to rural farmers. By 1884 Ward's single sheet had grown to a 240-page catalogue of 10,000 items (Petrison et al. 1993). In 1886 Richard Warren Sears, a telegraph operator, sold an undeliverable shipment of gold watches using a mailing list of his fellow railroad agents; as a result of this successful offering Sears Roebuck was created, which by 1902 had sales exceeding $50 million (Ross 1992).

These large catalogues flourished in the early 20th century, particularly after credit terms were introduced by Joseph Spiegel in 1905. In the 1920s marketers needed to segment these large lists more carefully as they began soliciting subscriber-prospects for new magazines such as *Time* and *The New Yorker*. During this period John H Paterson, founder of the National Cash Register Company, is given credit for the first use of business-to-business mail aimed at lead generation.

Communicating with customers via direct mail was achieved by storing their addresses on embossed cardboard or metal (Addressograph system) plates. Data on customer purchases were stored on these plates by notching or punching the edge of the plate. These notches allowed marketers to mechanically sort and segment their customer lists according to buying preferences (Petrison 1993). Unfortunately, most of these systems contained duplicates (up to 10%), and sometimes address data which might be 10 years old. Poor list management, and an inability to eliminate duplicates when using lists from multiple sources, created difficulty in predicting response rates (Gould 1938).

After World War II increased demands for sources of mailing lists were recognised by two companies, R. L. Polk and Reuben H. Donnelley. These companies created new businesses by compiling comprehensive prospect lists from numerous data sources (e.g. telephone directories, driving license records, automobile registrations). The development of compiled lists made demographic data on prospects available for the first time. Marketers were quick to use age and automobile ownership - a surrogate for high income or wealth - to target consumers for a wide range of products. Data of this nature were not available to British marketers, as these information sources were all controlled by the UK government at the time.

Several innovations in the 1960s helped to stimulate direct marketing response and build the foundation for database marketing systems. First, in 1961 AT & T introduced a toll-free long-distance telephone system (i.e. 1-800), which provided greater ease of response, and hence, increased sales. Second, the 1960 US Census divided most metropolitan areas into groupings, known as census tracts, and produced demographic profiles on each. Several marketers experimented with census tract data as a method of predicting buyer needs and behaviour (McCollum, 1964), but the manual matching process proved to be too unwieldy and expensive to gain widespread application. Third, the need to increase postal system productivity created new area codes within the U.S. Post Office's ZIP Code Sectional Center System. Likewise, the British Post Office introduced the present postcode system into the UK between 1966 and 1974 (Raper et al. 1992). Baier (1967) accurately foresaw that the five-digit zip code would soon become a major tool in market research, demographic profiling, and many other marketing purposes. Furthermore, mandated mail sorting forced direct marketers to review address compilation systems (Miller 1964). Hence, during this period, and most important to this research, direct marketers were beginning to exploit the productivity of computer hardware and software for marketing purposes (Migliaro 1966).

2.2.2 Computers and Databases Aid Direct Marketing Productivity

The rapid development of electronic data processing in the late 1950s encouraged major list compilers to transfer customer names and addresses from plates and stencils to mainframe computers. Some early benefits of storing mailing lists electronically included the abilities to eliminate duplicates, sort lists alphabetically, and target areas geographically. Unfortunately, these early mainframes were comparatively slow in manipulating millions of names, and their expense could not be justified against existing mechanical addressing systems. However, computerisation, as Petrison et al. (1993, p. 30) observed, represented a "watershed moment" that made possible decision support systems, statistical modelling, credit cards, and many other innovations to support direct marketing methodologies. All of these facilities were further enhanced through the development of database technology.

The origin of the term database can be traced to a U. S. military computer conference in 1963 (Olle 1978). The development of database management systems (DBMSs) in the 1960s was a great impetus to the availability of timely information within a wide variety of organisations. An early pioneer, Charles Bachman (1969), foresaw some of the management issues with this statement:

> "The real database of an organization is large. I don't know what large really means, but it is not 10 million or 20 million characters; 10 billion characters is more like it. This quantity is almost incomprehensible, yet we have the technical capability today to process that amount of data and we have the hardware to support it. But I am not sure whether we have the management organization capability to collect the data, support it or train the people to use it properly." (p. 37)

A survey of IBM installations - mainly mainframe - in the U. S. revealed the rapid growth of DBMS applications from 20% in 1976 to 55% in 1979 (Nolan 1979). Database management systems were mainly deployed in relatively large organisations that could afford the investment and provide technical support services. Exploiting the benefits of this new technology presented new management problems as research into UK database organisation and administration experiences revealed "more serious 'political' problems than technical ones" (Sherif 1984, p. 12).

Database software innovations solved several mailing list problems and created the opportunity to develop more sophisticated direct marketing methodologies. The availability of merge/purge programs solved the problem of duplicates in mechanically produced lists described earlier (Benson and Jain 1971), which resulted in reduced mailing and printing costs. Database customer information coupled with high speed printing devices enabled marketers to exploit the increased responsiveness of personalised communications (Hanau 1971). Greater accessibility of data files promoted the construction of market models aimed at improving direct marketing productivity. For example, Reader's Digest's rapid growth in the late 1960s was reportedly due, in part, to their use of multiple regression techniques (Petrison et al. 1993). The introduction of statistical packages (e.g. SPSS and SAS) in the mid-1970s further promoted the use of multivariate statistical methods to improve segmentation decisions (Gaeddert 1974; Harper et al. 1975). Furthermore, the economic modelling of customer acquisition and retention began to interest direct marketing researchers (Jain 1969), particularly those with actuarial capability (i.e. insurance companies). These early models evolved into the lifetime value (LTV) of customers concepts used by sophisticated direct marketers in the late 1970s.

Even greater access to customer data was made possible by the development of relational database software in the early 1980s. IBM's release of DB2, a structured query language (SQL) intended for mainframes, made it easier for organisations to store, access, manipulate, and share data. Relational databases provided greater flexibility in storing and analysing data, creating menu-driven interfaces for less expert users; furthermore, these systems made it easier to import from, or export to, external systems (Date 1990).

This section has described a historical perspective that demonstrates how the needs of direct marketers created the foundation for database marketing methods. However, the broad implementation of new techniques and technology described in this section were limited by data processing costs during the 1960s and 70s. The new economics of IT in the 1980s encouraged the development of more sophisticated DBM systems, which are described in the next section.

2.3 THE EVOLUTION OF DATABASE MARKETING IN THE 1980s AND 90s

Powerful computers and appropriate software were not widely available to many direct marketers until the 1980s. The invention of microprocessors in 1974 led to the development of the first personal computers (PCs) (e.g. Apple, Commodore PET), and greatly reduced hardware costs in general. Unfortunately, the early PCs were extremely limited in their data processing and storage capabilities. However, high demand for this new technology in the 1980s encouraged continuous developments in processing speed and capacity, internal memory chips, hard disk storage, CD-ROM devices, and laser printing; consequently, the virtuous spiral of information management economics described by Madnick (1991) had begun. Recently, still further economies have been derived from shared-access distributed database technology; specifically, local area networks (LAN) combined into client/server configurations.

Rapid technological innovations in computer hardware facilitated the use of increasingly sophisticated software. For instance, powerful database software programs (e.g. Paradox and Oracle) became widely available for microcomputer applications. This IT revolution promoted the increased adoption and use of DBM in a wide variety of organisational settings.

This new era of accessible, low cost, high performance hardware and software focused greater attention on the role of information systems in business. The possibilities of achieving competitive advantage through improved IT deployment became a reality. Porter and Millar (1985) explained how this could be achieved in terms of the "value chain" model, and provided this observation:

> "Information technology is generating more data as a company performs its activities and is permitting it to collect or capture information that was not available before. Such technology also makes room for a more comprehensive analysis and use of expanded data. The number of variables that a company can analyze or control has grown dramatically." (p. 152)

Interest in the potential impact of these new information technologies spawned a wide variety of research on how business would compete and collaborate in the future. Particularly notable was MIT's Sloan School of Management's comprehensive review of the long-term strategic implications of these changes (Scott Morton 1991). Specifically, the potential power of DBM to achieve competitive advantage was quickly recognised and detailed in several articles (Stone and Shaw 1987; Shaw and Stone 1988a; Moriarty and Swartz 1988; Fletcher 1990). All of these authors were enthusiastic and optimistic about the future for DBM.

The new economics of IT in the 1980s and 90s enabled marketers to capture and store large volumes of customer data. This quote from a *Business Week* cover story (Berry et al. 1994) recognises the growing applications and importance of DBM in this new era:

> "A growing number of marketers are investing millions of dollars to build databases that enable them to figure out who their customers are and what it takes to secure their loyalty. Direct marketers have long been in the vanguard of database users: Catalogs, record clubs, and credit card companies have always needed their customers' names and addresses to do business with them. But database marketing is now moving into the marketing mainstream, as everyone from packaged-goods companies to auto makers comes to believe that in the fragmented, fiercely competitive marketplace of the 1990s, nothing is more powerful than knowledge about customers' individual practices and preferences." (p. 57)

As stated in chapter 1, more sophisticated DBM approaches were adopted and developed by marketers trying to cope with, but also exploiting, greater segmentation in all their markets. For example, the new economics of DBM promoted rapid growth in the number of frequently mailed speciality product catalogues in the 1980s, which ultimately resulted in the demise of the century-old Sears catalogue (1,000 pages) in 1992. These threats encouraged some marketers to use DBM as way to create stronger customer relationships through improved quality, loyalty, and rewards programmes (Christopher et al. 1991).

Unfortunately, many barriers and inhibitors to the concepts of DBM became apparent. Briefly, the main problems were as follows: the anarchic proliferation of databases in end-user controlled environments (Couger 1986); the difficulties of financial justification for DBM investments (Swartz and Moriarty 1992); the need for appropriate management support and organisational environment (Fletcher et al. 1994); and a widespread lack of vision and understanding of the true DBM concept (Cameron and Targett 1992; Shaw 1993)

Some of these problems may have been partially due to weak definitions of DBM, and little thought about the composition of a generic model. Therefore, before examining the specific competitive advantages of DBM, and the factors inhibiting its exploitation, several definitions of database marketing are reviewed.

2.4 THE PROBLEMS OF DEFINING DATABASE MARKETING

Academics and experts failed, and some just did not attempt, to construct a meaningful definition of DBM. Some are terse and lacking in substance (e.g Bickert

1992, p. 138), while others are complex, verbose paragraphs attempting to encompass all aspects of this complex process. Attempts at devising a suitable definition are often differentiated on nationalistic grounds: British and American. Roberts' (1992) definition (section 1.2) is one of the most comprehensive in the US literature, but the limitations of her US-based research are clearly depicted by this statement: "There is no formal definition of database marketing as it is currently practised anywhere in the literature... (p. 52)." Her research overlooked several British journal articles, and the first comprehensive DBM text (Shaw and Stone 1988b), as Stone and Shaw (1987) had created the following definition almost five years earlier:

> "DBM is an *interactive* approach to marketing communications, which uses addressable communications media (such as mail, telephone and the sales force) to extend help to its target audience, to stimulate their demand, and to stay close to them by recording and keeping an electronic database memory of the customer, prospect and all communication and commercial contacts, to help improve all future contacts." (p.13)

Regrettably, neither of these definitions is sufficiently exhaustive to convey the full potential of DBM systems. Stone and Shaw's definition fails to convey the modelling capabilities, and Roberts' definition omits the need for a comprehensive memory of the customer relationship. Both definitions focus on outbound communications, whereas future systems, particularly those associated with Internet sites, will use DBM information as a way to manage both inbound and outbound communications. Morgan (1996) explains how the Internet and World Wide Web provide an interactive media channel, with many new opportunities to capture customer and prospect data from a global market and to facilitate electronic outbound communications (e.g. e-mail). New electronic media options, powerful DBM systems, and the growing use of direct communications in all business sectors, resulted in the term "interactive marketing" being coined to describe these new tools (Deighton 1996, Schultz 1997). Seemingly, Stone and Shaw's definition was more prophetic than many others in this field. Interestingly, several recent texts (Nash 1993, Jackson and Wang 1995) devoted to DBM contain no definition at all, and several others attempted only very limited definitions (Hughes 1991, p.3; Holtz 1992, p. 5).

It may be unfair to judge definitions of DBM in this way, as the complexity and variety of DBM could confound succinct definition. Similarly, a comprehensive literature search failed to reveal a generic model of the DBM approach. Consequently, most of the texts cited above lack a rigorous structure upon which users could build an adequate framework to fully specify their needs. Likewise, researchers and academics *assumed* that their readers understood the complex set of interrelationships at work in the construction and use of sophisticated DBM systems. Quotes in chapter 1 from the recent *Dataculture* report, and several surveys of industry practice (Cameron and Targett 1992, Schultz and Wang 1993), clearly refute this assumption.

Recognising these shortcomings, a generic model of DBM systems was devised to provide a structure for this research. For the purposes of this thesis DBM can be understood as a system comprised of three elements (Lewington et al. 1996):

(i) a large number of individually defined and electronically accessible data elements on customer (or prospect) attributes and behaviour, that are related to a specific individual's address for communication purposes;

(ii) alternative methods of data modelling to improve marketing mix decisions, and hence, productivity, profitability and competitive position;

(iii) a variety of measures to assess customer response, provide feedback and improve control over future marketing programmes.

The three elements were created from concepts grounded in the marketing literature. Technical configurations of systems are continually being refined as faster processors, increased functionality of database software, new statistical techniques, and greater integration of systems add to the sophistication level of DBM systems. The next section briefly describes the main reasons why DBM systems are being deployed to gain competitive advantage.

2.5 EXPLOITING THE COMPETITIVE ADVANTAGES OF DATABASE MARKETING

The work of British researchers (i.e. Fletcher, Shaw and Stone) helped marketers to identify some of the ways that DBM could be used to attain competitive advantage. Marketers were finding that customers wanted to be treated as individuals, and developments in DBM provided an economic way of segmenting and targeting customers for personalised communications (Evans 1994). A growing emphasis on *customer satisfaction*, *stronger relationships*, and *one-to-one* marketing encouraged the rapid adoption of DBM by marketers in every sector of business. Peppers and Rogers (1993) made this forecast:

> "The one-to-one future will be characterized by customized production, individually addressable media, and one-to-one marketing, totally changing the rules of business competition and growth. Instead of market share, the goal of most business competition will be share of customer - one customer at a time." (p. 5)

Defining the individual needs and preferences of customers are the fundamental responsibilities of marketers, with most DBM protagonists accepting Tynan and

Drayton's (1987, p. 301) contention that: "Market segmentation is a crucial marketing strategy." Determining market segments allows companies to determine business plans, and focus operating and marketing investments upon specific opportunities in the marketplace.

In this section, four key capabilities of DBM are examined using case material from the literature review as pragmatic examples of how businesses use DBM to gain competitive advantage. At the end of the section a model is developed to explain the virtuous spiral of competitive advantage to be gained using DBM systems.

2.5.1 Market Segmentation

Several papers demonstrate how the segmentation capabilities of DBM may be used to improve marketing productivity. The most commonly claimed competitive advantage from effective use of DBM is its ability to segment customers into homogenous groups (Bessen 1993; Schultz and Wang 1993). Two cases from the literature review are used to illustrate how consumer (i.e. Land Rover) and industrial marketers increased sales and profitability through segmented marketing strategies derived from the use of DBM systems.

2.5.1.1 Consumer Markets - Land Rover

Voelkel (1993) explains how direct marketing programmes were developed to support Land Rover's brand image, avoid discount pricing, and generate prospect test drive experiences for dealerships. The process of identifying suitable prospects began in 1990, during a sluggish car market and increasing competition amongst luxury brand vehicles. A mailing file was constructed using an age and income profile of Range

Rover owners to filter 50,000 prospects from the *Investor's Register* and *Wealth Register* databases. This highly targeted mailing programme resulted in 6% booking a test drive and orders for over 700 new Range Rovers.

Subsequent market research revealed that the above programme caused a positive shift in brand perceptions of individuals who did not take a test drive. This learning about customer behaviour resulted in a series of direct marketing campaigns incorporating insights gained from previous programmes. The accumulated database information was used in the 1995 launch of the new Range Rover model. A direct mail programme was used to communicate a weekend of different events at 127 dealerships to key prospects, a task requiring 4,000 mailing permutations (Denny 1996). The campaign resulted in 85% of prospects attending a dealership event - one dealer sold three months' supply of vehicles in a single day! Management believed that these programmes strengthened Land Rover's brand image, which contributed to vehicle sales in general over the five-year period shown in Table 2.1.

Model	1991	1992	1993	1994	1995
Range Rover	4,071	4,026	4,854	4,116	6,542
Discovery	8,438	10,427	15,402	20,093	22,189
Defender	6,294	5,536	6,431	6,610	7,368
Total	18,803	19,989	26,687	30,819	36,099

Source: Land Rover/Society of Motor Manufacturers and Traders

Table 2.1 Land Rover's Vehicle Sales 1991-95

2.5.1.2 Industrial Markets - Marketing and Sales Productivity (MSP) Management

Businesses and organisations have been segmented using SIC (Standard Industrial Classification) codes, number of employees and sales turnover. These criteria can be combined to select businesses by their main activity, size and potential buying power. It often requires considerable investment in service support - sales visits, technical information support and computer interfacing - to open and maintain business accounts. The use of DBM systems to automate and control sales and marketing activities, particularly in large organisations, has the potential to both reduce costs through increased productivity, while increasing sales through improved customer service and communications.

Moriarty and Swartz (1989) describe the features and benefits of industrial DBM systems intended to improve marketing and sales productivity (MSP). Primarily, competitive advantage is achieved by improved planning and control of the following four key activities:

- Sales lead qualification, distribution, tracking and data acquisition.
- Co-ordinating interactive communication strategies and sales administration for sales calls, direct mail, telemarketing and e-mail.
- Order planning and fulfilment: checking inventory and order status, payment status, monitoring specific customisation needs.
- Salesperson productivity management: planning, routing and expense monitoring of sales calls; contact listing and account status; definition of potential prospects and future sales prospects.

Whenever sales and marketing activities are performed, the database captures customer and prospect information that defines their product and service needs. Over a period of time the database becomes a rich source of marketing information, enabling management to track marketing activities and measure the results of marketing programmes.

Several cases in the 1980s illustrate the potential effectiveness of stand-alone DBM systems focused on specific activities. Some systems were used to achieve cost savings, while others were developed to improving customer service. Xerox used a DBM system to automate their sales administration activities - bidding, mailing of sales literature, and sales reporting - which was credited with marketing overhead savings of £2 million (Taylor 1987). Hewlett-Packard's management was dissatisfied with its response to sales enquiries as these would often take several weeks to reach a salesperson. In order to improve customer service Hewlett-Packard developed an automated network - Qualified Lead Tracking System (QUILTS) - to transfer leads to a telemarketing centre for qualification and ranking before returning them electronically to headquarters (Blue 1987). This improved customer service as the turnaround time for sales leads was reduced to 48 hours, and "hot" leads were telephoned directly to salespersons. The economic effectiveness of these individual DBM systems encouraged businesses to invest in more sophisticated DBM systems.

The success of stand-alone systems encouraged industrial marketers to develop integrated systems for total management of the marketing process. In the 1990s, companies began to use the segmentation capabilities of DBM systems to co-ordinate and direct marketing activities. A presentation from the Director of Marketing (O'Neill 1992), and subsequent discussions with managers in Diagraph Corporation exemplified how DBM systems have become essential for effective industrial marketing.

Diagraph manufactures and distributes computerised ink-jet date and batch coding equipment to a wide variety of producers (e.g. food, beverage, pharmaceuticals, etc.). Sales revenues for the company are typical of many business-to-business markets; large and irregular sales of capital equipment, followed by smaller, but regular, sales of consumable items (e.g. ink, cleaning materials). The company, faced with escalating sales force costs and a 30% customer attrition rate, implemented a DBM system to segment and manage customer accounts by sales value in the following ways (Figure 2.1).

The DBM system was devised to segment 30,000 customers and prospects into four basic categories. First, inquiries were qualified, and additional profile data collected, by telemarketers into two groups for lead tracking:

I. Prospects for immediate or future sales calls and literature mailing;

II. Suspects for literature mailing and product updates only.

The second group of companies, about 30% of customers, each of which produced relatively small annual revenues (i.e. < $200), would receive a catalogue and occasional calls from a telemarketing sales force. Medium sized accounts ($200 - $2000), the third group, received regular calls from telemarketers based upon their normal order cycle, and occasional salesperson visits. This support system allowed salespersons to concentrate their efforts on the fourth category - high value capital equipment sales and large purchasers of consumable supplies. Diagraph's DBM system resulted in several economic benefits: the sales force was reduced from 80 to 60, the retention rate of small accounts was increased, and customer communications and service were improved. These economic benefits encouraged Diagraph's management to improve and increase data capture for market research purposes.

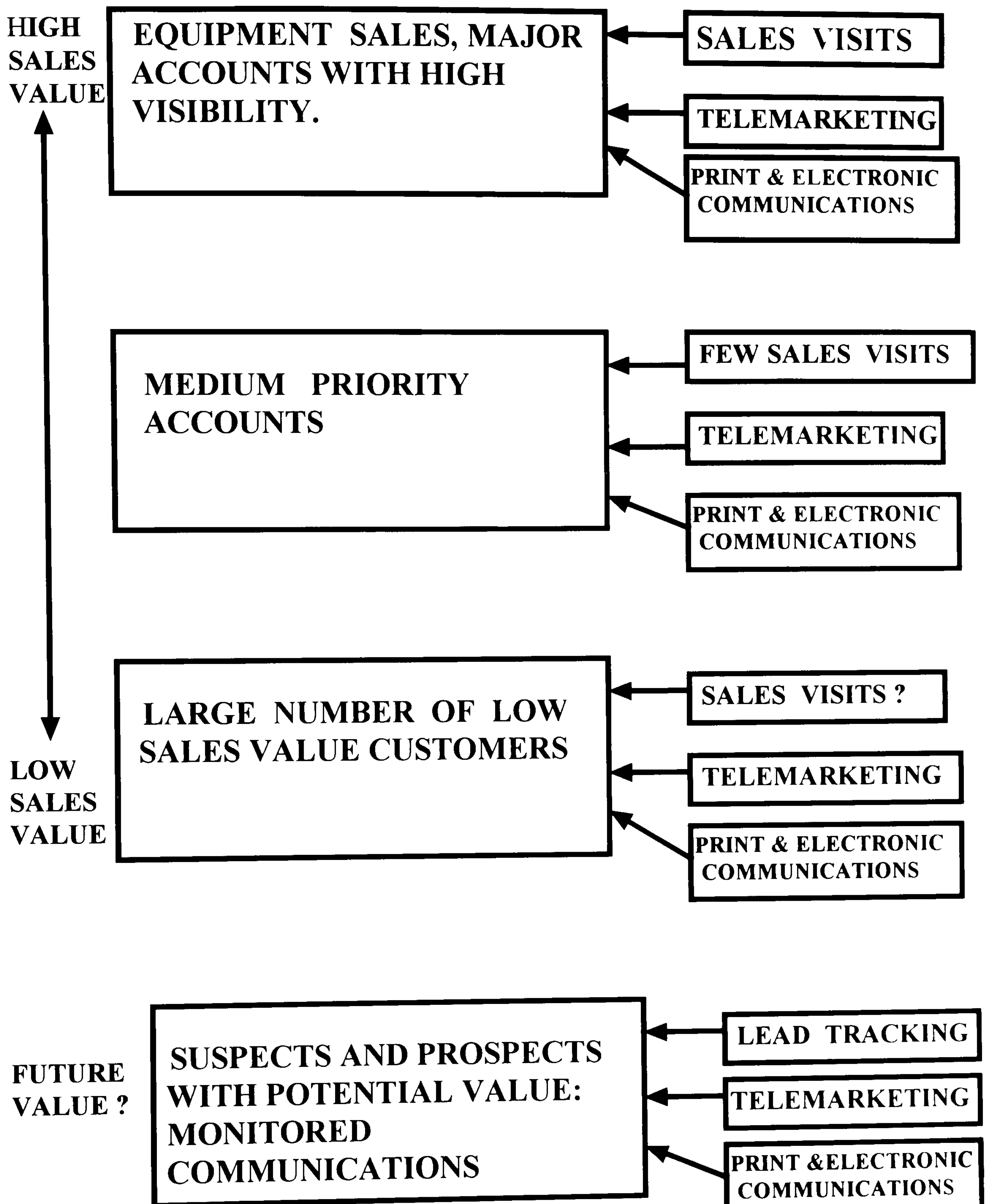


Figure 2.1 A Selective Communications and Contact Strategy for Industrial Markets

2.5.2 Market Research and Experimentation

Typically, when companies like Land Rover and Diagraph successfully deploy DBM systems they are encouraged to seek further competitive advantage through greater understanding of market segments. This elevates the need for market research into the economics and buyer behaviour of alternative segments. Companies adopting this approach increase the amount of data captured or, as in the case of Diagraph, use external data enhancement services (e.g. Dun and Bradstreet) to add SIC codes to customer files. Charnes et al. (1985) clearly pointed to databases as an important source of information for scientific market research. Direct marketers are familiar with list and creative testing as a way to gain greater understanding of consumers' behaviour. Market tests can be used to reveal consumer responses to alternative marketing mix variables, and this kind of feedback often yields more reliable insights into customer behaviour than surveys or qualitative research. However, combining database analyses with qualitative methods of market research can reveal the necessity for strategic changes in marketing policy.

2.5.2.1 Signode Corporation

Rangan et al. (1992) cite such a case, and explain how Signode - a provider of parts and repair services for the packaging industry - analysed their marketing database to determine trade-offs between price and service in mature markets. Their research approach combined customer profile and pricing models with salespersons' perceptions of customers service needs to classify the buying behaviours of specific microsegments. Subjecting the combined data sets to a hierarchical cluster analysis resulted in four classifications of customers.

Segment 1: Programmed Buyers. Small customers paying full list price and requiring below average service.

Segment 2: Relationship Buyers. This group were more knowledgeable about competitive offerings, paid lower prices and required higher service than segment 1, but were less prone to competitive switching than segments 3 and 4.

Segment 3: Transaction Buyers. Twice as large as customers in segment 2, required above average service level as the product was important for their operations, very knowledgeable about pricing - receiving on average a 10% discount - and would switch to the competition if pricing was not appropriate.

Segment 4: Bargain Hunters. Large volume customers receiving the highest price discounts and levels of service, very knowledgeable about alternative suppliers and most likely to switch if dissatisfied.

The researchers argued that their analysis contributed to management's understanding of segment buyer behaviour, enabling them to develop new account management policies to improve profitability. Interestingly, these findings in industrial markets conflict with Mathur's (1988) theories of economic behaviour (see Section 4.2.2).

The above case illustrates how the application of statistical techniques such as cluster analysis and AID (Automatic Interaction Detector) to customer databases can enhance marketers' understanding of customer groupings. Sensibly rationalising customer profiles and behaviour may assist in developing quantitative marketing models. From these DBM models managers are able to generate and evaluate a wide variety of marketing scenarios, creating a "marketing workbench" (Shaw and Stone 1988b pp. 128-133) for heuristic problem solving. Moreover, Blattberg and Hoch's (1990) laboratory research indicated that predictive decision making skills can be enhanced when managers combine intuitive skills with database models. Blending DBM with direct marketing methods allows marketers to test the effects of different marketing mixes on specific segments.

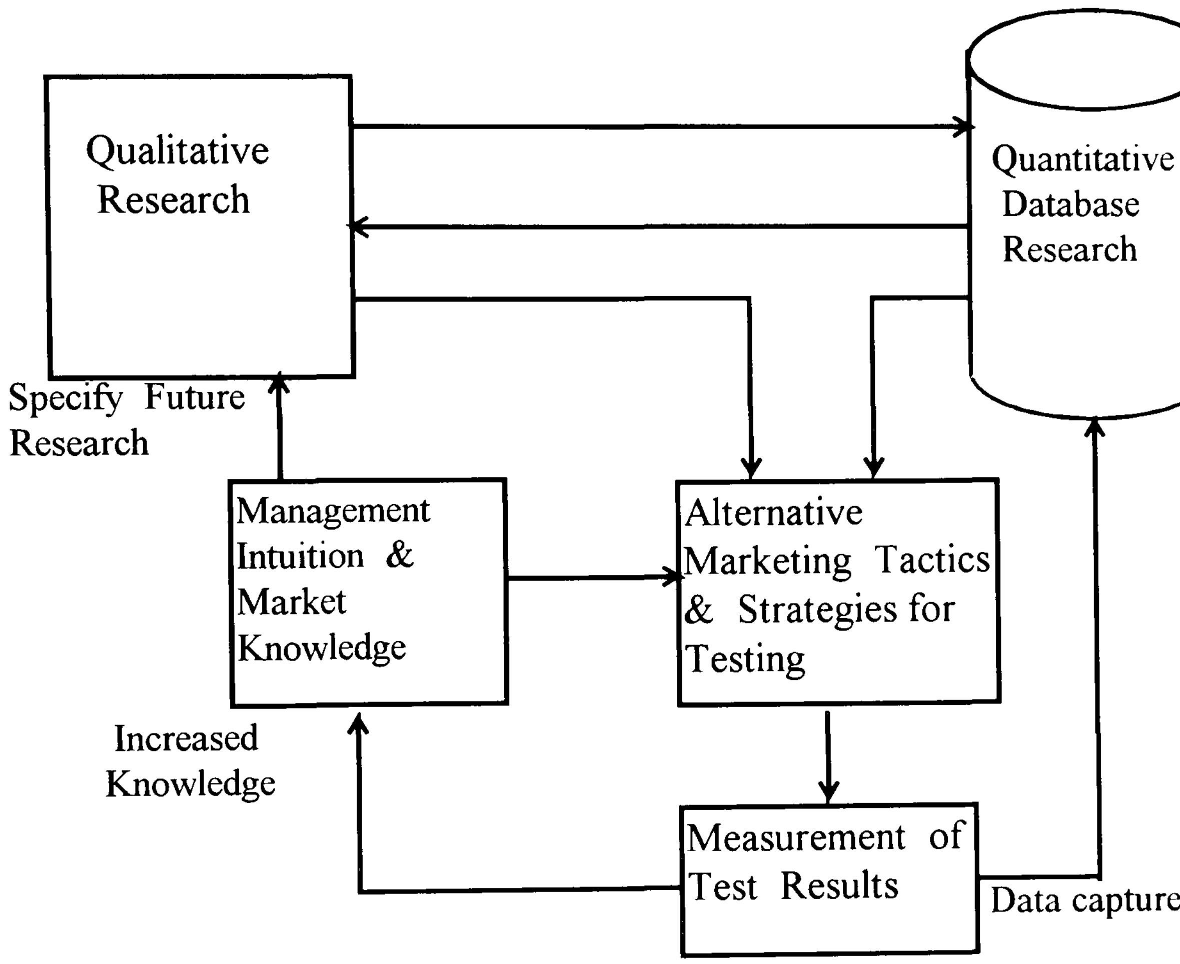


Figure 2.2 Heuristic Database Marketing Research System

Assessing the outcomes from alternative marketing programmes is an important feature of DBM. Enlightened direct marketers use DBM to support their marketing research, because it is, "... characterized by measurability and accountability ..." (Baier 1983, p. 11). Accurate measurement provides feedback about the responses of different customer segments to alternative marketing mix scenarios and can help improve the accuracy of marketing models.

2.5.3 Integration of Marketing and Operations Activities

The implementation of an effective DBM system can improve a company's own internal value chain, and alter its relationships with customers, suppliers, and rivals (Porter and Millar 1985, Venkatraman 1991). The DBM system is used as the integrating linkage to record orders, formulate efficient order fulfilment, co-ordinate supplier activities, and complete electronic payments. This can produce great savings in both operating and marketing costs. Increasingly, companies are recognising the collaborative advantages of building interorganisational information systems to create business networks with enhanced market capabilities.

2.5.3.1 American Airlines Reservation System: SABRE

One of the most commonly quoted case examples of IT competitive advantage is American Airlines' reservation system (SABRE)[1]. SABRE, which was originally developed for operations management purposes, eventually evolved into an electronic travel supermarket shared by 650 airlines, hotels and car hire companies world-wide (Hopper 1990). The economic and marketing advantages of sharing a DBM system with global marketing capabilities were so attractive that even American Airlines' competitors joined as partners. The case illustrates the future potential of DBM when it is integrated into communications networks. The cost sharing and global marketing capabilities of this DBM system seemed very attractive - even to American Airlines' competitors. But SABRE raised the spectre of "screen bias" - a system designed to display American Airlines' flights before their competitors - resulting in litigation with partners. Data partnerships can be very effective, but questions of priority, equal benefits and data ownership must be resolved before the system is established.

[1] In October 1996, American Airlines floated SABRE as a separate company on the New York Stock Exchange. The market value of this new company was $3.45 billion.

2.5.4 Lack of Visibility

Visible competitive strategies, or transparent strategies as Grant (1991) describes them (see section 4.2.3.2), are often easy to imitate. Strategies and tactics based upon personalised communications are less visible to competitors than are those implemented through the use of mass media and have several advantages (Roberts and Berger 1989, p. 5). First, direct communications with customers make it difficult for competitors to monitor and imitate changes in the marketing mix, hence reducing competitors' opportunities for retaliatory action. Second, using DBM systems marketers can create personalised communications for each individual customer - the one-to-one marketing described by Peppers and Rogers (1993). Hence, differential promotions and offers can be structured in terms of a customer's value to the company. These are important, but infrequently documented, competitive advantages of DBM methods. Late in 1996, an excellent example surfaced when Campbell's Soup announced a new product line which, if successful, would be almost impossible for competitors to replicate (Campbell's Soup Press Release, 1996).

2.5.4.1 Campbell's Soup: Customised Dietary Programme

Campbell's announced that it had been working with the American Heart Association and the American Diabetes Association to develop a dietary plan to combat high blood pressure, high cholesterol and diabetes. The dietary programme has taken 5 years of clinical research and $20 million to develop a variety of 41 meals to combat these common health problems. The meals - branded "Intelligent Quisine" - will be shipped directly to customers in special freezer containers once a week by United Parcel Service. A consumer's optimum dietary programme could be determined by primary care physicians, cardiologists or Campbell's dieticians, and then a 10-week schedule of meals entered into the customer's record for scheduling weekly shipments. It is conceivable that feedback from thousands of customers and physicians could convert the DBM system into a clinical research resource benefiting all of the participants. For consumers the convenience of direct delivery, elimination of expensive medication, and on-line physician monitoring of their medical progress would all appear to be substantial benefits. Hence, overcoming Campbell's market leadership would be difficult for competitors to imitate because the complex learning and customised dietary programmes established through consumers' health improvements would form strong bonds. The ageing baby boomer market presents a potential market of 60 million American consumers suffering from these health problems. However, the use of data from a marketing system linked to customers' health records raises many ethical and privacy issues.

Literature extolling the virtues of DBM rarely articulates the problems that managers face in justifying, implementing and maintaining these complex systems. Failure to recognise and overcome these barriers may prevent organisations from realising the true potential of DBM as is next considered.

2.6 THE INHIBITORS OF DATABASE MARKETING

The rapid evolution of DBM from its mailing list base could explain managers' limited conceptions, organisational conflicts, information technology constraints, weak literature, and concerns about consumer privacy that can all inhibit the development of effective systems. Marketers' understanding of these factors is important, as they will need to minimise these inhibitors when developing effective DBM systems.

2.6.1 Organisational Conflict and Control

Systems intended as marketing tools are often designed or controlled by information systems (IS) specialists (Cameron and Targett 1992). Typically, misconceptions of DBM, or resource constraints, encouraged IS specialists to use existing IS installed for other functions (e.g. accounts receivable), rather than developing systems specifically for DBM. This kind of approach can result in conflicts of interest over data capture and integration, systems development, budgetary responsibility, and philosophical conflicts - pitting analytical IS specialists against creative and intuitive marketers. The importance of these difficulties prompted Petrison and Wang's (1993) informal survey of interdepartmental conflict between IS and marketing personnel which observed significant potential for conflict in five areas: behavioural predisposition, task characteristics, social pressures, availability of resources, and incentives and goals.

2.6.2 Technical Constraints

Managers wishing to develop their DBM systems internally specify what they believe to be the most effective hardware and software configuration; however, poor specifications create further barriers to systems development. The legacy of DBM systems configured on mainframe computers results in DBM systems that may be costly and slow to adapt to changing data collection needs (Sargent et al. 1993). Cost advantages and increasingly powerful processing capabilities have encouraged greater deployment of microcomputers as the hardware base for DBM. Powerful microcomputer hardware has been augmented by sophisticated generic database software and numerous proprietary systems are, in Shaw's (1993) view, "piling up"; albeit, time, cost and expertise constraints encourage the use of proprietary DBM systems. Defining a configuration is influenced by the extent to which the DBM system supports core marketing strategy, or a firm's mission. Extensive use of direct marketing techniques promotes a need to integrate business activities or divisions using a networked DBM system across functional boundaries. Furthermore, marketers, in common with other functions, may have to overcome the frustrations of insufficient training, access to information, and scepticism about the value of information (Jobber and Watts 1987) when making their case for DBM systems.

2.6.3 Privacy Issues

Increasing concerns about the overuse and abuse of consumers' data raises many privacy issues (Patterson et al. 1996). This issue was recognised early in the UK with the passing of the *Data Protection Act 1984*. This legislation limits the business use and movement of personal consumer data in the UK; perversely, census data is available and used by several large direct marketers (e.g. Littlewoods). Many other countries and the European Community (EC) are in the process of developing similar restrictions that inhibit data availability and hence the effectiveness of DBM systems.

In the US, a looser legislative environment has spawned a multi-billion dollar data market; as a result, many companies, compilers, states and the federal government sell, swap or give away large data files. As in the UK, the proliferation of DBM systems has increased concerns about consumer privacy issues (Nowak and Phelps 1992), which may result in future restrictive legislation. Generally, data protection legislation reduces marketers' ability to segment their markets and meet the needs of specific groups of customers.

2.6.4 Poor Understanding of DBM's Capabilities

Two surveys of DBM practice (Cameron and Targett 1992; Schultz and Wang 1993) support the notion that some organisations are impeded by misconceptions of DBM's capabilities. Cameron and Targett's survey of DBM applications in British companies revealed that 15% of marketing managers still perceive DBM as computerized mailing lists. Schultz and Wang's survey of American direct marketers indicated that 24% of respondents made only minimal use of DBM's capabilities. Both of these findings support the contention that a "mailing list malaise" exists; managers failing to understand and exploit the full power of DBM. These weaknesses negate the market research, modelling and heuristic learning capabilities of DBM.

Historically, direct marketers have focused on list selection and testing to segment their customers. Early DBM techniques were subsumed into direct marketing texts as chapters on mailing list management. Several DBM texts (Hughes 1991; Nash 1993) perpetuated this approach, specifying only simplified data collection procedures and limited relationships with existing marketing theory in their examples of DBM systems design. These problems, combined with the lack of a conceptual model of DBM, may have created further confusion among managers attempting to construct effective systems.

2.7 CONCLUSIONS

This chapter presented a review of the evolution and growing adoption of DBM methodologies. The virtuous spiral of decreasing IS costs, increasing ease of data collection, and desire for greater control are facilitating more complex DBM systems and applications. An examination of the evolution of DBM from a historical perspective provides an insight into the virtuous spiral of DBM systems development. In the first phase of development, companies collect address and transaction data for accounting and operational purposes. The need to acquire new customers efficiently results in list purchases and greater use of the customer database as sources of market information. Customers' response and buying patterns provide feedback that, if appropriately analysed, encourage further data acquisition and more complex modelling of market behaviour. The development of SABRE is illustrative of this incremental development process which is discussed further in Sections 4.4 and 10.9.

Unfortunately, initiating and maintaining the virtuous spiral of DBM systems' development necessitates that organisations overcome a series of complex technical, behavioural and economic barriers. The pace and complexity of hardware and software innovations have resulted in an abundance of DBM systems' functionality. Making appropriate choices is often a source of organisational conflict between marketing and information systems specialists. These often involve traditional economic evaluations, which often fail to articulate the ambiguous benefits of marketing information systems. When developing new, or existing systems, it is important to have a clear understanding of DBM's role in an organisation's business plan, and a vision of its potential contribution to business strategy, in order to articulate clear communication between marketing and IT planners.

The cases presented in this chapter illustrate how innovative DBM systems have been deployed to segment markets to achieve greater marketing productivity and profitability. The competitive advantages to be derived from sophisticated DBM systems further strengthen the case for this research. Specifically, this research recognises the need to define the key elements that comprise a generic model of sophisticated DBM systems. A model would form the foundation for a construct to measure different levels of sophistication in DBM systems. Such a construct is a necessary prerequisite for causal research to provide greater insight into operational, organisational, and managerial characteristics that promote or inhibit the development of effective DBM systems.

The next chapter details three elements - data capture, market modelling and performance measures - that form a generic model of sophisticated DBM from which companies are able to derive competitive advantage. Case examples, primarily derived from research interviews with DBM system users, are used to illustrate how companies use different elements to gain competitive advantage. Section 4.7 cites Dell Computer as a company whose growth and financial results demonstrate how sustained competitive advantage can be achieved through the effective use of sophisticated DBM systems.

CHAPTER 3

DEFINING THE ELEMENTS OF SOPHISTICATED DBM SYSTEMS

3.1 INTRODUCTION

The previous chapter highlighted weaknesses in the definitions, concepts and perceptions of DBM. DBM is a relatively new phenomenon which has not been widely featured in general marketing texts, perhaps because of the dearth of literature and dispersed theoretical foundations of this new field. Historically, direct marketers have focused on list selection and testing to segment their customers. Even recent texts on DBM (Hughes 1991; Nash 1993) perpetuated the mailing list management approach, explaining only simplified data collection procedures and failing to provide their readers with a systematic structure of DBM's components. Furthermore, most DBM texts have only tenuous links with existing marketing theory, which restricts the theoretical framework for DBM systems design and use. When these weaknesses are considered, it is not surprising that managers find it difficult to construct effective systems.

A comprehensible model of DBM would be of benefit to both marketing managers and academics. Development of a holistic model could reduce the learning curve and resource costs for organisations adopting DBM. Organisations who already employ some form of DBM, albeit only a simple mailing list, may seek alternatives for systems development, or a benchmark by which to measure their level of sophistication. Therefore, a generic model of DBM could be used to clarify systems design options, educate and train marketing and IS personnel, and define directions for research.

The purpose of this chapter is to present the key elements needed in a generic model of an effective DBM system. The model, based on a synthesis of marketing literature and the author's research, is designed to assist managers' understanding of the interactions and processes necessary to create effective systems. It is composed of three main elements; the database, a market modelling process and a mechanism for performance measurement (i.e. feedback). The main body of the chapter describes these elements and their interaction. Potentially, its most significant benefit is the facility it offers for assessing the quality and sophistication of individual systems. The nature and composition of each element is described in the next section.

3.2 THE ELEMENTS OF A DATABASE MARKETING SYSTEM

Academic models are often criticised as being too complex, and are treated with scepticism by both practitioners and researchers (Lunn et al. 1986). Hence, Lewington et al. (1996) adopted a parsimonious approach to the design of a three-element model shown in Figure 3.1. This identified the significant elements of an effective DBM as the database, a market modelling process and a mechanism for performance measurement (feedback). The model proposed in this chapter was based on the marketing literature search and research interviews with managers in five local (i.e. St. Louis) direct marketing companies (Table 3.1). These research cases are used to illustrate how each element of the model can contribute to competitive advantage.

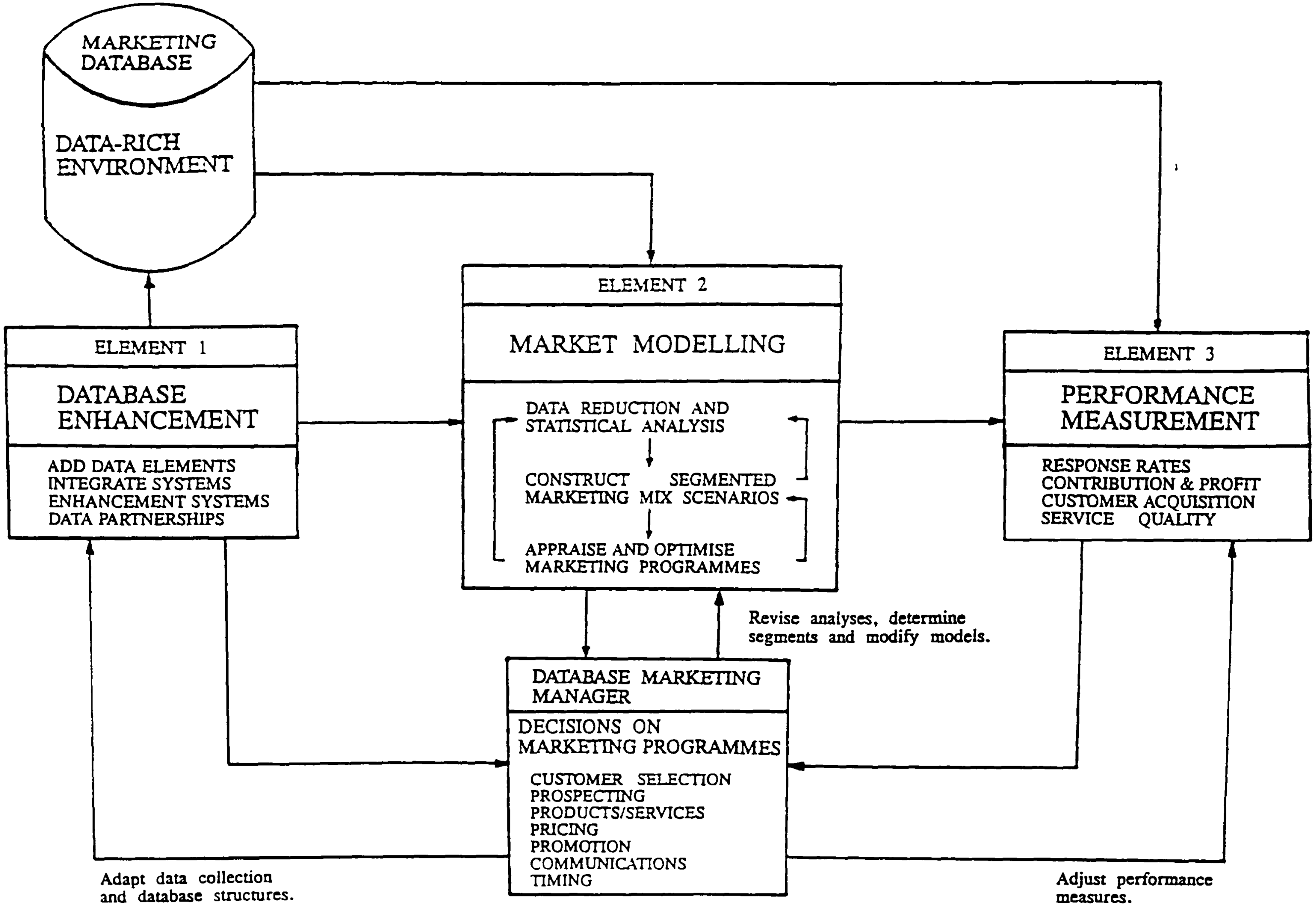
Lilien et al. (1992) suggest that appropriately devised marketing models should identify the basic components, illustrate interactions and indicate directions for future improvements. This section introduces the basic components and the following section discusses each of the three elements in greater detail.

Manager Title(s)	Business Type	Product/ Service	Customer Database	Number of Employees	Experience Level
President & Marketing Manager	Consumer Catalogue	Women's Apparel & Home Furish.	500,000	200	High
V. President Marketing	Consumer Catalogue & Retail	Soccer boots & wear	70,000	50	Low
President	Industrial Catalogue	Customised rubbish receptacles	60,000	40	High
Marketing Manager	Industrial Catalogue	Industrial tools	50,000	40	Medium
Marketing Analyst	Insurance provider	Car insurance	1,000,000	500	High

Table 3.1 Profile of Research Interviews to Construct DBM Model

It is a tautology to define the first element of a DBM model as a simple database; doing so would perpetuate the misconceptions of data-poor (i.e. mailing lists) information environments. Market research, segmentation, relationship building and performance measurement all require the capture of numerous customer/prospect data elements. As products and services change, so do the needs for acquiring and managing data. Hence, the first element of our model is defined as a framework for creating a data-rich, as opposed to, data-poor database. The concept of data-rich will vary from organisation to organisation and from industry to industry. By combining Pride and Farrell's (1993, p. 46) definition of segmentation with Kotler's (1994, p. 280) criteria for effectiveness of segmentation, I define a data-rich database as:

> A data-rich database contains sufficient segmentation data elements to identify customer clusters of adequate size and behavioural variation to justify economic exploitation through available direct response media.



Source: Lewington et al. (1996), p. 334.

Figure 3.1 A Three-Element Model of Database Marketing Systems

A data-rich environment provides a foundation for the second element of our model: a market modelling facility. Combining extensive data collection with a variety of models forms the basis of a Marketing Decision Support System (MDSS). Little (1979) identified the main components of these systems as a data bank, models, statistics and optimisation used to promote a feedback dialogue (i.e. question/answer, what-if) with managers. Exploiting the competitive advantages of DBM requires the specification of a heuristic process that uses statistical analysis, segmented marketing mix scenarios, and economic models to assess and develop marketing programmes. Promising marketing scenarios can then be converted into market experiments and the results measured.

Performance measurement is the third element of our DBM model. In section 2.5.2 accurate measurement of customer response to alternative marketing approaches was identified as a key strength of DBM. Feedback from performance measures provides control information that clarifies data collection decisions and improves the effectiveness of market models, a point echoed by Shaw and Stone (1988b).

The next section considers how the three elements of the model are operationalised for research and application purposes.

3.3 OPERATIONALISING THE MODEL

This section explains the detailed background to each of the three elements in the model. As the trends toward shorter product life cycles and greater fragmentation of markets are expected to continue, marketers must expect to cope with these as highly dynamic systems requiring constant change and updating.

3.3.1 Element 1: Creation and Adaptation of Data-Rich Information Environments

The creation of a data-rich information environment for modelling and performance measurement is a complex process, which may be achieved in many ways. Opportunities to acquire data are growing through sources such as credit applications, purchase records, national censuses, and compiled lists. Integrating data from a wide variety of sources creates a constant need for data cleansing - error correction, format standardisation, and duplicate elimination - to ensure efficient database management. Sources of data to create a data-rich environment can be classified in four ways (Figure 3.2).

(i) **Customer Transactions** Organisations most commonly capture data during the customer transaction dialogue. A wide variety of methods are used to accumulate customer and prospect data: warranty cards, mail-in rebates, in-house credit cards, questionnaires, membership clubs, sweepstakes, and other incentive programmes. In some businesses detailed data from customers is a necessary requirement of the exchange process (e.g. life insurance), which forms the foundation of a data-rich information environment.

(ii) **Integration of Internal Databases** Data may be captured at several different points in the firm, rather than one central point, as businesses interact with their customers. For example, the numerous divisions of a large corporation may have common customers, yet data is collected through isolated systems. Typically, these independent systems are related to functional efficiency rather than organisational effectiveness. Greater systems integration can be achieved by merging customers into a single database, which provides increased access to useful customer information (Brown 1994). Typically, take-overs and mergers often create a need to merge customer databases into one file. The increased connectivity of network systems encourages the merging of databases and the use of relational database systems.

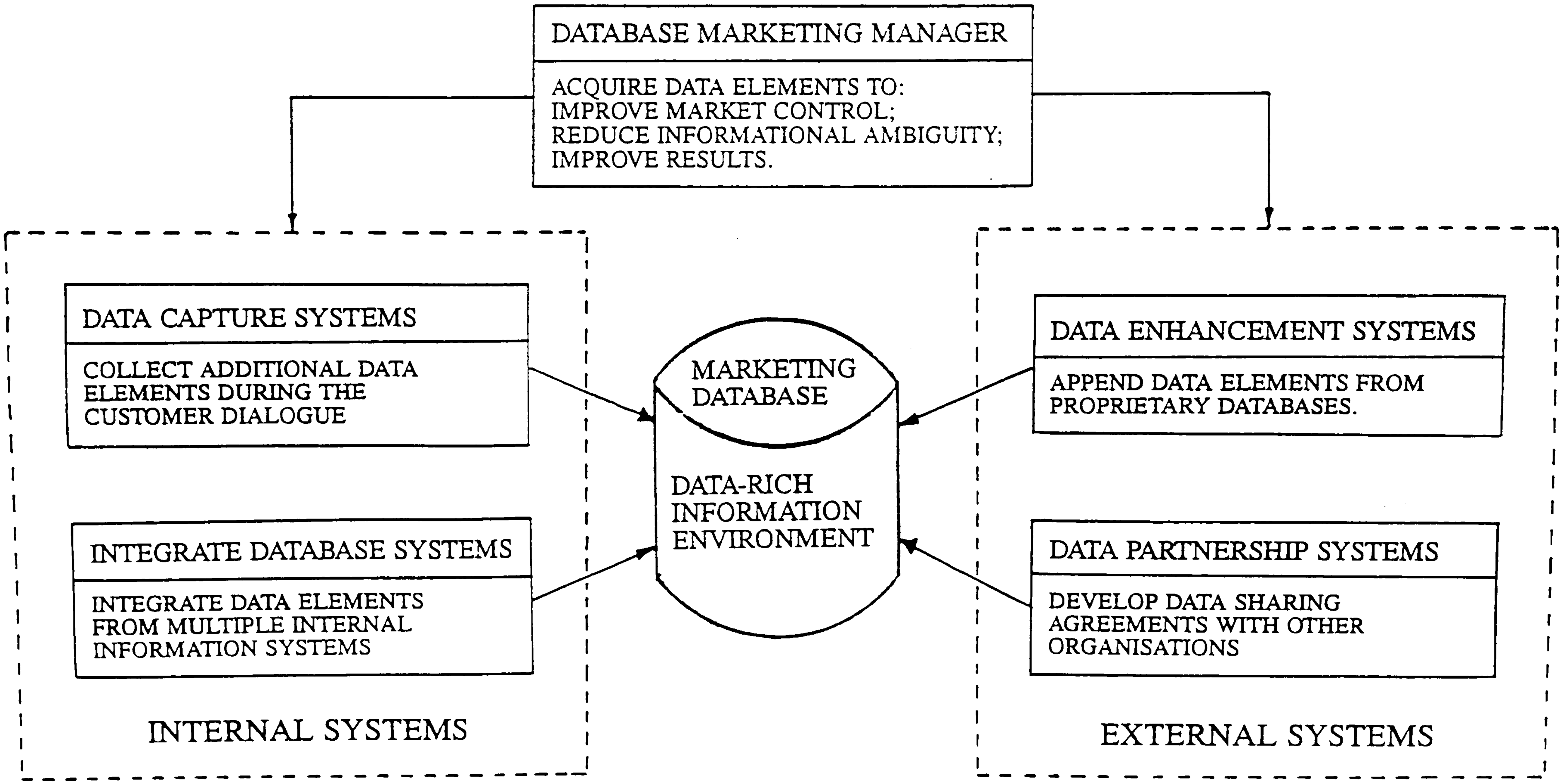


Figure 3.2 Creating a Data-Rich Information Environment

The consolidation of data into one file can be an imposing task. For instance, the trade press reported that General Motors (GM) merged customer data from its numerous automobile and financing activities as a precursor to launching its own credit card. The resulting single database was then used, in conjunction with credit information, to target GM's most loyal customers with direct mail solicitations for the GM Card. GM then modelled their consolidated database to identify their most loyal and credit worthy customers. The accuracy of their targeting, and generous financial rebates for card use, resulted in 12 million cards (Berry et al. 1994) being issued in the United States. The success of GM's innovative programme prompted imitation by many other companies (e.g. Ford, Apple Computer) to develop similar reward programmes. Consumers use of the card exceeded all GM's projections; consequently, in 1997 the company decided to reduce the benefits which consumers could accrue to the card.

If internal data sources prove inadequate, the following two external data sources can fill voids.

(iii) **External Data Enhancement** Extensive proprietary data services have been developed to service marketers' needs for consumer information. These services have developed "mass-compiled" databases that combine several sources (e.g. census, telephone listings) of data into one file. Evans (1994) explains how proprietary data may be used to create a database of prospects, or enhance existing customer records with demographic data (i.e. age, income) and geodemographic clustering codes (e.g. PRIZM, ACORN). Appropriately enhancing customer records may provide a quick and cost effective way of creating a data-rich information environment (Kobak 1993). However, several practical constraints may limit the enhancement process. First, many proprietary and mainframe, DBM systems lack the flexibility to add new data fields without costly and time consuming modifications. Second, many companies with small databases regard data enhancement as too expensive; consequently, they often prefer testing a wide variety of purchased lists to enrich their understanding of the marketplace.

(iv) **Data Partnerships** Finally, there is the sharing of data among organisations (Darrow and Belilove 1978). Airlines, hotel chains and car hire companies often share databases of frequent users to promote new locations and routes. Premkumar and King (1991) also observed a growing trend toward inter-organisational systems that share data acquisition and systems costs in an effort to create strategic DBM systems. The economic and market advantages of shared systems has led to an increase in their popularity.

Ventresca (1991) explains how Farm Journal formed data partnerships with its clients to improve segmentation capabilities. The client's database is matched with Farm Journal's to produce three distinct groups customers of prospects.

Group 1: Customers that were matched as present on both databases. This enables Farm Journal to enhance the client's database with demographic and geographic data to improve customer profiling.

Group 2: Customers on the client's database that were previously unknown to Farm Journal form the second group. These individuals are contacted by Farm Journal's telephone survey department to enhance the customer's data profile. This data is then available to both Farm Journal and the client's database.

Group 3: The final group represents businesses and individuals on Farm Journal's database with a profile fitting the client's target market but currently unknown to them.

This case illustrates how external enhancement and data partnerships may be used for mutually beneficial database enrichment. Farm Journal's database is used to drive laser printing and computerised collating process which enables them to publish a journal customised articles and advertising reflecting the specific farming activities (e.g. wheat, soy beans, pigs) of its readers.

Several problems have arisen as organisations have increased their data capture capabilities. Combining data from numerous sources is feasible, but may be limited by legislation and lack of economic justification. Collecting too much data may result in redundancy and misinformation systems (Ackoff 1967). A proliferation of data-rich systems may raise consumer concerns about privacy issues (Nowak and Phelps 1992) and result in further restrictive legislation reducing marketers' ability to segment their markets and meet the needs of specific groups of customers.

3.3.2 Element 2: Market Modelling

An effective market modelling process should be capable of extracting sufficient information from a database to improve marketers' decision making capabilities. Information on customer types and buying patterns can be used to formulate alternative marketing mix scenarios, which can be tested, aiding marketers' decisions on the effective use of limited resources. But market modelling is a complex process, which may require marketers to adopt new approaches in their market planning.

The market modelling process described in this section has been developed by combining Little's (1979) concepts of a marketing decision support system with Schultz and Wang's (1993) survey of DBM activities. Once again, a parsimonious approach was adopted, which reduced market modelling to a pragmatic three-step process. Figure 3.3 shows the three-step process of modelling used for DBM:

Step 1. Statistically analyse the database.

Step 2. Construct segmented marketing mix scenarios.

Step 3. Appraise and optimise marketing programmes

3.3.2.1 Step 1: Statistically Analyse the Database

Having large amounts of data generally creates a need to reduce or analyse the data into comprehensible patterns. Marketers' application of powerful microcomputers and user-friendly software is increasing (Hirst 1994). Database marketers, using sophisticated methodologies, may find the pragmatism of Hooley and Hussey's (1994a) "10 new-age commandments" of data analysis useful for selecting techniques and interpreting results. As the marketing applications of statistical methods are well documented (Hooley and Hussey 1994b), the following discussion will focus on a general philosophy for DBM rather than specific techniques.

An informative database analysis might be accomplished by applying data reduction techniques so as to produce a series of descriptive distributions (Ehrenberg 1981). Graphical analyses and pictorial presentations may indicate natural groupings of customers and their product preferences, which can be tested using statistical analysis.

Powerful PC-based statistical packages may delude some marketers into believing that multivariate analysis automatically reveals groups of customers, perhaps overly encouraging the use of cluster analysis. Appropriate choice and application of multivariate techniques may reveal groupings or clusters, help expose interrelations, and form a foundation for predictive models. However, these techniques were not designed to automatically reveal market segments (Churchill 1983) and care should be exercised in interpreting statistical analyses of customer databases. As Sheth (1971) notes, multivariate analysis should be viewed as an exploratory tool, particularly with large databases when the potential for combining alternative marketing variables is large (Coates et al. 1994). Any results need blending with managerial intuition and judgement.

3.3.2.2 Step 2: Construct Segmented Marketing Mix Scenarios

The insights provided by statistical analysis should now be thoroughly considered in order to identify possible market segments. The relative attractiveness of each segment can be assessed, and decisions taken about how best to meet customer needs in the segment. Lunn et al's (1986) review of segmentation, and examples from research into consumer and industrial DBM practices, are used to illustrate a variety of scenarios.

Consumer-Oriented Approach. Analysis of the database might reveal customer groups or clusters that will commonly be defined by several demographic segmentation variables, e.g. the areas in which they live, or customers' age and income profiles. Further enhancement can be achieved with life-style data to produce psychographic groupings, and this may become more common as sophisticated DBM techniques are developed.

A research case illustrates how a catalogue marketer of ladies apparel used simple data analysis to improve their productivity of prospect selection. In common with many other cataloguers, the company purchased numerous mailing lists to build its customer base, and as customers were added, the list source code was appended to their record, primarily for list performance measurement purposes. This information was of further use when the

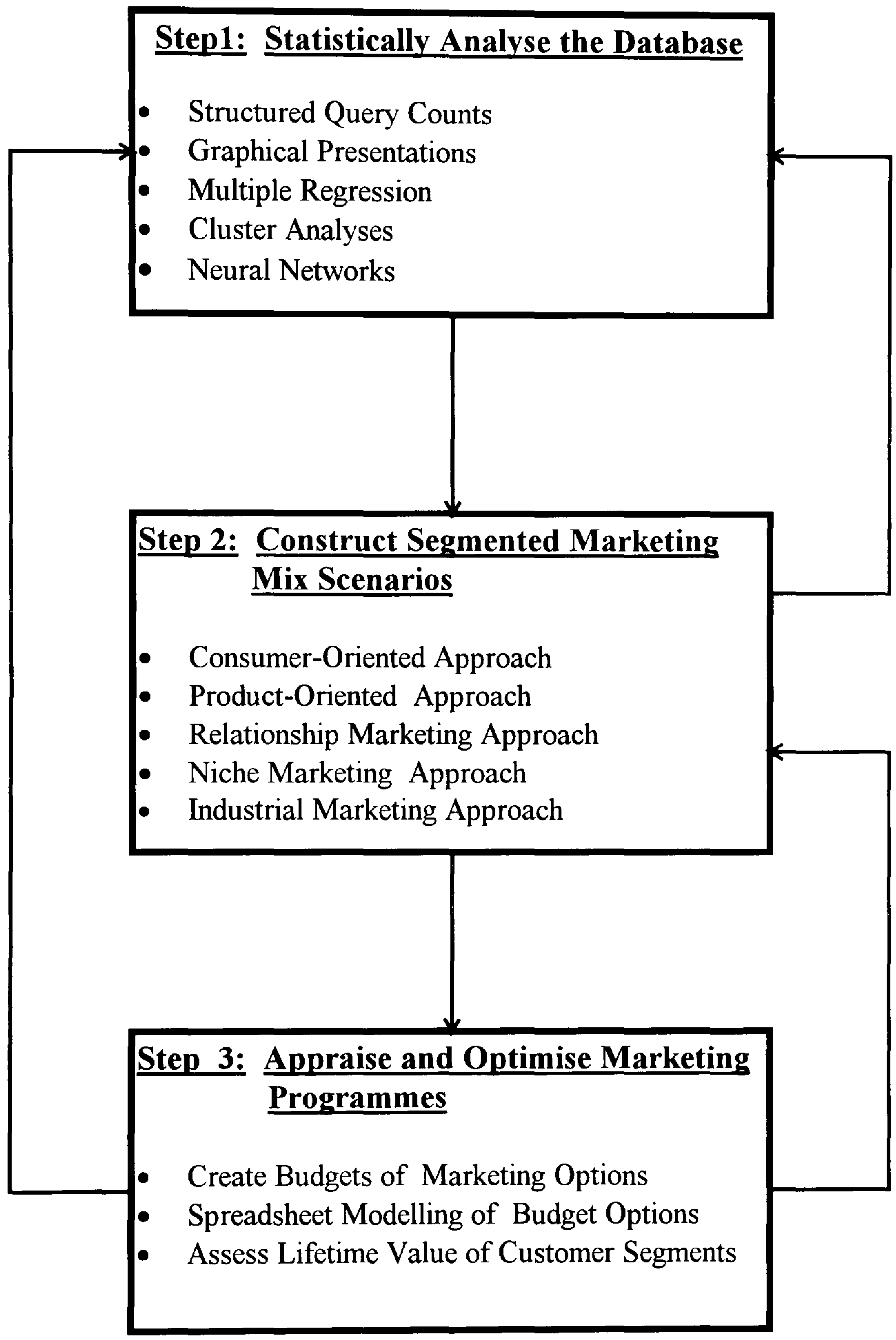


Figure 3.3 The Market Modelling Process

company decided to launch a new catalogue featuring home furnishings. Using its in-house file for test marketing, it was able to track response on the basis of previous external data purchases. This information improved prospecting decisions, and reduced customer acquisition costs, which enabled the company to rapidly expand its home furnishings business. In a business review (Faust 1996), the company revealed that sales grew from $70 million in 1994 to $150 million in 1996. Clearly, this company's ability to identify customer profiles for future catalogues provided the basis for their rapid growth.

Product-Oriented Approach. Identifying groups of customers might prompt a matching analysis of their needs and preferences for alternative products and services. These models may be used to resolve catalogue product positioning and space allocation decisions, or assist in constructing entirely new product lines. Financial service marketers often use customer profiles to devise new product offerings. These approaches have resulted in increased market fragmentation, and the rapid growth of speciality catalogues.

Many new products and services are being introduced using DBM, but mistakes and failures often provide a note of caution. In the early 1990s American Express, a pre-eminent user of DBM, decided to launch their own revolving credit card - Optima - to compete with Mastercard and Visa. In theory their modelling of consumer profiles and credit histories should have led to a profitable new product line; however, within two years of the launch, bad debt losses had amounted to several hundred million dollars. Why did this marketing disaster occur? The American Express card is primarily used by individuals for corporate business travel expenses, which are reclaimed or paid directly;

whereas the Optima card was used for personal expenses - a very different credit risk. This case illustrates how a very experienced database marketer can overlook vital consumer behaviour differences.

Relationship Marketing Approach. Segmentation is an important feature of relationship marketing. Grouping customers by their purchasing level may promote the development of retention and reward strategies that can be tracked by database systems. Loyal, heavy users are being rewarded with free gifts, upgrades and rebates. This doesn't mean that under-performing segments should be ignored; many companies may wish to test marketing mixes that will improve sales or retain transient customers.

Tesco's supermarkets introduced a customer loyalty card programme in 1995, and within a year, overtook rival Sainsbury's in market share (Fletcher 1996a). Tesco's market share increased to 13.9%, while Sainsbury's market share declined to 12.5% by the end of 1995. Sainsbury's chairman, David Sainsbury, illustrated a fundamental misunderstanding of DBM by comparing Tesco's loyalty programme to "electronic Green Shield stamps" - a pure customer reward programme. Clearly, gathering and analysing information on the buying behaviour of 8 million customers may produce substantial additional improvements in marketing productivity.

The DBM programme established Tesco's as a market leader and innovator in supermarket customer service. This resulted in Tesco's being voted as Britain's most-admired company in1996. After a profit decline £ 300 million, Sainsbury's issued their own loyalty card to imitate Tesco's, but research indicates that pioneers, such as Tesco, tend to maintain first-mover market share advantages when implementing new innovations

(Murthi et al. 1996). Furthermore, Tesco's moved along the DBM experience curve more quickly than Sainsbury's, and hence were able to use their DBM system to segment and forecast buyer behaviour more accurately.

Niche Marketing Approach. Many businesses have developed marketing strategies which cope with small groups of customers, because they are important to business survival (e.g. heavy users) or have special needs (e.g. customisation). Database analysis may reveal specific niches or microsegments, which require special product/service mixes (Linneman and Stanton 1992). Combinations of segmentation criteria may develop numerous potential niches with specific marketing mix components. Niche marketers use their DBM systems to memorise the specific needs of customers, develop special promotions, and maintain cost-effective communications (Pine et al. 1995).

Soccer Master is a small catalogue business that has focused its marketing effort on selling high quality European brands of boots, apparel and equipment to soccer enthusiasts throughout the United States. Their database forms an economic direct distribution system for European manufacturers wishing to exploit this market. Interestingly, Soccer Master, in common with several other niche marketers observed in this research, was able to operate profitably with a relatively data-poor database. Adding even simple data items (e.g. sex of customer) further fragments the market for manufacturers wishing to produce soccer wear specifically designed for women. Developing and maintaining a direct distribution channel for niche allows the company to charge premium prices for merchandise not available locally to many consumers. At the time of the interview the company were preparing to upgrade the size and sophistication their DBM system to further exploit other DBM opportunities.

Industrial Marketing Approach. Industrial marketers' needs and uses of DBM were previously described in Section 2.5.1.2. Generating leads to new customers, reducing sales force costs, alternative promotions tactics, exploiting new markets and the elimination of sales intermediaries are all feasible scenarios which can be explored using DBM systems. Applying these principles to industrial sales and marketing productivity can lead to spectacular results, even in highly competitive markets, as demonstrated by Dell Computer (see Section 4.7).

Burnett (1995) advocates a two-step approach when modelling business-to-business customer files. The first step in the modelling process is intended to use a penetration analysis (i.e. percentage of market served) by 8-digit Standard Industrial Classification (SIC) Code and employee size categories. Matching a company's distribution of these two variables against the business universe reveals a profile of the SIC codes and size of companies serviced by the company, which if necessary can be further analysed by product. Burnett cites many cases of how this form of modelling revealed misspent promotion, under-resourced market segments, improved prospecting by company; consequently, most companies were able to improve their marketing productivity. An industrial marketing case emerged in the research interviews, and this is described in Section 3.3.4 as an example of how the market modelling process can be applied.

In the second step, a weighted model uses the penetration analysis as foundation for determining the scoring of four additional levels of data: transactions over time, monetary value over time, total customers over time, and new customer acquisition. The scores are used then used to provide tracking indices by SIC code and number of employees. Furthermore, all elements of the marketing mix can be managed on a microsegmentation basis.

3.3.2.3 Step 3: Appraise and Optimise Marketing Programmes

The third step involves appraising the practicality of alternative programmes likely to match the needs of a particular segment. Economic projections may be prepared by combining segment size information with the costs of alternative marketing mix variations. Profitability forecasting, based upon individual customer purchase histories, is a feature almost unique to DBM. Modelling long-term purchasing relationships enables marketers to evaluate the lifetime value of customers, and relate marketing activity to long-term customer retention objectives.

Jackson (1989) contends that lifetime valuation models improve decisions relating to product pricing, segment profitability and distribution channels. For instance, companies, such as GM and the airlines, might attempt to assess the long-term benefits of enhanced contribution and market share against the costs of operating the loyalty programme. These valuation models often depend upon complex forecasts and discounted cash flow models, which are not unanimously accepted. Product innovation and new pricing structures by competitors are some of the factors that can upset the assumptions underpinning these models.

The economic modelling approach discussed above is regarded as a complex process by many organisations. Another approach uses simple budgetary models that project revenues and marketing expenses for each alternative. Installing these models on spreadsheets utilises "what-if" modelling, and automates laborious calculations.

In some organisations (e.g. insurance) the size of the customer base is inextricably linked to the total valuation of the business. These organisations may find that segmented lifetime valuation models provide useful information on the economics of customer acquisition and retention. A sophisticated DBM system should provide information that enables organisations to optimise their customer loyalty and acquisition programmes. These systems may increase the size of the customer base, profits and business valuation.

One of the research case interviews illustrated how one small, but highly profitable company, was able to develop and a new product line using the marketing modelling process.

3.3.2.4 Market Modelling: A Case History

The manufacturer of outdoor rubbish receptacles had successfully developed a $10 million market using catalogue selling as the direct marketing media. Because the receptacles were customised with logos and messages, the company had developed a strong brand image with fast food restaurants, municipal and state governments, and recreation facilities. Analysis of products often found with rubbish receptacles revealed customised street and event banners as a potential product. Customised designs for banners were a high value added product, which would potentially generate additional work for the company's team of graphic designers. Key target segments were identified from an analysis of the in-house database to form a test market. A simple catalogue was prepared and mailed to a random sample of 5000 prospects. In order to avoid the investment in banner manufacturing facilities (i.e. silk screen printing equipment), sales from the catalogue were sub-contracted to existing banner manufacturing companies. Measurement of response to the catalogue - actual buying behaviour - from key segments enabled management to forecast sales across the entire US market. This forecast was consolidated into a business plan specifying operating expenses and capital investment to forecast the profitability of the new venture. Within a year of implementing the business plan the new product line was profitable with sales of $2 million. This case illustrates how small, entrepreneurial companies can use market modelling and testing to reduce the risk of new ventures through the use of data-based marketing research.

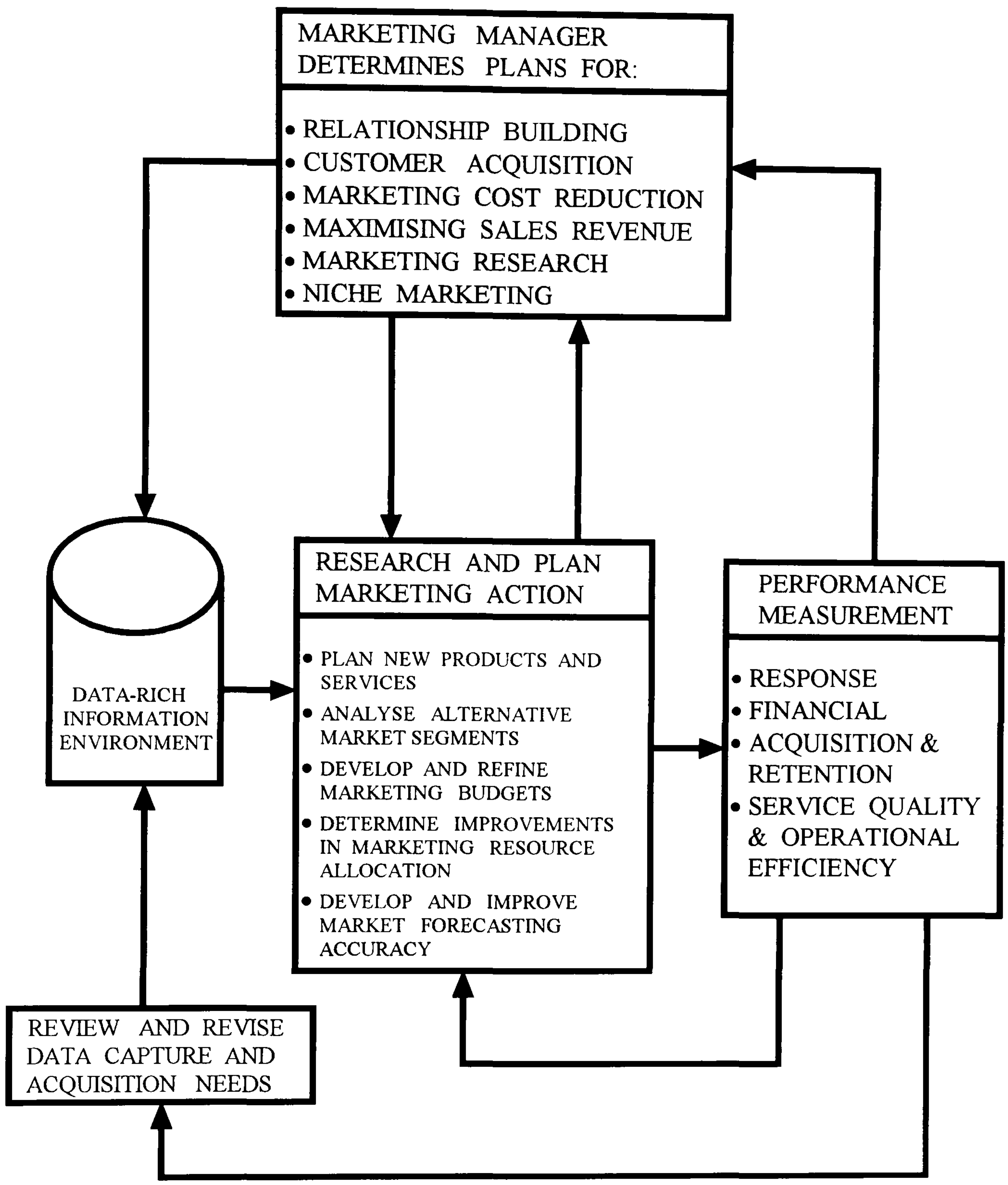
3.3.3 Element 3: Performance Measurement

The accurate measurement of different customer segments' response to alternative marketing mixes is an important function of marketing management. The constant need to improve marketing productivity should encourage marketers to use the personalised communication capabilities of DBM to test alternative marketing scenarios against each other or a control. Appropriate performance measures, which provide accurate information on the responses of target groups to alternative marketing mix scenarios, improve control over the marketing process. Greater control over marketing expenditures, and better use of resources, are fundamental benefits sought by organisations implementing DBM systems (Lewington 1994). Additionally, reductions in feedback from direct customer contact create a need to use a comprehensive range of performance measures, which provide sensitivity to marketplace trends. However, performance measurement is only briefly, and then often poorly, described in the DBM literature, which is consistent with the lack of emphasis on control in the marketing literature (Jaworski 1988).

Response rate is the performance measures most commonly used by direct marketers to measure the effectiveness of alternative mailing lists, graphics, copy and offers. Increases, or decreases, in response rate may be the critical predictor of marketing performance for organisations marketing a single product or service.

Marketers seeking increased understanding of their markets may wish to monitor other measures of marketing productivity. Several authors (Piercy and Evans 1983; Shaw and Stone 1988b) describe numerous marketing productivity measures, but three categories, apart from response rate, should provide feedback on marketing effectiveness. The first category is the measurement of financial performance of each marketing programme in terms of average sale per customer, contribution analyses, and bad debt provisions. The second category measures the economics of customer acquisition, retention and reactivation. Both of these categories provide information on the relative profitability of alternative market segments, and improve the accuracy of future economic models. Trends in these measures may indicate the effectiveness of marketing activity in relationship building, within the context of changes in the market environment. Finally, measures of service quality and operational effectiveness highlight potential problems that arise from late shipments, customer complaints and returned merchandise. Future sales may be lost if management fails to identify and correct problems related to potential sources of customer dissatisfaction.

The formal marketing control process above connotes a traditional cybernetic paradigm of establishing objectives, measuring performance, and taking corrective action when necessary (Figure 3.4). This approach has been criticised from several perspectives. First, it assumes that corrective action for performance deviations is known with certainty (Hofstede 1981); yet many factors, some of which are difficult to identify, could be responsible for the poor performance. Second, focusing on financial measures only captures part of a marketing manager's responsibilities (Churchill et al. 1985), and produces dysfunctional organisational behaviour in the long term. Finally, several



Source: Lewington (1994)

Figure 3.4: Performance Measures in the Database Marketing Control Cycle

pragmatic factors can be identified which limit the use of performance measures. The costs of data acquisition and management may not be offset by marketing productivity improvements. Poor management understanding of the significance of complex performance measures can results in inappropriate actions. Perhaps most significantly, these measures may be used to assess managers' personal performance, creating job insecurity and constant pressure to perform.

There are no specific rules for selecting appropriate performance measures which reflect business and economic trends. For instance, the small, but highly professional, cataloguer of rubbish receptacles used all the categories of performance measures stated above. The company's owners believed that this made them highly sensitive to market needs, enabling them to achieve above average business growth rates and profitability. Even greater sensitivity may be available to marketers developing electronic catalogues and malls for the information superhighways (e.g. Internet). These marketers are able to monitor electronic browsing of products and services (Cronin 1994), yielding even greater insights into customer behaviour. Companies like DEC (Digitial Equipment Corp.) are already using these combinations of information networks and DBM methodologies to improve customer communications and marketing efficiency.

Observations and discussions indicate that successful DBM applications use a range of detailed performance measures to reduce marketing information ambiguity, which improves marketing productivity in several ways. First, it provides feedback on the effectiveness of internal and external data acquisition, giving indications of new data acquisition needs, or alternatively, data redundancy. Second, ratios from performance measures may be used to construct more accurate economic forecasting models. Finally, charting key productivity measures (e.g. customer acquisition costs) can reveal trends, both favourable and unfavourable, for management action. Adaptation of the database to accommodate new customers and data can yield different segmentation profiles, marketing mix scenarios and revised economic models. However, constantly altering DBM system variables can be difficult to achieve in practice.

3.4 PRACTICALITY OF THE MODEL

The largest company interviewed in the qualitative research, the provider of car insurance, stated that they had just completed a three-year, multi-million dollar development programme to upgrade the capabilities of their DBM system. The data captured for car insurance policies enabled the company to maintain a data-rich information system on its customers and prospects. List purchases were very common, and the company received databases from over a hundred data partners. Hence, list cleansing and data standardisation were important issues which had to be resolved in the merging and purging of databases.

The use of statistical modelling was commonplace as the company's actuaries often used the database for risk analyses. Market modelling activities were primarily focused on matching customers to appropriate insurance packages. For instance, the company intended to grow its customer base at 10% per annum, while reducing its mailings from 25 to 20 million pieces of mail per annum. In order to achieve these objectives the company was continually testing and monitoring a wide variety of creative promotional formats. Therefore, this interview confirmed that the DBM contained all of the functional components of sophisticated DBM systems.

3.5 CONCLUSIONS

The model of a DBM system presented in this chapter will used as a framework for the research work conducted in the remainder of this thesis. However, the reader should be aware that this conceptual representation of DBM systems is a simplification of the complex processes inherent in powerful DBM systems. Defining DBM through a three-element model brings together a number of disparate concepts, in an attempt to avoid the problems associated with presenting large amounts of information that can overwhelm marketers (de Chernatony et al. 1993). The model identified three main components that interact with each other to form a complete system. Ignoring or weakly implementing any one may greatly reduce the power of the system as a whole. It is intended that the model increase understanding of the main elements of a DBM system, improve communications when such systems are developed across functional boundaries, and offer a benchmarking tool to system designers.

It is unlikely that any model could overcome all the inhibitors described in the previous chapter, but it should give managers a greater understanding of these problems. Some of the factors inhibiting DBM are at least partly due to ineffective communication. Effective communication between skilled and knowledgeable managers is essential in order to integrate all the elements into a complete system. A DBM model should help in articulating the needs of users (marketers) to system designers (IS professionals), or assist in creating criteria to assess proprietary IS packages. Most theorists (e.g. Stone, Shaw, Fletcher) agree that marketing managers should play a central role in the way DBM is developed in their organisations. Their knowledge, understanding and attitude comprise the cornerstone on which systems are based. Finally, it should explain the interactions of DBM system elements, which can afford greater insight into system development.

Competitive advantage comes in unexpected ways as data are subjected to new forms of analysis. Microcomputers make market modelling more accessible and affordable, and hence, data can be analysed from many more perspectives than were feasible in the past. Feedback from numerous performance measures should improve managers' control of the marketing process, but responding quickly to this information has many human, economic and organisational implications. Clearly, developing a DBM system that is integrated with business requirements is a complex task, but the competitive advantages to be gained can be substantial.

The model described in this chapter defines how the term *DBM system* should be interpreted for the remainder of this thesis. In chapter 7, the model is operationalised to refine a construct to measure the level of sophistication in DBM systems. The strong relationships between the use of sophisticated DBM and the notions of competitive advantage are discussed in the next chapter.

CHAPTER 4

ATTAINING AND SUSTAINING COMPETITIVE ADVANTAGE THROUGH DATABASE MARKETING

4.1 INTRODUCTION

The previous chapter outlined the elements and capabilities of sophisticated DBM systems. In section 1.2, it was noted that *the* leading strategist (i.e. Michael Porter) of the 1980s predicted many of the *potential* strategic applications for DBM. Following Porter's (1980, 1985) theoretical frameworks, many leading proponents of DBM expounded on how systems could be applied to attain competitive advantage (Stone and Shaw 1987, Shaw and Stone 1988a, Fletcher et al. 1990). Subsequently, Porter's theories have been refined, and other theories defined, about how companies attain and sustain competitive advantage.

Unfortunately, many of the ideas, notions and theories of competitive advantage are not easy to implement in practice. Porter (1985) reflects on the difficulties confronting managers when developing and implementing strategic plans:

> "The book reflects my deepening belief that the failure of many firms' strategies stems from an inability to translate a broad competitive strategy into the specific action steps required to gain competitive advantage." (p. xv)

Both the difficulties and rewards of translating business strategy into competitive advantage are illustrated by the burgeoning theoretical and empirical research in economics, marketing, organisational development, and information systems; as a result, a plethora of models, factors and variables have been proposed to explain how competitive advantage can be attained. Organisations seeking to gain and sustain competitive advantage are exhorted to create "value chain" frameworks (Porter 1985), develop distinctive capabilities (Stalk et al.1992), transform through information technology (Scott Morton 1991), and promote organisational learning (Senge 1990). Clearly, developing strategies for attaining and sustaining competitive advantage is a complex task, and no single marketing approach could possibly meet the needs of all industry environments. Nevertheless, it will be shown that the effective use of sophisticated DBM plays an important role in translating strategic plans into competitive advantage, particularly in fragmented markets.

The purpose of this chapter is to identify the links between the notions of competitive advantage and the characteristics and capabilities of sophisticated DBM systems as presented in chapter 3. First, a section reviews Porter's theories (1980, 1985) that provided the foundation for several authors' (Stone and Shaw 1987; Fletcher et al. 1990) descriptions of how DBM could be used to gain competitive advantage. Because of the considerable debate about how competitive advantage is achieved, and the interdisciplinary nature of DBM systems, it was necessary to review the notions of competitive advantage from the perspective of three business disciplines. Hence, the next three sections discuss the notions of competitive advantage from the perspectives of marketing, information technology, and human resources. In the following section, the concepts of learning organisations are presented, which in essence combines notions from all three disciplines. In the final section, a short case is presented to demonstrate how a successful direct marketer, Dell Corporation, used DBM to attain and sustain competitive advantage in the highly competitive PC marketplace. All of these analyses are intended to expose common factors that link the notions of competitive advantage and DBM. As a result of the discussions and critical reviews in this chapter, it is possible to identify potential factors promoting higher levels of sophistication in DBM systems. This theoretical foundation provides a basis for specifying hypotheses to direct the collection of empirical data to test these theories.

4.2 NOTIONS OF COMPETITIVE ADVANTAGE

This first part of this section briefly reviews how Porter's main theoretical concepts were used by DBM theorists (Stone and Shaw 1987, Shaw and Stone 1988a, Fletcher et al. 1990) to link the distinctive capabilities of DBM with the notions of competitive advantage. While Porter's theories and frameworks continue to be influential, other theories (i.e. Mathur 1988, Grant 1991) of competitive advantage are considered as they relate to DBM.

4.2.1 Porter's Concepts of Achieving Competitive Advantage

The work of Michael Porter has been highly influential in creating debate and shaping concepts related to competitive strategy throughout the current generation of strategy philosophers. Porter's texts (1980, 1985) on creating and sustaining competitive advantage present management strategists with three sets of concepts: the five forces of competitive intensity within an industry [market], three generic competitive strategies, and value chain analysis as a method of internal evaluation. Most readers will be familiar with Porter's ideas; hence, to avoid repeating them, a brief summary of the three main ideas is provided in Appendix 1. These concepts are now briefly critiqued in the context of DBM.

4.2.1.1 The Five Forces that Determine Competitive Intensity within Markets

Porter's framework of five forces provided a basic model for environmental analysis of competitive intensity within an industry. Fletcher et al. (1990) explicitly used Porter's framework to demonstrate DBM's capabilities as a competitive tool (Figure 4.1). An examination of the direct marketing trade press and journals revealed numerous examples of companies using DBM to underpin all of the marketing strategies described in the table below, one of which is used as a case in section 4.7.

Competitive Opportunity	Marketing Strategy	Role of Information
1. Change competitive basis	Market development or penetration Increased effectiveness/ margins Alternative sales channels Reducing cost structure	Prospect/Customer Information Targeted marketing Better control
2. Strengthening customer relations	Tailored customer service Providing value to the customer Product differentiation Create switching costs	Know customer needs 'Individual' promotions' Response handling, identify needs Customers as 'users' of your systems
3. Strengthen buyer/supplier position	Superior market information Decreasing cost of sales Providing value to supplier Pass stockholding onto supplier	Internal/external data capture Optimisation of sales channels Measure supplier performance Identify areas of inefficiency
4. Build barriers	Unique distribution channels Unique valued services Create entry costs	Market knowledge allows improved service/value 'Lock-in' customers, suppliers and intermediaries Immediate responses to threats
5. Generate new products	Market-led product development Alliance opportunities New products/services	Market gap analysis Customer dialogue, user innovation Information as a product

Source: Fletcher et al. (1990), p. 11.

Figure 4.1. The Role of Database Marketing as a Competitive Tool

Perversely, the fragmented markets and technological progress which enabled firms to implement Fletcher's ideas have reduced the effectiveness of Porter's model, and several theorists believe that Porter's approach was flawed for several reasons. First, managers do not define their "industry" within the classical notions of economists. Managers use restricted cognitive capabilities to identify a limited number of competitors; hence, firms are characterized by differing degrees of homogeneity among managerial perceptions of their competitive environment (de Chernatony et al. 1993). Second, perceptions of competition are further complicated by increasing market fragmentation that focuses on customizing products to customer needs (Mueller-Heumann 1992). This change is supported by computer-aided technology that has increased the flexibility of production technology without greatly increasing costs (Zuboff 1988). One author (Moore 1996) challenges the notions of an "industry" in a rapidly changing global economy:

> "The presumption that there are distinct, immutable businesses within which players scramble for supremacy is a tired idea whose time is passed. Traditional boundaries that we've all taken for granted throughout our careers are blurring, and in many cases crumbling." (p. 142)

Mathur (1988) also criticised Porter's theories as promoting a "static view" of markets - one whose composition is stable. He contends that strategy should concentrate on positioning a firm's outputs (products or services), not its inputs. Customers' buying decisions are mainly concerned with perceived value; it is for their purchasing preferences that businesses compete. Hence, the purpose of competitive activity is to destabilise markets through the introduction of innovative products and services.

After completing an analysis of industry attractiveness Porter recommended that firms consider their relative position within an industry in order to determine an appropriate strategy.

4.2.1.2 Positioning in a Marketplace

Porter's model provides three dimensions for positioning in an industry that he describes as "generic" competitive strategies for outperforming other businesses in a particular [market] industry; these three dimensions are *cost leadership, differentiation*, and *focus*. At first, Porter's three generic strategies were seen as complementary to marketing theory as Sharp (1991) observed :

> "... his analysis of industry structure was certainly economic work, but its outcome - competitive strategy - is theory which describes marketing decisions, a fact which was quickly appreciated by marketing academics and practitioners worldwide." (p. 4)

Unfortunately, attempts to interpret Porter's generic strategies have led to some confusion when attempting to implement these concepts. Cost leadership is often confused with low pricing. Theoretically, the lowest cost producer has the exclusive ability to go to a lower price than all other competitors; however, the main purpose of cost leadership is to achieve superior profitability when achieving the same price as competitors. Differentiation and focus strategies are confused because both are based on the concepts of market segmentation. This confusion arises from Porter's matrix presentation - he does not present focus as strategy in its own right. Differentiation involves defining the benefits desired by a market, and then differentiating a product through one or more benefits for which customers will pay a premium price. Focus does not require outperforming competitors in benefits; instead, it requires that a bundle of meaningful benefits provide the best match for customer needs in a segment. Speed

(1989) presents two versions of focus that are relevant to DBM: one where a distinct segment is targeted (target marketing), and another where the segment is so small it can only accommodate one firm (niche marketing).

Interestingly, Porter (1985) presents his ideas on focus strategy within the context of industry [market] segmentation. Selecting an appropriate focus strategy rests on the differences among segments. Sustainable focus strategies require the selection of one or a few segments; this enables the firm to optimise its value chain to develop cost leadership, or differentiation, within a specific segment. In a recent paper, Porter (1996) seems to have modified his stance on strategic positioning :

> "In contrast, strategic positioning means performing *different* activities from rivals or performing similar activities in *different ways*." (p.62)

This stance seems to be very close to the Mathur's (1988) ideas of generic strategy (see section 4.2.2), which are based on a customer-focused segmentation approach to strategy.

These examples of DBM's capability to strategically change service and product distribution activities could be construed as adjustments to firms' *value chains*, the third and final part of Porter's theory which is now considered.

4.2.1.3 Value Chain Analysis

The final contribution of Porter (1985) to competitive advantage theory is "value chain analysis," a systematic way of examining the nature and extent of synergies, cost reduction possibilities, and quality improvements among the *internal* activities of a firm.

The purpose of this kind of analysis is to achieve high operational effectiveness, thus achieving higher profitability through lower overall costs.

Even Porter (1996) now concedes that this kind of operational effectiveness is no longer enough to deliver long-term competitive advantage. He now advocates that companies use *variety-based, needs-based* and *access-based* positioning: this apparently is an affirmation of the basic theories of market segmentation as the foundation of competitive strategy. Most companies would find a sophisticated DBM system useful if trying to implement any one, or all, of these strategic approaches. Porter's concepts of sources of competitive advantage seem to have moved closer to the customer-focused ideas of Mathur (1988), which are considered below.

4.2.2 <u>Mathur's Generic Strategies</u>

Mathur (1988) clearly supports market segmentation as a method of achieving competitive advantage:

> "Thus a firm introducing a differentiated offering would tend to detach one part of the market from the rest and thereby split off a profitable sub-market in which competition was less intense." (p. 30)

Mathur's views are closely aligned with the main purpose of DBM systems, which is to accurately identify specific market segments which offer enhanced profitability, similar to the differentiated focus strategy described by Porter. Mathur commented that Porter's notions give the impression that differentiation and cost leadership are mutually incompatible, but these two factors are not inseparable parts of strategy.

Mathur defines his generic framework through differentiation of merchandise and support offerings that make a firm's products and services unique in the "eyes of customers" using "non-price" dimensions (Figure 4.2).

MERCHANDISE	SUPPORT: Differentiated	SUPPORT: Undifferentiated
Differentiated	System	Product
Undifferentiated	Service	Commodity

Source: Mathur (1988), p. 34

Figure 4.2 Mathur's Four Polar Generic Strategies

The four generic strategies are easy to understand. Firms differentiate products, services, or both to provide customised systems to meet the individual needs of customers. Choosing undifferentiated support and merchandise dimensions - a commodity approach - confines a firm to price as the only source of competitive advantage, whereas companies that focus on differentiating their merchandise and support systems to meet customers' needs are often able to charge premium prices and build strong relationships.

In the early 1990s dissatisfaction with the static, equilibrium theories of Porter resulted in a resurgence of interest in resource-based theories of competitive advantage. The next section reviews the characteristics of these theories.

4.2.3 Resource-Based Theory of Competitive Advantage

Grant (1991) concludes that a firm's resources and capabilities are the central considerations upon which strategy should be formulated. For the purposes of this review the customer database is viewed as a firm's key resource, and the DBM system as a firm's key capability. Grant's resource-based approach is founded on four determinants of sustainability of competitive advantage: *durability*, *transparency*, *transferability* and *replicability*. While Grant does not discuss DBM specifically, the concepts of the four determinants of sustainability have important implications for notions of how competitive advantage can be derived from sophisticated DBM systems.

4.2.3.1 Durability: The Longevity of Competitive Advantage

Grant believes that the longevity of a firm's competitive advantage depends upon the rate at which underlying resources and capabilities depreciate or become obsolete. Hence, a firm adopting direct marketing approaches as their main strategy for servicing and communicating with customers should deploy sophisticated DBM capabilities to ensure the renewal and maintenance of its customer base, in order to ensure longevity of its survival. In the following statement, Grant supports Barney's (1986) view of organisational culture's role in developing human resources as an integral factor in the cultivation of capabilities:

> "One of the most important roles that organization culture plays in sustaining competitive advantage may be through its maintenance and support for capabilities through the socialization of new employees." (p. 125)

Further support for the argument of organisation culture as an important factor in the durability of competitive advantage will be found in section 4.3.2. of this chapter, where the arguments for a market-oriented culture are considered.

4.2.3.2 Transparency: The Difficulties of Imitation

Attaining sustained competitive advantage is more likely when the resources and capabilities are difficult to imitate (i.e. the strategy is not *transparent* to competitors). Competitive advantage based upon a single variable is more easily imitated over time than strategies based upon a complex pattern of coordination between diverse resources. It could be argued, from the discussions in section 2.5.3, that DBM requires the complex coordination of marketing, IS and general management skills to develop the resources to support and sustain sophisticated DBM systems. Furthermore, sophisticated DBM systems enable direct marketing communications to be devised on a one-to-one basis, and, as argued in section 2.5.4, this makes marketing strategy "invisible" to competitors (Roberts and Berger 1989, p. 5). Consequently, such marketing strategies and tactics are difficult to imitate.

4.2.3.3 Transferability: Amassing Resources and Capabilities

Potential imitators must overcome the problem of amassing the same resources and capabilities to eliminate a firm's competitive advantage. Many direct marketers rent (or swap) customer lists to competitors, so this resource may be attained at a reasonable economic cost. While customer data may be attained economically, developing the capability to maximise marketing productivity is still dependent upon the sophistication of the DBM system available for decision making. Another option available to firms is the hiring of their competitor's key manager, in an attempt to transfer strategic knowledge. But even when marketing managers can be hired from competitors, differences in information infrastructure, and the hiring firm's culture, make the success of such moves uncertain.

4.2.3.4 Replicability: Recreate Resources and Capabilities

Difficulties in transferring human resources may encourage competitors to replicate resources and capabilities through internal investment. Acquiring new customers through direct marketing generally requires large investments in customer communications (e.g. direct mail, telemarketing), but it is feasible approach. However, unless the competitor has access to a similar proprietary DBM system, imperfect knowledge about how the elements are co-ordinated, and the mental models used by managers, make it very difficult to replicate these complex systems.

Grant's notions of resources and capabilities are close to those of Hamel and Prahalad (1994) which promote a focus on an organisation's "core competencies" in the marketplace. In recent years, some companies have become myopic about "downsizing" and "quality circles" as strategic measures, and while these approaches are important, they too often distract managers' attention from the future needs of the marketplace. Sophisticated direct marketers are able to support quality customer service, develop efficient direct communications and sales channels with low overhead, and operate from a single location (e.g. L. L. Bean, Dell Computer). Thus DBM is being adopted because it strongly contributes to many of these strategies through a single approach (see Section 4.7).

Having completed a brief review of Porter's notions and other general theories of how competitive advantage may be gained, it is now useful to look at the concepts and ideas from the perspective of three disciplines inherent in the generic model of DBM systems. Accordingly, the next three sections examine DBM's links with the notion of competitive advantage in marketing, information systems and human factors.

4.3 MARKETING PERSPECTIVES OF COMPETITIVE ADVANTAGE

Marketplaces are evolving more quickly as changing demographics, economics, technology and social mores create converging pressures which destabilize existing market environments. Consequently, it is a major management challenge to continually develop new marketing strategies to meet the needs of increasingly demanding customers, while trying to fend off vigorous competition. Increasingly, marketing managers face the dilemma of determining whether scarce resources should be devoted to serving customer needs or repelling competitors. This section considers this dilemma, mainly through a review of an Anglo-American methodology (Day and Wensley 1988) for assessing competitive advantage which promotes the importance of market-oriented organisations.

4.3.1 Competitor-Centred versus Customer-Focused Assessments of Marketplaces

Day and Wensley (1988) offered two perspectives that attempt to explain how managers assess their competitive position in a marketplace: competitor-centred and customer-focused marketplace orientations. The two perspectives offer distinctive options for managers to consider, but they are not mutually exclusive. However, managers tend to adopt a specific perspective in order to cope with complex marketplace information that must be collected, screened and interpreted for effective decision-making (Pfeffer and Salancik 1978).

Competitor-centred market assessments focus management's attention on the prices, promotional activity, and market share of a few competitors. Companies adopting this approach tend to pay close attention to costs, match their competitors' marketing initiatives, and rely on technology for their competitive edge. As observed in section

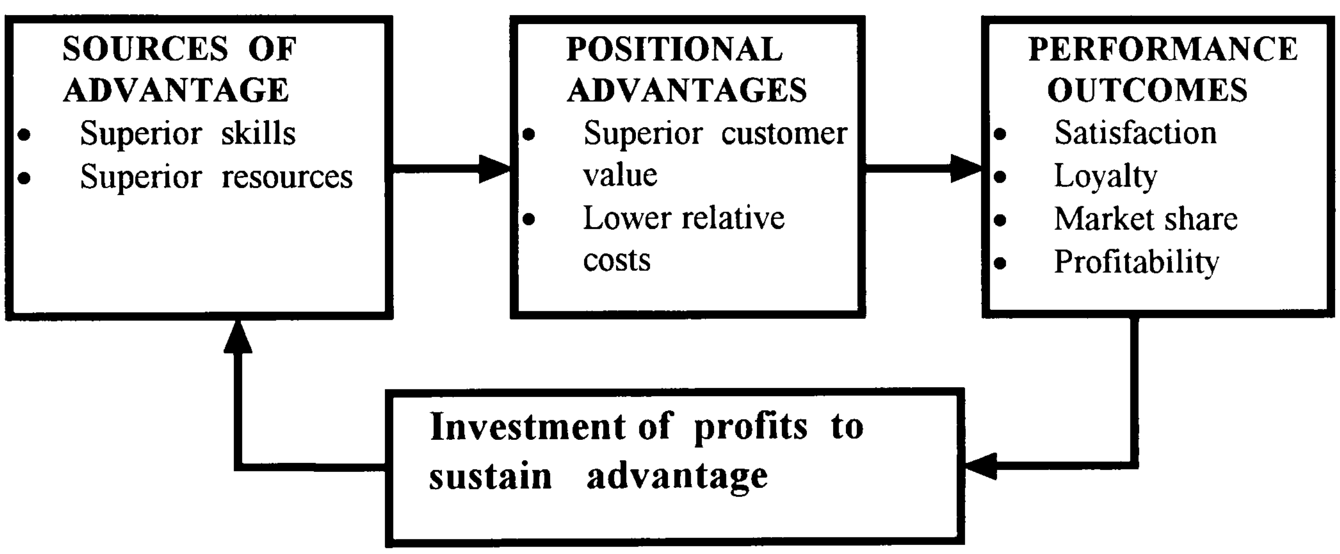
4.2.1, competitor-centred responses are sometimes complicated by managers' perceptions of their "industry" and the competitors therein. Furthermore, a recent study (Slater and Narver 1994) found little moderation of the market orientation-performance relationship by the competitive environment. These findings cast doubt on the effectiveness of competitor-centred analyses as bases for planning courses of action to attain competitive advantage.

Customer-focused assessments are based on detailed analyses of customer benefits within end-use segments, in order to identify the actions needed to achieve customer satisfaction. This approach advocates the development of marketing plans which are aligned to customers' needs and perceived value. Ultimately, this approach emphasises continuing customer satisfaction and loyalty as evidence of strong relationships. Direct marketers are familiar with this approach, because segmented markets are best exploited when a firm's resources are focused on meeting the needs and value orientation of specific customer groups. Again, these observations would tend to emphasize the benefits of a customer-oriented approach.

Striking an academic compromise, Day and Wensley (1988, p. 2) hedged on whether the adoption of one specific approach was more appropriate than another when assessing competitive advantage, stating: "Clearly a balance of the two characteristic perspectives is needed."

4.3.2 A Marketing View of the Elements of Competitive Advantage

Day and Wensley (1988, p. 3) offer a simple model (Figure 4.3) that explains the elements of a cyclic process to gain competitive advantage. Evidently, there is considerable commonality between the three elements of the DBM model presented in chapter 3, and Day and Wensley's source - position - performance (SPP) framework. They acknowledge that their SPP framework is "...a complex environment distorted by feedback, lags, and structural rigidities (p. 2)." Their theory was developed before DBM was formally recognised in marketing literature; however, a comparison between the three elements of the SPP framework and the model of DBM illustrates several clear parallels between the two philosophies.



Source: Day and Wensley (1988), p. 3.

Figure 4.3 The [Three] Elements of Competitive Advantage

The first element of Day and Wensley's model views the sources of competitive advantage as being rooted in the superior skills of functional personnel (discussed in section 4.5) to manage tangible resource strengths more effectively than competing firms (Aaker 1989). The authors ideas are similar to Grant's (1991) which define superior resources (i.e. the scale of manufacturing facilities, location, breadth of distribution system, availability of automated assembly lines, or family brand name) as a source of competitive advantage. The second element of their model is positional advantages, which are very similar to Porter's notions previously discussed in section 4.2.2. The final element of the SPP model recommends several popular indicators - customer satisfaction and loyalty, market share, and profitability - as marketing performance outcomes. These marketing outcomes are clearly congruent with the performance measures used in element 3 of the DBM model. Feedback of marketing outcomes is intended to focus attention on investment decisions aimed at enhancing skills and resources to gain further advantage.

Interestingly, the case Day and Wensley chose to support their model, Foremost-McKesson's turnaround in drug retailing, doesn't exploit any of the superior resources that they contend yield competitive advantage. Their description of McKesson's turnaround describes an *information system* (ECONOMOST) that "...was used to offer unique value-added services to both suppliers and customers (p. 3)." Essentially, this was a DBM system used to facilitate a cost-effective value chain between suppliers and customers.

The above model provides a conceptual representation of an organisation's drive to create superior value for its customers, and in the process achieve sustainable competitive advantage. Market orientation is proposed as an organisational culture that supports and nourishes a continual drive for customer value and superior business performance (Deshpande′ and Webster 1989, Kohli and Jaworski 1990). The next section examines the behavioural characteristics and attributes of market-oriented businesses.

4.3.3 Market Orientation: A Culture for Achieving Competitive Superiority

One of the earliest proponents of the marketing concept was Peter Drucker (1954), who argued that creating a satisfied customer was the only valid definition of business purpose. Unfortunately, organisations lacked the appropriate defining features and attributes of market orientation, so it became "... more an article of faith ... (Day 1994a, p. 37)" than a practical paradigm for business culture. Fortunately, in the 1980s a number of conceptual and empirical studies began to emerge which described the essential characteristics of firms capable of understanding and satisfying their customers' needs. Deng and Dart (1994, p. 729) provide a detailed analysis of the literature, but the four principal features are as follows:

- A set of beliefs aimed at maintaining long-term customer satisfaction (Michaels and Day 1985, Deshpande′ et al. 1993).
- An understanding of current and potential competitors to serve the same markets (Kohli and Jaworski 1990).
- The ability of the organisation to generate, disseminate, and use information for the interfunctional coordination of resources that create superior customer value (Narver and Slater 1990).
- A profit orientation that is supported by responsive accounting and planning information (Kotler 1977).

Day (1994a, p. 49) concludes that two specific capabilities are important if firms wish to achieve and sustain market orientation. One is a *market sensing* capability, based upon an *organisational memory*, which follows a sequence of information processing enabling the organisation to perceive changes in its market. The second is a *customer-linking* capability, which comprises the skills, abilities and processes needed to achieve collaborative customer relationships. It would seem that Day is acknowledging the importance of an effective customer database, which Blattberg and Deighton (1991, p. 6) also described as " ... a memory of the customer relationship." Day (1994a, pp. 48-49) recognises the potential of new information technologies to transform market sensing and customer linking capabilities.

The next section reviews the progress of marketing information systems, and examines notions of IT's capacity to deliver competitive advantage.

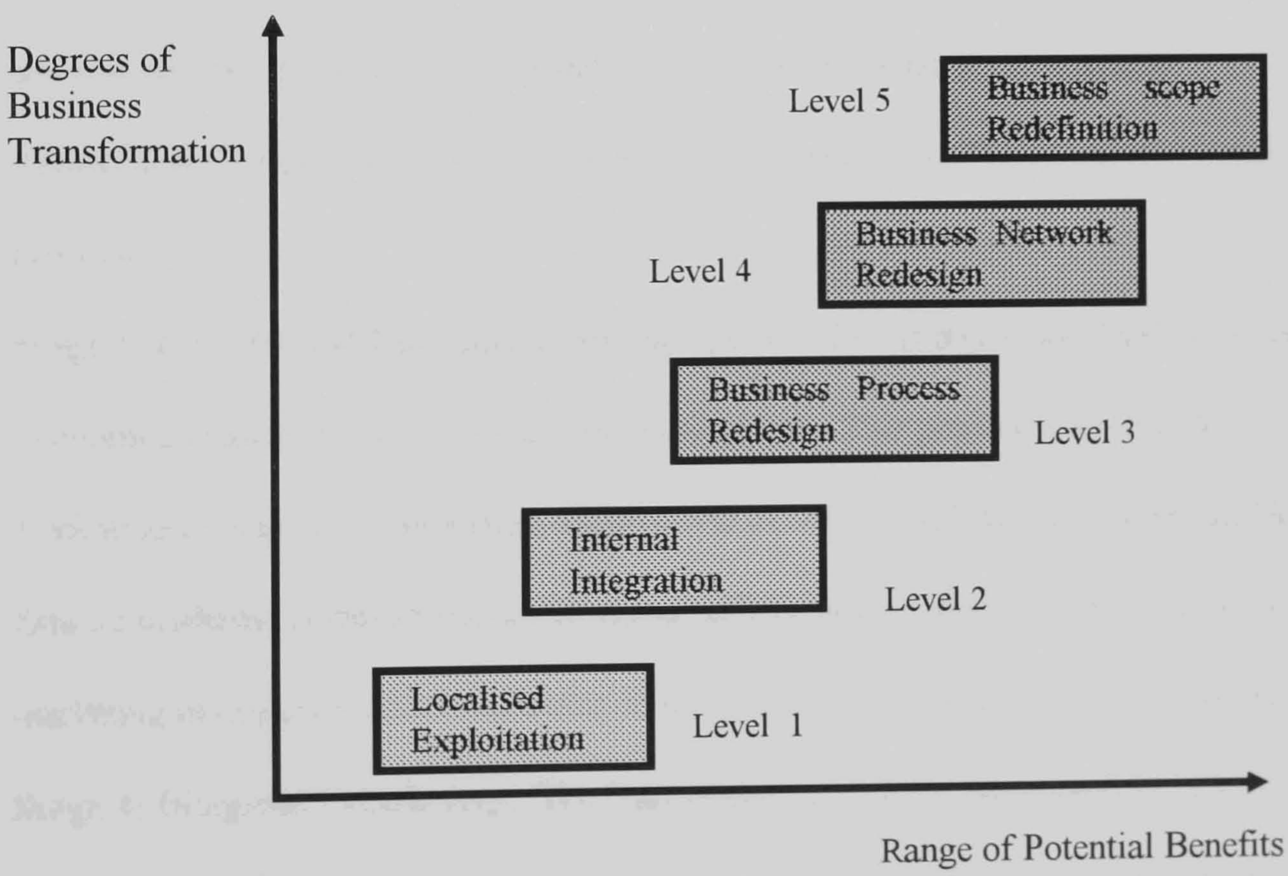
4.4 THE ROLE OF INFORMATION TECHNOLOGY IN ATTAINING COMPETITIVE ADVANTAGE

Few, if any, stones have been left unturned in the search for strategic paradigms that lead to "... the Holy Grail of competitive advantage from information technology" (Galliers 1993, p. 283). The planning and use of information systems to attain competitive advantage has retained a pre-eminent position as one of the critical IS management issues of the past decade. In 1991, the Massachusetts Institute of Technology (MIT) published a major study of the *impact* of information technologies on organisations in the future. This study provides a foundation upon which to examine how DBM information systems are developed to gain competitive.

4.4.1 Transformation Through IT to Gain Competitive Advantage

Section 1.2 described some of the problems of assessing the value which can be derived from marketing information systems. While the potential benefits of IS applications in marketing planning and control have been recognised for decades (Stasch 1969; Gladstone 1971), rapid developments in IT have created an opportunity to continuously develop an organisation's systems. A recent strategic model proposes that organisations' information systems evolve through a variety of stages. As Venkatraman (1991, p. 124) observes: "A major challenge for organisations in the 1990s clearly lies in implementing these stages in a way that supports the degree of organisational transformation required to maintain effectiveness in the turbulent 1990s and beyond."

Venkatraman provides a useful framework for considering how businesses can reconfigure to exploit the strategic opportunities of these new technologies. His framework for business reconfiguration consists of five levels shown in Figure 4.4. As Brown (1994, p. 155) observes, this is an "illuminating way not only of assessing where any individual organization stands in the use of IT but also points the direction in which it might go."



Source: Venkatraman in Scott Morton (1991), p. 127.

Figure 4.4 Venkatraman's Five Levels of IT-Induced Business Reconfiguration

4.4.2 Levels of Transformation in DBM Systems

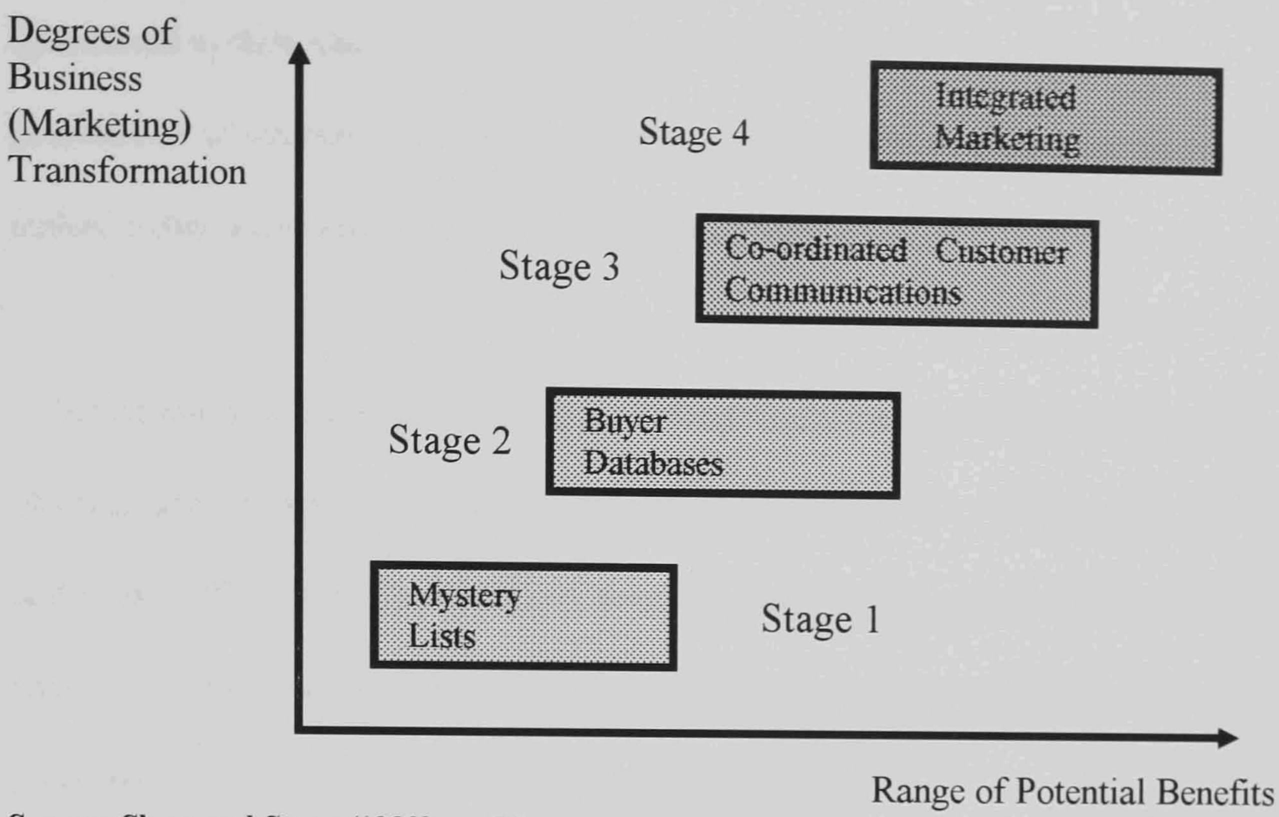
In the case of DBM systems, several research papers (Schultz and Wang 1993; Fletcher et al. 1996) do not refer to specific stages, but varying "levels of sophistication" in DBM. A similar evolutionary process (Appendix 2) was recognised by Shaw and Stone (1988b pp. 52-61), who described four stages of development in DBM systems (Figure 4.5), which have many similarities with Venkatraman's, conceptual model. Briefly, Shaw and Stone describe the four stages of DBM systems development as follows.

Stage 1: Mystery Lists. Data is stored in sales databases, for localized use, in tactical marketing programs. The operation of these databases is function specific e.g. mailing lists which are only useful for communication purposes.

Stage 2: Buyer Databases. In this phase databases are better organised, specific groups of customer may be targeted, and limited modelling of markets can be undertaken. But Shaw and Stone's definition of this phase does not extend to Venkatraman's vision of Level 2 as technical and organisational integration of business processes.

Stage 3: Coordinated Customer Communications. In this phase one database is used to coordinate and drive all customer communications. This phase is very similar to Venkatraman's Level 2. In a large organisation the centralised database stores and links data on products, customer communications, and inventory. Furthermore, it enables marketing managers to share marketing information across organisational boundaries.

Stage 4: Integrated Marketing. The final phase requires the establishment of high levels of internal integration. This requires the development of accurate measurement of marketing programmes so that closed loop control systems can be operated. In common with Venkatraman's Level 3, this phase requires radical changes to business practices.



Source: Shaw and Stone (1988b, p. 54)

Figure 4.5 Stages of Database Marketing Development

Shaw and Stone's developmental model provides a vision of DBM's evolutionary cycle, but it was developed too early to recognise emerging Level 4 and Level 5 applications described by Venkatraman. The early 1990's saw the emergence of Level 4 DBM applications which describe the electronic integration and sharing of information among multiple participant organisations forming business networks. An example of this type of advanced DBM system was General Motors' sharing of automotive ownership data with Household Finance's credit card files. The result was one of the earliest, and most successful , examples of customer relationship building using affinity credit card marketing programmes.

There are very few examples of Level 5 (business scope redefinition) DBM systems. However, it is becoming increasingly apparent that highly sophisticated DBM systems are a major factor promoting business scope enlargement and shift. A specific example cited by Venkatraman, and described in section 2.5.3 is SABRE, which evolved from an operational system into a strategic marketing tool and profit centre. The new possibilities of electronic communications that couple DBM systems with the Internet makes global direct marketing a technical and economic reality.

Senior managers clearly recognise the critical importance of information systems planning and strategy formulation. But research (Galliers 1991, Wilson 1989, Lederer and Sethi 1992) has highlighted many issues which give cause for concern, and as shown in section 2.6, developers of DBM systems are familiar with the following problems associated with the development of strategic IS:

- the time taken and consequently perceived high cost of IS strategy studies;
- over-optimistic planning, which does not produce all the benefits originally claimed;
- difficulties associated with translating business strategy into an effective IT strategy;
- conflicts among stakeholders about what the IS system is intended to achieve;
- coping with the rate of change in both information technology and business environment;
- the lack of credibility, in a business sense, of IT personnel.

These points reflect the risks and disappointments of strategic IT projects in general. Conversely, some firms have achieved competitive advantage through innovative use of IT, but Galliers (1988) argues that, perhaps, these were serendipitous results, rather than outcomes of overt strategic planning.

Likewise, marketing researchers continually bemoan the same problems as impediments to the development of information systems for the marketing function: the lack of sophistication in MkIS (Jobber 1977, Fletcher 1983, Schultz and Wang 1993), behavioural and organisational constraints (Piercy 1985, Jobber and Watts 1987), and the problems of investment justification (Shaw 1993, Swartz and Moriarty 1993, Fletcher et al. 1994). Predominantly, these problems stem from the ambiguous nature of marketing decisions, making it difficult to specify IT configurations that deliver increased profitability from better marketing decisions. Apparently, determining appropriate levels of MkIS sophistication to increase marketing effectiveness still, after thirty years, requires "... a good deal of faith ...(Cox and Good 1967, p. 154)" when deciding upon appropriate levels of resource investment.

The results and outputs of information systems are inevitably interpreted and absorbed into the mental models of marketing and general managers. Managers use these mental models to impose order on complex and ambiguous competitive environments (Day and Nedungadi 1994). Marketing decision makers form the human component of the DBM model, and the next section examines the role of these individuals in determining the deployment and development of DBM systems.

4.5 THE ROLE OF THE MARKETING MANAGER IN ACHIEVING COMPETITIVE ADVANTAGE

Thomas (1986) provided a useful list of 16 skills inherent in the role of a *professional* marketing manager. If these skills are appropriate, and intuitively they seem reasonable, then the skilled marketing manager should be expected to combine 16 factors into any marketing decision - a very complex mental model by any standards. In this quote, Piercy (1979) clearly expressed the role of human and organisational factors in shaping marketing decisions:

> "…no matter how sophisticated are our research methods and data retrieval techniques, we must recognise that the MkIS exists in an organisational context and is constrained by the characteristics of the organisation and the individuals involved in collecting, processing, disseminating and using data. Indeed, the very way in which the MkIS is established and developed reflects the implicit assumptions made about the working of the organisation and the motivational forces acting on involved individuals." (p. 261)

Piercy's prophetic statement recognised the existence of "learning organisations," (see section 4.6) which are currently a major research focus of sustained competitive advantage in marketing. Pfeffer (1994) argues that traditional sources of competitive advantage (i.e. economies of scale, market share) are being undermined by shortened product life cycles, new information technologies and market fragmentation; consequently, these turbulent changes require a market-oriented culture to promote learning throughout the organisation.

The previous section assumes that the increased power and effectiveness of new information technology creates competitive opportunities and threats which will change the present frameworks of businesses. Competitive advantage sometimes derives from learning about changes in the environment that result in a strategic vision of future opportunities for the organisation. The term "vision" is constantly associated with the strategy-making process when discussing how competitive advantage is achieved in marketing, DBM and IT (Venkatraman 1991, p. 122; Shaw and Stone 1988b, p. 42; Slater and Narver 1994, p. 71). But what does "vision" mean in strategic terms?

4.5.1 <u>Vision: The Human Component of Competitive Advantage</u>

Vision emanates from an individual and defines the future state of an organisation (Rowe et al. 1989, pp 57 - 58). This concept opposes the view of strategy as the preserve of the Board or corporate planning groups. Recent papers (Bowman and Johnson 1992, Hart 1992) have focused on managers' actions in the strategy-making process. An acceptance of this approach recognises that certain individuals occupy powerful roles in organisations, because their decisions can impact the survival of the business. This research argues that the marketing manager is the individual primarily concerned with the use and application of information from DBM systems in organisations that have adopted direct marketing strategies.

Marketing managers are the individuals responsible for defining data capture, applying modelling techniques, and interpreting feedback from performance measures. In organisations that utilise DBM, these individuals determine the communications between their organisation and its market environment (i.e. they operate across external organisation boundaries). The individuals that control and interpret the flow of information across an organisation's internal-external boundaries are said to occupy "boundary roles" (Miles 1980), and in many cases these roles are believed to have significant impacts on performance and profitability (Lysonski, 1985). Coping with high levels of environmental uncertainty is believed to generate role stress in the individuals who occupy these boundary role positions (Kahn et al. 1964, Singh 1993). The responsibility for interpreting and disseminating marketing information throughout the organisation places the marketing manager in a powerful role (Jemison 1981). It is conceivable that these stresses motivate some marketing managers to develop, and adapt, their DBM systems to provide improved marketing information.

The presence of stress does not create a vision. This raises questions about the mental processes used to structure a vision of these "wicked" (Mason and Mitroff 1981) and unstructured problems. Strategic problem solving process theory (Lyles and Thomas 1988 p. 133) suggests that problem complexity results in individuals interpreting cues, and developing assumptions, according to their individual differences. The study of individual (personal) differences in marketing roles gives this approach further credence. A study of retail store managers (Lusch and Serpkenci 1990) examined personal differences - achievement orientation, self-esteem, inner-direction, other-direction - as critical variables, in conjunction with role stress, for achieving higher performance in retailing. Equally, it is be argued that these personal differences in marketing managers motivate the development of DBM systems.

In the 1990s, marketing theorists (Cravens and Shipp 1991, Webster 1994, Day 1994a) agreed that firms should predominantly develop customer-focused, market-driven strategies for competitive advantage. For instance, Cravens and Shipp (1991, p. 54) claim that executive vision "... must identify rapidly changing customer needs and wants, determine the impact of these changes on customer satisfaction, increase the rate of product/service innovation ..." in order to maintain competitive advantage. Research suggests that such strategic marketing vision is often sustained within organisations having a market-oriented culture (Slater and Narver 1995).

Day (1994b) observes that a manager's vision can be susceptible to marketing myopia unless that individual is prepared to learn through continuously seeking new market information. As observed above, the marketing manager controls the flow of important information across the organisation's internal-external boundaries, and this information is seen as critical in the organisation's learning process. Learning about market behaviour requires an adjustment of a manager's mental models, and a sharing of this new understanding with others in the management team. Some writers believe that sophisticated DBM systems offer a key marketing tool for organisational learning (Detienne and Thompson 1996), as will be examined in the next section.

4.6 LEARNING ORGANISATIONS

Organisational learning theory was developed by Cyert and March (1963), but it was not until the 1990s that it gained prominent interest as a theoretical framework for gaining competitive advantage after Senge's (1990) publication of the *Fifth Discipline: The Art and Practice of the Learning Organisation*. In the 1990s, Senge's text resulted in a flood of literature on learning organisation theory (Lee et al. 1992, Mohrman and Mohrman 1993, Day 1994b, Slater and Narver 1995, Cunnington 1996), some of which combine and enhance concepts already discussed in this thesis. Basically, this theory views organisations as cognitive entities that learn and interact with their environment. A typical definition, Lee et al. (1992), describes organisational learning as an interactive process:

> "... individual actions lead to organisational interactions with the environment, the environment responds and environmental responses are interpreted by individuals who learn by updating their beliefs about cause-effect (i.e. action-response) relationships." (p. 23)

The view of organisational learning as defined above is congruent with the process of DBM described in chapter 3. For example, Day's (1994b, p. 11) model is founded on an accessible memory as a basis for action that is systematically measured to provide feedback which further augments the accessible memory. Before fully accepting congruence between these paradigms, the reader should be aware of some important features of organisational learning(Cunnington 1996). First, organisational learning is not confined to individuals or groups: it should be an organisation-wide process of reflection and action. Second, there should be formal systems developed to implement the processes. A third, and more difficult, consideration is the ability to transform the organisation into new ways of doing business.

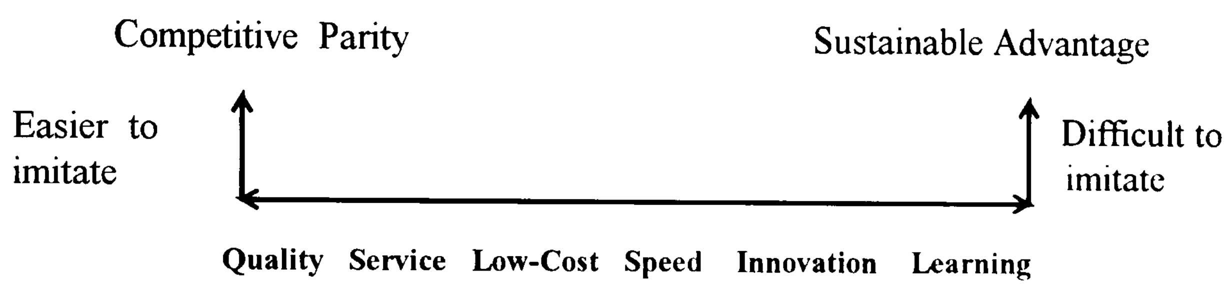
For customer-focused organisations, some prominent theorists (Day 1994b, Slater and Narver 1995) posit that such sharing of information and action are best accomplished by firms with market-oriented cultures. A market-oriented culture promotes the sharing of mental models and decision rules for interpreting market information. Individuals working within this culture actively promote a continuous learning process that pervades all decisions (Day 1994b). But all of this is dependent upon preserving an effective organisational memory as a source of information for decisions.

DeTienne and Thompson (1996) recommend DBM as a fundamental step in operationalising the learning organisation:

> "The customer database is an opportunity for organizations to mechanize the process of learning about customers. In today's enormous and complex marketplace, the retention of key information about all of a company's customers in any other way is inconceivable." (p. 16)

The iterative nature of DBM tends to promote and enhance organisational learning, and when combined with effective market modelling and performance measurement elements the DBM system can become an ever-increasing source of organisational knowledge. Glazer (1991) presented similar MKIS cases where organisations went beyond the IT infrastructure to use information to gain competitive advantage.

Slater (1996) offered guidelines for evaluating how organisations in different market environments utilise capabilities such as quality, service, speed and market-oriented learning to achieve competitive superiority (Figure 4.6). In his view, a learning culture "... supports the ability to anticipate and proactively confront dynamic market conditions (p. 86)." If, as Slater suggests, learning cultures are difficult to imitate, then sophisticated DBM systems could play a significant role in sustaining competitive advantage.



Source: Slater (1996), p. 86.

Figure 4.6 Capabilities and Competitive Advantage

4.7 DELL COMPUTER: A CASE OF COMPETITIVE ADVANTAGE.

Dell Computer, a direct marketer of PC's, was chosen because its success in the highly competitive PC marketplace has been well documented (Biesada 1992, Pitta 1992, Neal 1993, Serwer 1997). Dell Computer has attained its competitive advantage by focusing company resources on the business market segment. Neal's (1993) interview with Dell's President, Joel Kocher, clearly indicated that the company's strategy was highly dependent on the use of sophisticated DBM to identify market segments and formulate direct marketing communications.

Dell Computer's success story in the highly competitive PC systems market is remarkable, especially as Wensley (1994, p. 37) cites a notable list of companies that have failed to develop competitive advantage in "exciting markets." Dell has clearly adopted a customer-focused approach to developing market strategies that deliver competitive advantage, an approach which finds substantial support in the marketing literature (Shapiro 1988, Kohli and Jaworski 1990, Kotler 1994). Interestingly, some authors (Wensley and Day 1993) have raised concerns about whether competitive advantage can be sustained in market environments where the ambiguities of future customer behaviour and competitor innovations are difficult to predict. Dell's ability to "learn" about markets has delivered continual growth against much larger competitors (e.g. IBM, DEC, etc.).

4.7.1 Background to Dell Computer

Michael Dell started his PC retailing business from a dormitory room at the University of Texas in 1984. The company uses direct response print advertising in newspapers and computer magazines to build brand awareness, generate leads, and obtain orders directly. Customers orders are received directly, and each system is configured (hardware and software) to their personal specification; as a result, finished-goods inventories are virtually eliminated, allowing Dell to incorporate new technological innovations into their products faster than competitors. Dell focuses on business markets with only 10% of sales being derived from consumer markets.

4.7.2 Dell's Acquisition and Use of Customer Information

An interview (Neal 1993) with Dell's President, Joel Kocher, revealed the following insights into the company's marketing and information systems strategies.

- In 1993 sales representatives were supported with a customer database of 1 million records. This database is augmented with surveys, focus groups, and diskette-based questionnaires - a data-rich memory of the customer relationship.

- Kocher describes end-user segmentation as the "holy grail" of the company's marketing efforts. Dell's database enables the company identify and market to customer groups, refine the focus of its marketing efforts, measure advertising effectiveness, and detect trends in product needs faster than competitors.
- Customer communications are highly segmented, as is illustrated by the number of creative projects (i.e. over 1000), resulting in 20 million pieces of mail.
- Kocher believes that Dell's culture has evolved from a technology-based company into a market-oriented, customer-driven organisation.

4.7.3 Dell's Financial Results

Table 4.1 shows Dell's remarkable results in the highly competitive and constantly changing PC business. The financial results below indicate the company's growth and profitability from implementing strategies based upon a sophisticated DBM system.

Year	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Sales Revenue ($ millions)	889.9	2,013.9	2,873.2	3,475.3	5,296.0	7,759
Net Profit ($ millions)	50.9	101.6	(35.8)	149.2	272.0	531.0
% Earned on Total Capital Employed	16.3%	25.3%	NMF [1]	20.3%	25.7%	48.5%

Source: Value Line Survey, July 1997.

[1] Reflects losses incurred when Dell strayed from direct marketing, and attempted to use retail sales channels.

Table 4.1 Main Financial Statistics for Dell Computer 1991-96

This is just one of a number of prominent cases that illustrate how DBM can be deployed to gain competitive advantage (see Section 1.2). For instance, Tesco's introduction of a customer loyalty card programme in 1995, which, within a year, enabled them to overtake their main rival Sainsbury's in market share (Fletcher 1996), further demonstrates the competitive advantages to be derived from investments in sophisticated DBM systems.

4.8 CONCLUSIONS

Several leading theorists, including Porter (1996), now appear to believe that competitive advantage can best be derived from strategies which are formulated from the notions of market segmentation. Devising strategy around these approaches allows firms to focus their limited resources and capabilities on meeting the special needs of specific customer groups. As observed in chapter 2, the information systems to support highly segmented strategies are now widely available. After examining a number of theories, there is substantial evidence to suggest that sophisticated DBM systems play an important role in enabling organisations to overcome the problems of *translating* strategic plans into meaningful competitive advantage in their marketplaces.

Combining Grant's (1991) resource-based theory with Day's (1994a) ideas on the importance of organisational memory reveals that a large, data-rich database is a key resource. Possession and maintenance of such a database creates a significant barrier to market entry for competitors, because such a resource is not easy to replicate or imitate.

Clearly defining the nature, role and development of strategic information systems in any application is difficult and risky, but MkIS is perceived as especially hazardous. Many theorists believe organisational culture is an important variable in the potential success of information systems. Specifically, adopting a market-oriented culture is linked with competitive advantage and higher performance. Creating such a customer-oriented organisation is more difficult to achieve and understand than adopting a low cost strategy, particularly in a small company (Pelham and Wilson 1996). A market orientation results in an organisation which shares values and information about how to best meet customer needs. Hence, market-oriented organisations are more likely to invest in, and develop, sophisticated DBM systems to support customer-focused marketing strategies.

Examining models of IS and DBM development indicates that DBM systems may evolve through a series of phases, each bringing new benefits and requiring greater organisational transformation. Upward mobility through these phases may be viewed as movement from tactical to strategic deployment of DBM. In most cases piecemeal addition of DBM features and capabilities forms an incremental process of systems development. This process gradually increases the level of sophistication of DBM activities. Increasingly, marketing managers have devised creative DBM applications that can deliver strategic market benefits. However, the "unstructured" nature of marketing decisions stipulates that human intervention will inevitably be used to shape information inquiries, interpret results, and determine which courses of action should be implemented.

Marketing managers use DBM systems to manage an interactive flow of information between their organisations and customers. Hence, such marketing managers occupy powerful boundary roles, which, to be effective, require DBM systems that give a clear view of the marketplace i.e. minimising the informational refraction of data analyses and personal mental models. This information enables managers with a vision of DBM's capabilities to discern new market segments or niches that present market opportunities. Organisational learning about the appropriateness of alternative actions may be facilitated by formulating direct marketing test programmes that provide feedback on the trends and changes in customers buying behaviours. Many theorists now believe that such learning and market knowledge makes an organisation resilient to competitive actions, and hence, more able to *sustain* their competitive advantage.

DeTienne and Thompson (1996) provided the most profound conclusion on the role of DBM in organisational learning theory with this statement:

> "The use of organizational learning theory as a framework for the study of DBM also has the potential to enhance the theory itself. Most of the extant work on organization learning theory deals with information in a much more nebulous sense than do databases. Much of the work focuses on the promulgation of ideas throughout an organization through informal channels, rather than on the retention of specific pieces of information in a formalized manner such as data storage. DBM may be problematic for some theorists in that involves the retention of concrete, rather than general, information, but it also provides an opportunity to increase the observability and measurability of organizational learning phenomena. DBM promises a clear link between organizational theory and marketing practice." (p. 17)

The virtuous spiral of IS costs has made it possible for most organisations to implement powerful DBM systems. However, it is equally clear that possession of a DBM system in and of itself is not sufficient to ensure sustained competitive advantage. The development and exploitation of sophisticated DBM capabilities may be influenced by a mix of organisational culture and resources, marketing approaches, personal characteristics, and understanding of information technology. The next chapter creates hypotheses to examine these relationships.

CHAPTER 5

FACTORS AFFECTING THE DEVELOPMENT OF SOPHISTICATED DATABASE MARKETING SYSTEMS

5.1 INTRODUCTION

The purpose of this chapter is to present the theoretical foundations for research into the factors that promote or inhibit the development of sophisticated DBM systems. Several surveys (Cameron and Targett 1992; Schultz and Wang 1993) noted that some organisations were developing sophisticated DBM systems to achieve competitive advantage, while others, in similar marketplaces, seemed unable, or unwilling, to exploit the potential benefits of these powerful systems. An extensive literature search revealed little, if any, empirical research into factors promoting the development of sophisticated DBM systems. Greater understanding of these factors could assist investment decisions and enhance DBM productivity in the future.

The first section of this chapter discusses the philosophy of scientific inquiry adopted for this study. A precursory requirement for this research was the development of a reliable and valid construct to measure the sophistication level of DBM systems, as at the time this research was undertaken no such published construct existed. Therefore, the next section examines the feasibility of developing such a construct as a necessary precursor to hypothesis development. The following section describes the development of a conceptual framework for the examination of DBM systems. The remaining sections examine four factors through the application of Popper's (1972) critical rationalism approach to developing hypotheses as conjectures to guide construct development and research methods.

5.2 RESEARCH PHILOSOPHY

The phenomenon of sophisticated DBM systems has emerged primarily over the last decade, following the developments in database technology of the 1970's. Hence, most papers reflect the *observations* of practitioners and researchers, so tenable hypotheses were developed using Chalmers' (1992) theory of "naive inductivism." In the social sciences inductivists argue that universal statements may be derived from empirical research when:

(i) the number of observations is large;

(ii) the observations are repeated under a variety of different conditions;

(iii) no observation statement conflicts with the derived universal law.

Chalmers criticises the observation statements of inductivists as vague, imprecise and distorted by the preconceptions of the observer. Following Popper's (1969) falsification theory affords the inductive approach some measure of protection. By proposing *falsifiable* hypotheses researchers create the possibility of obtaining observations, or sets of observations, that are inconsistent with the hypothesis statement. Hence, all of the hypotheses related to DBM systems could be rejected. Falsifying hypotheses still contributes to scientific progress, if an adequate explanation can be derived from the literature.

DBM is a relatively new phenomenon; consequently, theory development is still in what Kuhn (1970) describes as "pre-science." This phase of scientific progress is characterised by diverse and less structured activity, which, in the long term, will form the normal science phase of DBM. Because of these limitations, judgments as to the scientific nature of this research may follow Kuhn's *relativist* philosophy. Relativism denies the acceptance of universal, historical standards of judging theory rationality; instead, it requires the assent of an appropriate academic (i.e. marketing) community. Accepting a relativist philosophy does not remove the obligation to use the best methods available, and the overall research philosophy may best be guided by Churchill's (1979) concluding statement on scientific method in marketing:

> "Progress in the development of marketing as a science certainly will depend on the measures marketers develop to estimate the variables of interest to them." (p. 73)

5.3 LEVELS OF SOPHISTICATION IN DATABASE MARKETING SYSTEMS

Cox and Good (1967) repeatedly use the term "sophisticated" when referring to three types of marketing information systems - those designed to facilitate market research, planning, and control. Their paper recognised that organisational, managerial and economic factors have a role in determining the level of sophistication to which MkIS systems can be developed. Their contemporary researcher, Amstutz (1969), used five dimensions - management access time, information recency, information aggregation, analytic sophistication, and system authority - as a framework to evaluate the similarities and differences among alternative MkIS systems development. Historical studies of MkIS further reinforce Venkatramen's (1991) theory of IT-enabled business reconfiguration as an evolutionary process consisting of five stages (see section 4.4.1). These studies, and many others, reveal widely differing levels of sophistication, and as a result Amstutz (1969) concluded:

> "Analyses of responses reveal dramatic differences between the theoretical capabilities of management systems described in the literature and those actually used or planned by operating companies." (p. 496)

These observations of MkIS could be equally applicable to DBM systems. Chapter 2 described the evolution of DBM from its traditional use by direct marketers (i.e. catalogue companies) to manage mailing lists to the competitive benefits of sophisticated systems used in a wide variety of marketing applications at the present time. One study, Schultz and Wang's (1993) descriptive review of DBM capabilities within direct marketing organisations, revealed

> "... a meaningful variance among these 108 traditional direct marketing organizations in their usage and planning of customer database applications." (p. 127)

They concluded that these variations were due to learning curve and company differences; however, these findings were not apparently substantiated by any data, or analysis, published in the study. These observations give credence to Shaw and Stone's (1988b, p. 54) contention that DBM systems evolve in an incremental manner.

Researchers' observations of differences in the sophistication levels of DBM systems raised questions about whether these variations among DBM systems could be reliably measured. Fletcher et al. (1996) claimed to have measured the "sophistication of DBM use" using one *subjective* and three *objective* factors, which were self-defined criteria, and, unfortunately, not explained or defined in their paper. Their "measurements" were subjected to only a single cursory correlation test, from which they concluded that "... the subjective measure of the sophistication of DBM use was valid (p. 14)." Evidently, there is a need for a properly defined construct to measure the level of sophistication in

DBM systems. These observations inspired a proposition to be validated for successful completion of this research

Proposition:

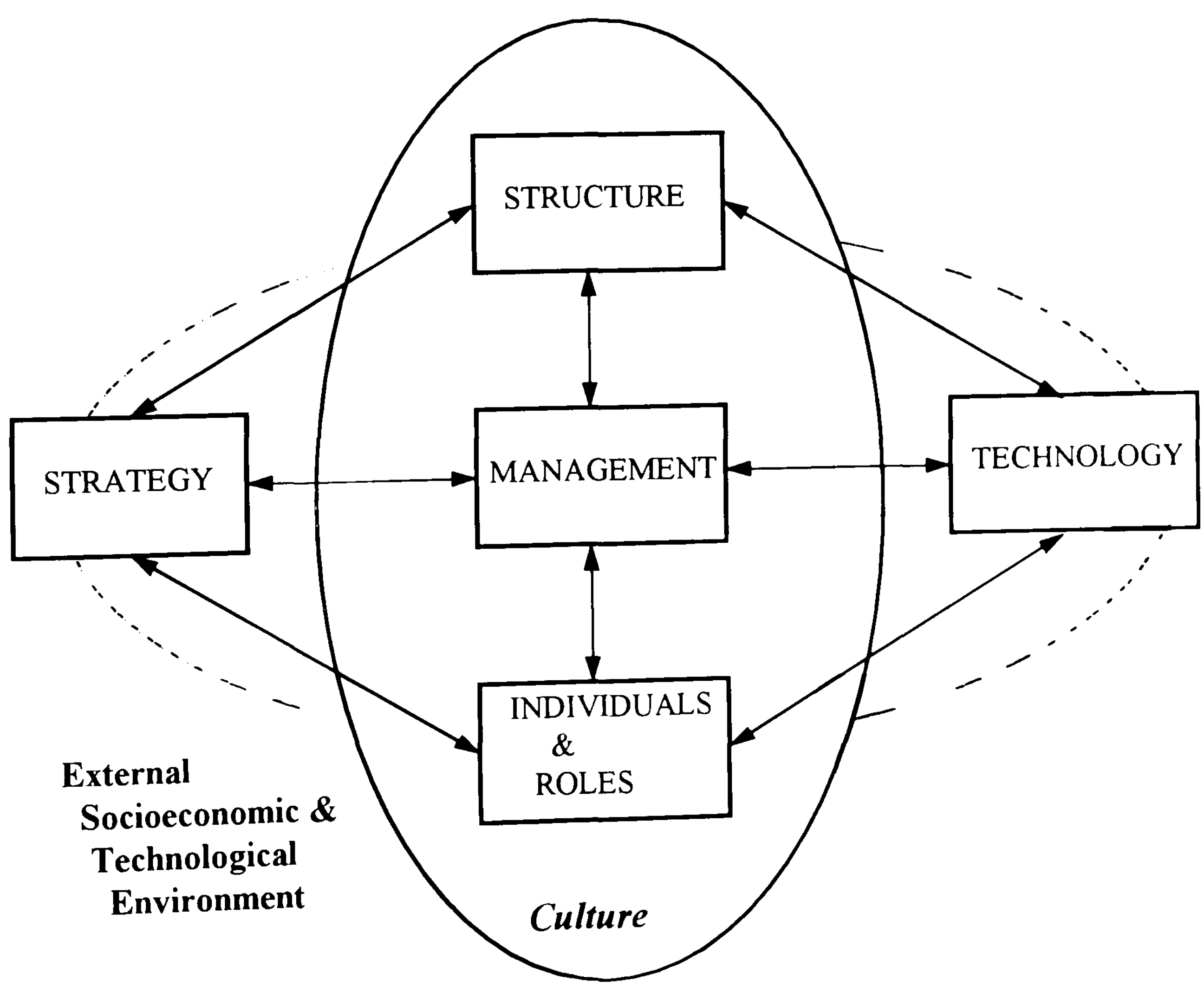
A reliable and valid construct to measure the level of sophistication in DBM systems can be derived from empirical data.

If the above proposition can be substantiated, then the association between the level of sophistication in DBM systems and other variables may be measured. Greater insight into factors that promote or inhibit the evolution of DBM systems should enable managers to focus scarce resources on innovations that deliver value through increased marketing productivity. These insights should be beneficial to both practitioners wishing to implement DBM strategies, and future DBM researchers. A framework for this investigation is developed below.

5.4 FACTORS AFFECTING THE SOPHISTICATION OF DBM SYSTEMS

The purpose of this section is to present a theoretical framework for the choice of factors that were hypothesised as influencing the development of sophisticated DBM systems. The inter-disciplinary nature of these systems required the adoption of models from both marketing and information systems perspectives. In the previous chapter it was observed that sophisticated DBM systems have the potential to deliver competitive advantage in a variety of marketing environments. Interestingly, the term "competitive advantage" is used interchangeably in the literature with "distinctive competence" to mean relative superiority in skills and resources (Day and Wensley 1988, p. 2). Conceptually, and for the purposes of this research, sophisticated DBM may be viewed as a distinctive competence that endows an organisation with superior capabilities to attain competitive advantage, which if properly applied, can lead to higher profitability and sustained business growth.

The purpose of strategic research is to explain how superior skills and resources are converted into positional advantages. This kind of organisational transformation has been described in many ways, but two theories - one related to IS transformation, and one related to marketing information systems transformation - were particularly appropriate for this research. First, Scott Morton (1991, p. 20) presented a framework comprised of five sets of forces (represented by the boxes) purported to be in dynamic equilibrium as an organisation moves through time to achieve its objectives (Figure 5.1).



Source: Scott Morton (1991), p. 20

Figure 5.1 The MIT 90s Framework: Five Forces in Equilibrium

Second, in a closely related study, Kench and Evans (1991) used five cases to examine the use of IT to support different levels of sophistication in the marketing information function. Their analysis of MkIS also used a three component model, developed by Piercy and Evans (1983), to assess differences in the levels of sophistication. Kench and Evans recognised that these differences in MkIS could be related to a number of factors:

> "... the *size* of enterprise, the resources available and used, the *personalities* and dominant *culture* of the company, the *markets* that the company operates in, the sophistication of the company and the formulation of the marketing objectives for the company." (p. 16)

A common theme from Scott Morton's model and Kench and Evans' research is the search for forces, or factors, that significantly affect the development of strategic information systems. Ultimately, such searches are founded on the belief that these factors facilitate the organisational transformations necessary to gain competitive advantage. Applying this reasoning to the study of DBM raises the following fundamental research question.

Research Question:

What factors promote the development of sophisticated DBM systems to achieve competitive advantage?

In order to isolate such factors it was necessary to synthesise ideas from several sources: the notions of competitive advantage and DBM examined in chapter 4; interviews with DBM managers; the common themes of the MIT 90s model; and the observations from Kench and Evans' MkIS research. This synthesis identified four factors that were hypothesised as promoting the development of sophisticated DBM systems:

1. **Market orientation** as the specific ***culture*** of an organisation promoting the collection and dissemination of information on customer needs and preferences.
2. **Size of the database** (i.e. number of customers) representing a key ***organisational resource*** exploited for research and segmentation opportunities.
3. **Locus of control** as a ***personal difference*** of ***individuals***, in the ***role*** of marketing managers, using and developing DBM systems to attain competitive advantage.
4. **Type of market** (i.e. consumer versus industrial markets) as a factor in the ***external environment*** representing differences in customer profiles and competitive environment.

This is not an exhaustive list of factors; instead, it is one that can be justified by inductive reasoning (Chalmers 1992) from the existing literature. The next four sections provide a detailed review and analysis of each factor for the purpose of hypothesis development.

5.5 MARKET ORIENTATION: THE IMPACT OF ORGANISATIONAL CULTURE ON DBM SYSTEMS

In the previous chapter (Section 4.3), the importance was recognised of market orientation as a business culture cultivating a customer-centred focus to organisational behaviour. Leading marketing academics (e.g. Levitt 1960; Webster 1988; Kotler 1994) consistently perceive market orientation as, "... the business culture that most effectively and efficiently creates superior value for customers (Narver and Slater 1990, p.20)." A market-oriented culture creates a nurturing environment for building distinctive capabilities or competencies in using their assets to continually create superior customer value, which is believed to produce competitive advantage (Day 1994a).

Surprisingly, researchers only began to specify and empirically measure the construct of market orientation in the early 1990s. Kotler (1988) proposed three core themes as representing the concept of market orientation: customer focus, coordinated marketing, and profitability. These themes were merged with a variety of theories to develop three constructs to define and measure market orientation. First, Narver and Slater (1990) synthesised literature from the fields of sustainable competitive advantage and market orientation to postulate three behavioural components - customer orientation, competitor orientation and interfunctional co-ordination - combined with long-term focus and the profit objective as two criteria, as a scale for measuring market orientation. Second, Kohli et al. (1993) developed MARKOR, a construct to measure intelligence generation, intelligence dissemination and responsiveness as factors representing a customer-centred organisational focus. Finally, Deng and Dart's (1994) paper analyzed eleven authors' notions of this construct, and they gave following the definition of market orientation:

> "The generation of appropriate market intelligence pertaining to current and future customer needs, and the relative abilities of competitive entities to satisfy these needs; the integration and dissemination of such intelligence across departments; and the coordinated design and execution of the organization's strategic response to market opportunities." (p. 727)

Day (1994a) argues that market-oriented organisations promote superior market sensing and customer linking capabilities (section 4.3.3), which, when embedded in organisational processes, result in more appropriate responses to changing market conditions. Day adopts the emerging capabilities approach to defensible competitive positions - a business is an integrated collection of assets and capabilities that must be adapted to changing markets. The capabilities are routines and practices - "the glue (p. 38)" - that allow assets to be deployed for competitive superiority.

Many of Day's concepts of capabilities reflect the elements of sophisticated DBM presented in chapter 3. He explicitly refers to accessible "data banks" and "scenarios" used to articulate marketing strategy (p. 44), which can be monitored through key performance indicators (p. 49). Furthermore, Fletcher's (1994) paper discussing the problems of DBM's strategic implementation also observed the importance of market orientation,

> "... if the marketing concept is not well established in a company's management philosophy and operating methods, then the adoption and successful use of DBM is unlikely." (p. 134)

Hence, the above notions support the first hypothesis linking the development of sophisticated DBM capabilities with market-oriented business cultures.

H1 - Market orientation will be positively associated with the development of sophisticated DBM systems.

As discussed in sections 4.2.3 and 5.3, the purpose of strategic research is to determine the specific capabilities, skills or resources that deliver competitive advantage. The next section views the possession of a large database as a specific resource that limits or enhances research and segmentation opportunities.

5.6 THE IMPACT OF DATABASE SIZE ON DBM SYSTEMS

One of the main purposes of sophisticated DBM systems is the acquisition, retention and reactivation of customers and prospects i.e. maximising the number of active customers in the database. No specific studies are available linking database size (i.e. number of customers) to the sophistication of DBM systems, but Kench and Evans (1991) study of MkIS found that larger companies tended to possess more sophisticated systems. At first glance, it might appear obvious that the possession of a large customer database reflects the sophisticated use of DBM as a superior resource to satisfy customer needs. Conversely, it is conceivable that some companies, following Porter's conjectures (section 4.2.1), have developed sophisticated DBM systems to exploit focused or differentiated strategies to exploit profitable opportunities in niche markets i.e. sophisticated DBM with only a small number of customers. Indeed, a review of Boston Consulting Group and PIMS' studies (e.g. Buzzell et al. 1975, Buzzell and Gale 1987) reveals the importance of relative market share in segments; hence, some companies may derive advantage from having a larger database of customers than their competitors in a specific market segment.

Porter and Millar (1985) clearly believed that companies with larger databases could attain competitive advantage from the economies of scale:

> "Where the information technology used in a company's value chain is sensitive to scale, a company may improve its overall competitive advantage by increasing the scale of information processing and lowering costs." (p. 158)

A review of the theory offers three plausible reasons to explain the potential advantages of a large database of customers. First, Porter (1985) contends that the economies of scale promote rapid movement along the experience curve, thus increasing cumulative learning, while further decreasing costs. Second, a large database is often an indication of prominent market share, which is seen as one of the principal drivers of capital investment (Jacobsen and Aaker 1985). Therefore, companies are able to allocate greater financial and human resources to DBM systems development, which can then be allocated over a larger number of customers. Finally, these experience and resource benefits often result in superior quality products that consumers readily associate with a specific brand (de Chernatony 1996); as a result, companies with large databases and strong brand image have the opportunity to further segment their markets[1], particularly when combined with a data-rich information environment. Recent changes in consumer behaviour and technology have created new opportunities for companies with large databases to fragment their markets, and Mueller-Heumann (1992) explicitly acknowledges the desirability of this course of action:

> "A combination of further rapid progress in information technology together with a radical increase in the flexibility of production technology and a dramatic fragmentation of consumer demand will enable and force marketers to get closer to their consumers without the product and communications policies previously dictated by the economies of scale." (p. 303)

Database size should be an important variable in organisations dependent upon direct marketing for their existence. In many cases, the number of active customers is a surrogate variable that reflects an organisation's market dominance, IS resources, sales revenue, and business longevity. Both Kobak (1993) and Coates et al. (1994) cite database size as the major decision variable when determining data enhancement and modelling to improve marketing productivity. Fletcher (1994) cites examples (e.g. Automobile Association) of "sophisticated" database marketers. Nearly all are large organisations, which from general knowledge can be assumed to have databases exceeding a million customers. Hence, the second hypothesis related the level of sophistication in DBM systems to database size.

H_2 - Database size is positively associated with the development of sophisticated DBM systems.

1 For instance, L. L. Bean, a prominent US cataloguer, with a database of 5,000,000+ customers, produces many niche catalogues.

The DBM model, combined with the discussions in sections 4.5 and 5.3, recognises the role of the DBM manager in developing sophisticated DBM systems. In the next section several personal characteristics are examined as potential behavioural traits motivating the continual development of DBM systems.

5.7 THE IMPACT OF MARKETING MANAGERS' PERSONAL CHARACTERISTICS ON DBM SYSTEMS.

The major benefits of DBM systems indicate that these complex configurations may produce competitive advantage through reduced ambiguity in the information environment, greater control (prediction), and the use of heuristic problem solving to achieve improved results. Piercy (1979) clearly recognised the role of individuals in the development of MkIS with this statement:

> "However, the central point made here is that no matter how sophisticated are our research methods and data retrieval techniques, we must recognise that the MkIS exists in an organisation context and is constrained by the characteristics of the organisation and the *individuals* involved in collecting, processing, disseminating and using data." (p. 261)

This conceptual view cites marketing managers' personal characteristics as a factor in the information processing cycle. The impact of personal characteristics on the effective performance of marketing roles has been studied on numerous occasions (e.g. Behrman and Perreault 1984, Churchill et al. 1985, Lusch and Serpkenci 1990), but not all of these characteristics are appropriate to the marketing manager's role. Three characteristics appear to be particularly important as they are often studied in management and marketing roles: intolerance of ambiguity, need for achievement, and locus of control.

The following discussions assume these personal differences are the antecedents of role stress in DBM managers, motivating problem solving and coping behaviour (i.e. a desire to continually develop the capabilities of their DBM system). A number of research studies in role theory (Kahn et al.1964, Rizzo et al. 1970, Miles, 1976) support this assumption. The following sections review each variable and select one as the most appropriate variable for this research.

5.7.1 <u>Tolerance-Intolerance of Ambiguity</u>

Intolerance of ambiguity (Budner, 1962) causes individuals to perceive ambiguous situations, most commonly a lack of appropriate information, as a source of job tension. The behavioural outcomes of tension and uncertainty created by ambiguous situations have intrigued researchers in many disciplines. Numerous studies in accounting, psychology and marketing (Dermer 1973, Johnson and Stinson 1975, Walker et al.1975) have focused on individuals' responses to ambiguity as an important factor in role performance. Several marketing studies (Walker et al. 1975, Singh 1993) have investigated perceived role ambiguity (i.e. lack of information about role responsibilities) as a function of job satisfaction, job tension, and performance. Two research studies (Lysonski 1985, Lusch and Serpkenci 1990), attempting to relate emotional outcomes (satisfaction, tension) to job performance, failed to produce significant results about the effect of intolerance of ambiguity in marketing roles. Furthermore, this study is attempting to measure problem-centred outcomes (i.e. DBM system development) - not emotions - as a result of a manager's desire to reduce informational ambiguity. Lacking conclusive evidence from previous marketing studies to support this variable, it was rejected for this research.

5.7.2 Need for Achievement

Individuals with a high need for achievement are often highly motivated to seek and conquer challenges (McClelland et al. 1953). This is more specifically described as a strong desire to achieve goals, accomplish tasks quickly, and exert their best effort (Friis and Knox 1972, Robbins and Butler, 1993). Roles that present some difficulty, control over results, and fast feedback enable the achiever to do well. Hence, the traits of individuals with high need for achievement could be posited as a personal characteristic motivating the capture of data, encouraging the use of statistical models to achieve better results, and using performance measures for fast feedback of results. Several studies (Johnson and Stinson 1975, Lusch and Serpkenci 1990) found a positive relationship between need for achievement and job satisfaction, possibly supporting the notion that this personality characteristic would encourage marketing managers to develop their DBM systems to achieve higher levels of personal satisfaction. Specifically, Lusch and Serpkenci (1990) concluded that individuals that are both high in need for achievement and inner-directed make the best retail managers. Therefore, before making a final decision on which personal characteristics to measure, the impact of locus of control was considered.

5.7.3 Locus of Control

Locus of control (Rotter, 1966) is a term used to describe inner-directed (internals) and other-directed (externals) individuals' characteristics. Inner-directed individuals believe their environment is controllable (i.e. as consequences of their own actions), encouraging them to create initiatives for coping with novel problems (Riesman, 1960). This contrasts with other-directed individuals who view events as luck or chance. Several studies in marketing (Bagozzi, 1978; Behrman and Perreault, 1984; Lusch and

Serpkenci, 1990) determined that inner-directed individuals perform better than other-directed individuals in marketing roles. These studies suggested that inner-directed individuals are cognitively more active, highly motivated, and less prone to stress when they are in control of their environment. A fundamental benefit of sophisticated DBM systems is greater control over a variety of marketing scenarios and decisions (Charnes et al. 1985; Bruns and McFarlan 1987).

Research into the strategy-manager fit found a strong link between locus of control and the formulating and implementing of differentiation strategies (Govindarajan 1989). His research suggested that the personal characteristics of managers in key roles have a significant effect on strategic performance; Govindarajan specifically cites these characteristics as affecting individuals' information-processing capabilities:

> "Previous research has concluded that internals and externals have different information-processing capabilities. In particular, these studies have found that internals are more proactive in the acquisition and utilization of information than externals (Phares 1968; Spector 1982). The logic behind these findings is based on the construct properties of the internal-external dimension.
> .... Thus, internals' more active search for, and more efficient processing of, task-relevant information is in keeping with their belief in the controlling value of their own behavior as the significant determinant of task outcomes." (p. 254)

The concepts of increased control and proactive search for improved information are fundamental to the philosophy of this research. Clearly, it can be hypothesised that inner-directed managers should have a strong desire to gain greater control over marketing programmes. As a result, inner-directed managers should be more likely to instigate the use of statistical and economic modelling techniques to define segments and improve predictive capabilities.

It could be argued that inner-directed individuals often exhibit need for achievement, and Lusch and Serpkensi found a strong positive inter-correlation between the two variables in their study. Overall, the research results for locus of control appear to exhibit a much stronger fit with the managerial task of developing sophisticated DBM systems. The likely existence of other-directed individuals as DBM managers should enable these relationships to be properly tested. These observations led to the following two hypotheses.

H3A - Highly inner-directed marketing managers are more likely to develop sophisticated DBM systems.

H3B - Highly other-directed marketing managers are less likely to develop sophisticated DBM systems.

Previous discussions highlighted the role of managers' perceptions of their competitive environment in shaping strategic decisions. The hypotheses stated so far only examine the effects of internal variables - organisational culture, operational size, and personality characteristics - on the sophistication level of DBM systems. However, the discussions in chapter 4 indicate that managers and organisational behaviour may be influenced by the external (i.e. competitive) environment. The final variable considered in this study examines whether the type of market served (i.e. consumer or industrial) is an external variable moderating the level of sophistication in DBM systems.

5.8 THE IMPACT OF TYPE OF MARKET ON DBM SYSTEMS

Two studies (Jaworski and Kohli 1993; Slater and Narver 1994) examined whether the external competitive environment moderates the positive impacts of market orientation on performance. Both studies examined the impact of market turbulence, competitor intensity and technological turbulence across a variety of environmental contexts, and concluded that market orientation was not moderated by differences in the external environment. Unfortunately, both studies seem to ignore the influence of potential differences between consumer and industrial markets. Many texts and papers observe the substantial differences in market planning (McDonald 1989), buying processes, distribution channels and product complexity (Reeder et al. 1991). Webster (1978) clearly identified this as a problem in marketing research:

> "A failure to recognise these differences is one reason why management scientists in marketing have had trouble applying models and measurement techniques, developed in consumer marketing, to the problems of industrial marketing." (p. 22)

A recognition of these differences raises questions about whether they have any impact on the level of sophistication in DBM systems.

DBM is most commonly described in terms of its consumer applications, but industrial (i.e. business to business) marketers also derive significant benefits from these systems. Continual increases in selling costs, and the problems of managing marginal accounts, have focused attention on companies' needs to improve marketing and sales productivity (Meredith 1989; Moriarty and Swartz 1989). DBM systems designed for industrial marketing use business "demographic characteristics" (Griffith and Pol 1994) to segment markets. Demographic segmentation refers to the use of SIC codes, location, size (i.e. number of employees), asset value, and sales turnover, as ways to segment markets. Some industrial marketers employ behavioural segmentation criteria (e.g. light vs. heavy users), which are similar in nature to consumer markets.

Several papers (Hlavacek and Ames 1986; Griffith and Pol 1994) argue that industrial marketing is more complex than consumer marketing. These authors justify this assertion on the following grounds: industrial products often have multiple applications; industrial buyers often vary greatly from one to another, and are often highly dependent on the seller for on-going service; finally, close customer relationships are the norm rather than the exception (Blois 1996). Conversely, consumer marketers might argue that they must cope with a large number of customers, many more segmentation alternatives, and numerous competitors. Nevertheless, industrial customers generally have greater buying power, require stronger relationships, and need more customised products, consequently promoting higher levels of sophistication in industrial DBM systems than exist in consumer systems of equivalent size. Hence, the final research hypothesis is stated as follows.

H4 - Industrial markets (business-to-business) promote higher levels of sophistication in DBM systems than consumer markets.

5.9 CONCLUSIONS

Using prominent factors from the notions of competitive advantage in marketing and information systems, four hypotheses have been advanced about factors promoting the development of sophisticated DBM systems. From a generic perspective, the four factors represent organisational culture, operational size, influence of powerful individuals, and nature of the external environment. Discovering which factors have a positive impact on the level of sophistication in DBM systems should provide useful insights for management.

Each of the four factors had a logical rationale for its inclusion, and is grounded in contemporary research. First, several authors contend that DBM systems are fostered and nourished within market-oriented cultures. Second, large DBM systems are generally associated with large organisations, potentially possessing greater marketing and IS resources with which to develop their DBM system. Third, the desire for greater control over marketing programme outcomes should motivate highly inner-directed marketing managers to increase DBM system capabilities. Finally, the greater buying power and smaller number of industrial customers should promote greater sophistication in business-to-business DBM systems than consumer systems. The four hypotheses expressed in this chapter cover important, but very different, facets of marketing information systems theory, and would appear to be intuitively logical from a pragmatic understanding of DBM systems.

The research challenge is to devise a study to collect empirical data that quantifies the proposition and four hypotheses stated as conjectures in this chapter. The next chapter describes how a research design was operationalised to collect empirical data to investigate these factors.

CHAPTER 6

RESEARCH DESIGN

6.1 INTRODUCTION

The purpose of this chapter is to describe the development of an overall research design to test the proposition and hypotheses rationalised in chapter 5. The lack of a construct to measure the dependent variable (i.e. level of sophistication in DBM systems) determined that data collection would have to be conducted in two stages. Stage one of the fieldwork focused on developing a parsimonious, reliable and valid construct to measure the sophistication level of DBM systems. In the second stage of fieldwork, this construct was incorporated into a shorter questionnaire to improve response rate and significantly increase sample size. Hence, the research structure defined in this chapter is intended to specify and co-ordinate an overall plan for a two-stage experimental design. The next two chapters explain how postal surveys were designed for data collection, and the statistical analyses employed in each stage of fieldwork.

Before embarking on research design, the first section of this chapter restates the proposition and hypotheses in pragmatic terms as a series of research aims to guide the investigation. This leads to the second section of the chapter which examines alternative research design methodologies. As a postal questionnaire was selected as the most suitable method of data collection, the remainder of this section determines whether appropriate sampling frames and methods were available to support such a choice. An appropriate sampling frame was found, and the next section explains how the dependent and independent variables were operationalised in a postal questionnaire. The final section explains how different components of the postal survey process were integrated to motivate managers to respond. For the reader who is interesting in perusing the components of the postal survey package used in the fieldwork (i.e. stage I), they are detailed in Appendices 7 to 10.

6.2 RESEARCH AIMS

This section restates the research proposition and four hypotheses developed in chapter 5 as specific research aims, and reviews them in terms of classical experimental design considerations. Effectively fulfilling these research aims determined which methodologies and constructs were most appropriate from both theoretical and pragmatic research perspectives. The fieldwork and analysis in the remaining four chapters of this thesis were directed by three research aims stated below. The first two aims focus on DBM theory development; the third aim describes practical implications of, and uses for, the research findings. Specifically, the research aims were:

1. To develop a construct capable of consistently and accurately measuring differences in the level of sophistication of DBM systems.
2. Using empirical data to measure the effects of four variables on the level of sophistication of the DBM system.
   (i) The market orientation (i.e. customer orientation) of the organisation.
   (ii) Number of customer records managed using the DBM system.
   (iii) Personal characteristics (i.e. locus of control) of marketing managers using DBM information systems.
   (iv) The type of market (i.e. consumer or industrial) serviced by the business.

3. To use the increased knowledge gained from aims (1) and (2) to assist managers in developing effective DBM systems.

The first research aim is *comparative,* as it proposes the development of a construct to measures differences in capability to produce useful marketing information. But determining the capabilities of sophisticated DBM systems is a complex task. Much anecdotal evidence of successful systems was described in cases, the trade press and texts; however, little serious, well defined research had been conducted into the structure and nature these systems. The three elements comprising the generic model of DBM systems were used as the foundation for a construct to measure the level of sophistication in DBM systems. Fortunately, the process for developing constructs from empirical data was well defined in the literature(Churchill 1979). Unfortunately, the development of a construct to measure of level of sophistication in DBM was complicated by the large number of variables defining the domain. Because of this complexity, Chapter 7 is entirely devoted to explaining the research methodology, empirical data analyses and validation processes employed to develop the construct.

The second research aim is *causal,* as it proposes that the construct be used to assess whether four factors (i.e. independent variables) are associated with different levels of sophistication in DBM systems. Many papers described sophisticated DBM systems with a large number of customer records, developed by managers to improve control over decision making, within market-oriented organisations, in both consumer and industrial marketing contexts. Unfortunately, little rigorous empirical research had been undertaken to substantiate whether any real relationship exists between these factors and DBM systems' development.

The third aim requires that research findings be *translated* into practical paradigms for improving the effectiveness of DBM systems. Implementing these improvements should contribute to increases in direct marketing productivity as the field evolves from its mailing list foundations to on-line interactive, integrated marketing methodologies. This last aim should result in practical improvements to DBM practice, which are largely missing from the previous research in this context.

These three aims formed the foundation for selecting methodologies to operationalise the dependent and independent variables defined for this research. The next section reviews research design alternatives considered in order to determine the most effective methodologies for operationalising the overall study.

6.3 RESEARCH DESIGN

Marketing research authors describe different categories of research. For instance, McDaniel and Gates (1993) argue that there are descriptive and causal studies; additionally, Tull and Hawkins (1993) add exploratory research as a third category. All three categories are appropriate in the context of this research programme.

Exploratory research is concerned with discovering the nature of the problem and the variables that relate to it. Cameron and Targett's (1992) survey sought background information relating to the use, integration, management and development intentions of companies deploying DBM systems. Several descriptive studies have been published to explain the current state of DBM. Petrison et al. (1993) studied the historical perspective, while Schultz and Wang (1993) sought to evaluate the current scope of DBM applications.

These descriptive studies - particularly Schultz and Wang's (1993) study - provide useful data, which can be used to validate and support causal research. This study is primarily concerned with establishing possible causal connections between pairs of variables in the hypotheses. Causal studies demand measurement of variables so as to establish an association between independent variables and observable attributes in the dependent variable. Hence, the specific needs of causal research defined the philosophy and methodology for devising this research.

6.3.1 The Nature of Causal Studies

A common method of investigating causal effects is a retrospective or *ex post facto* study (Moser and Kalton 1971). Causal studies group subjects based upon desired study characteristics in the dependent variable, and then attempt to determine factors that have caused these differences. A common problem with this kind of "effect-to-cause" study is memory distortion bias among individuals in the sample. Ideally, a search of administrative records should be completed to confirm managers' statements. But few companies have systematically recorded how their DBM system evolved, and even if this information were available, its amorphous structure would make it difficult to analyse. An alternative approach is a prospective study (i.e. following subjects forward in time), which might be more revealing, but it would take many years to complete a useful study. The final approach available is a retrospective study, which is common in situations where a phenomenon has been observed but not adequately explained. Similar studies in marketing (e.g. Walker et al. 1975, Lysonski 1985, Lusch and Serpkenci 1990, Narver and Slater 1990) all adopted this approach, because of its ability to identify meaningful factors for future research.

Retrospective causal studies should meet three criteria (Moser op cit). First, it is important to show concomitant variation between one or more of the independent variables and the dependent variable, although even showing strong correlation does not prove causation. A second criterion requires that studies show an appropriate causal order of events describing a temporal sequence. The final criterion recognises the possibility of spurious associations. For instance, selecting a sample from a homogenous product group (e.g. women's apparel) of DBM users could cause the product group to have a spurious association with the level of DBM sophistication, hence reducing the extent to which the results can be generalised to larger populations.

Moser and Kalton (1971) provide some useful approaches for adjusting and controlling the effects of extraneous variables, and these procedures were followed to strengthen the research design. One approach is the collection of data from two or more groups [i.e. Professor Gerald Goodhardt's suggestion during the City University Panel presentation]. Another approach is to collect data on potential extraneous variables for the purpose of adjusting the analysis. It is very difficult to identify all of the potential extraneous variables, and generally impractical to collect data on all of them. Examples of several extraneous variables which were collected in this research are:

- education/training level of the DBM manager;
- number of employees in the organisation;
- database development to gain additional revenue from data merchandising (i.e. mailing list rental).

Several other accepted approaches also help the researcher cope with the problems of extraneous variables. A common approach to the problem of extraneous variables is *randomisation* of the sample. Using a random sampling approach has two important advantages. First, the impact of extraneous variables can only be due to random chance fluctuations. Second, statistical techniques may be used to determine the probability of the association between the dependent variable and each independent variable occurring by chance. Consequently, random sampling was adopted for this research.

Retrospective studies, which attempt to make statements about information systems and marketing approaches, generally employ one of two methods: the case method or survey research. The rationales for data collection methodology are described in the next section.

6.3.2 Data Collection Methodology

Yin (1981) argues that alternative methods of data collection should be evaluated using three criteria:

(i) the type of research questions asked;

(ii) how much control the researcher has over behavioural events;

(iii) the focus of the research in investigating historic as opposed to contemporary events.

These criteria were adopted as a structure to determine whether case or survey methodology should be used for this research.

Case studies are useful for exploring descriptive research questions where general understanding is required. This type of study may be useful to researchers needing to define future inquiries. For instance, several papers (Moriarty and Swartz 1989;

Hopper 1990; Ventresca 1991), which form the foundation of this research, describe sophisticated DBM systems. Hence, the research aims expressed in this document specifically relate to the use of *measurements* of DBM phenomena. Several authors (Bittner 1973; Bryman 1988) argue that the case method lacks objectivity and generalisability of testing to find associations, because the results may be influenced by the intuition and convictions of the researcher.

As Pavlides (1993) conceded, it is difficult to introduce sufficient behavioural controls into marketing research. In case research, researchers rarely refer to *measurements* of organisational orientation or the behavioural traits of key managers observed in the study. Conversely, the research aims of this study specifically encompass the measurement of organisational orientation and individual behaviour traits. Survey methods are most commonly used to measure these orientations and traits.

Both case and survey research methods are applicable to the study of contemporary events. Yin (1994 p.6) states that quantitative studies "... are likely to favour survey methods or the analysis of archival records as in economic research." But as archival records would not reveal market orientation or personal differences, this method was also rejected.

Overall, the above discussion and nature of the research aims dictated the use of survey methodology for data collection. A review of quantitative DBM research comparable to this study (Schultz and Wang 1993, Fletcher et al. 1996), and other research using similar variables (i.e. market orientation, personal characteristics), all captured survey data through the use of postal surveys. The mailing of questionnaires has some advantages, particularly when "... rare and scattered populations..." (Moser op cit. p. 257) must be studied. Postal surveys are substantially cheaper than the travel or telephone costs associated with direct interviewing. Additionally, they avoid interviewer bias, and allow managers to complete the questionnaire at a convenient time in their work schedule. Furthermore, it is still possible, if necessary, to discuss respondents' systems using telephone interviews. The remainder of this chapter focuses on the development of the postal questionnaire that was sent to marketing managers as the main method of data collection.

Therefore, it was necessary to find an appropriate sampling frame before defining a questionnaire. Defining an appropriate sampling population is a critical part of a research activity, and this is given detailed discussion in the next section.

6.3.3 Defining and Selecting a Sampling Frame

An effective sampling frame should accurately represent the elements of the population being studied. Most sampling frames are incomplete, contain bias and restrict the research objectives in some way. Therefore, before appraising alternative frames, it was necessary to describe the characteristics of the responding individuals and their organisational environment, in order to ensure an appropriate sampling frame.

Some studies (Cameron and Targett 1992) have accepted DBM survey responses from information system (IS) managers. In some large organisations, IS managers are primarily concerned with the technical management of the system, rather than applying information to cope with marketing problems. The aims of this study specifically required that the individual primarily responsible for marketing decisions complete this survey. Hence, the following definition specified the characteristics of the sampling element; namely:

Senior marketing managers who rely on DBM systems as their *main* source of marketing information to formulate strategic and tactical marketing plans for *direct* customer communication programmes (e.g. direct mail, catalogues, telemarketing).

Defining a specific business sector in which these marketing managers operate was the final step in fully defining the sampling unit. The proliferation of marketing databases has resulted in nearly all organisations possessing some form of DBM system. For example, DBM is now widely used in the financial, publishing, direct sales (i.e. catalogues) and charity sectors. Clearly, the chosen sector had to be capable of fulfilling all the research aims in section 6.2. As market orientation and locus of control of the marketing manager could be measured in any sector, the criteria used focused primarily on the two remaining variables. First, the sampling frame had to contain organisations with a wide variety of database sizes (i.e. a few thousand to several millions of customers) in order to measure the second variable. Second, it was necessary to select a sampling frame that contained companies marketing with specific consumer and business markets in order to test the type of market hypothesis. Moreover, in order to limit the impact of some exogenous marketing variables (e.g. salespersons, general advertising, physical branch locations) the sampling frame had to contain a high proportion of organisations whose existence, survival and operational productivity all rely heavily on effective DBM systems for marketing information. Applying these criteria resulted in direct mail catalogue sales companies being defined as the most appropriate sampling frame. Combining the sampling element definition with geographic constraints provided a statement of the sampling population.

Senior marketing managers in direct mail catalogue companies based in the USA .

Several sampling frames were available to operationalise the above population definition. Moser and Kalton's (1971) widely used text on survey methodology recommends the use of Yates' (1960) five criteria - adequacy, completeness, duplication, accuracy, and convenience - when evaluating alternative sampling frames. Yates' criteria and the sampling unit definition were applied to select the most appropriate sampling population from the alternatives below.

American Business Lists. This company's catalogue (1995) lists 3,378 companies under the heading Catalog Shopping and Mail Order (i.e. SIC code: 5961-02). This list would have to be purchased in its entirety, and does not have marketing managers' names. This option was rejected on the basis of completeness.

Catalog Age Magazine. A trade publication subscription list could form a source of individuals and companies for the study. Some catalogue companies do not subscribe, and some subscribers are not catalogue companies. This option was rejected on the grounds of adequacy and completeness.

Direct Marketing Association Membership List. This source was used in previous published studies (e.g. Schultz and Wang 1993), but not all catalogue companies belong to the association. Additionally, many members were companies that did not use DBM as their primary marketing method (e.g. mail fulfilment, advertising and consultants). Hence, it was rejected on grounds of completeness.

Directory of Mail Order Catalogs 9th Edition (Gottlieb 1995). This compendium contains 7091 entries, in 41 main product categories, of catalogue companies across the United States. Nearly all of these companies must maintain DBM systems to manage their marketing activities. In its most complete form, company entries describe: the products marketed, titles and names of management, including marketing manager; catalogue circulation - quantity and frequency; number of employees; estimates of sales revenue; and length of time in business. This directory is updated annually which makes it the most current source of company information available. Some duplication of companies (i.e. some businesses have more than one catalogue) occurs, and this results in a minor reduction in the overall sampling population.

Dun and Bradstreet's Credit File. This source contained 7,600 catalogue companies, primarily presenting data collected to assess firms' credit status. The database contained presidents' name, but not marketing managers' name; furthermore, it was expensive (£4,500) and lacked details of catalogue operations. It was rejected on grounds of completeness and cost convenience.

The Directory of Mail Order Catalogs 9th Edition (Gottlieb 1995) was selected as the most complete, convenient and cost effective sampling frame for the survey. The next section explains how the samples were selected.

6.3.4 Sampling Methodology

As stated earlier in this chapter, random sampling was adopted to select samples. This approach allows the application of parametric statistical methods. The process of sampling was divided into two stages, the first to collect data for the construct, and the second to accumulate data on the research variables. The rationale for sample size, sampling method and sample data entry are now discussed.

6.3.4.1 Sample Size

Decisions on sample size involve complex issues that affect all research studies. Determinations of sample size entail finding a balance among several factors. Erickson and Nosanchuk (1992) define these factors as accuracy required of the results, potential cost of inaccurate results, cost and time constraints in data collection, and size of the population. Peter (1981) also points to the use of construct reliability values as a guide to sample size requirements. Furthermore, prior academic research studies can provide precedents for acceptable sample sizes. All of these factors were considered in the evaluation of sample size.

Moser and Kalton (1971) believe that the issue of sample size is more complicated than the application of simple formulae, and hence, clear decisions about precision are required:

> "The researcher himself must decide how precise he wants his sample results to be, that is how large a standard error he can tolerate." (p.148)

Three analyses were performed to clarify the final sample size decision. First, a sensitivity analysis of different levels of percentage error was undertaken using a formula for small samples (Narins 1994). The results shown in appendix 3 indicate a feasible range of sample sizes from 96 to 383. Second, it was known from the preliminary research that the construct might involve 40 items, which, using a five-point scale, would give scores ranging from 40 to 200. If the survey captured a representative cross-section of systems, this would result in a construct with an estimated mean of 120 and standard deviation of approximately 20. Applying this estimate of standard deviation allowed sample sizes to be evaluated using the simple formula below (Frankfort-Nachmias and Nachmais 1996, p. 198):

$$\text{Sample size (n)} = \frac{(\text{Standard deviation})^2}{(\text{Standard error})^2}$$

hence, if standard error = 1 and standard deviation = 20, then n = 400

or standard error = 2 and standard deviation = 20, then n = 100

Finally, a study of the DBM and direct marketing literature revealed four papers papers in the UK and US literature (Table 6.1). This review showed a consensus sample size of approximately 100 observations as acceptable for published research in this discipline.

Author and Date	Focus of Study	Sample Size
Fletcher et al. 1996	Study of DBM variables in the financial services sector.	108
Thwaites and Lee 1994	Study of the use of direct marketing practices in financial services industry.	105
Schultz and Wang 1993	Survey of DBM capabilities in traditional direct marketing companies.	108
Cameron and Targett 1992	Broad survey of industry uses and perceptions of DBM capabilities.	85

Table 6.1 Summary of Sample Sizes Used in Published DBM Research

After considering precision, criteria for academic publication, and economics, a final sample size of 100 was determined as appropriate for the study[1]. A standard error of 2

[1] From the results in chapters 7, 8 and 9 this estimate appears reasonable. Specifically, the accuracy of the mean for DBM sophistication (95% confidence) = 74.5 ± 4.4, and the reliability of all constructs exceeded Cronbach's alpha values of 0.8.

was deemed an acceptable level of precision for a construct with such a large range. Collecting over 100 responses would produce a study with appropriate levels of accuracy for publication. Finally, the economics of the required sample were not prohibitive. Applying conservative criteria derived from the studies in Table 6.1 - response rate (20%), undeliverable addresses (10%), and incomplete questionnaires (10%) - projected that an overall sample of 720 companies would required. As the costs of labour, printing, postage, stationery, and data entry for a postal survey were assessed at £2.00 per item, a total estimated expense of £1,440 was projected for the study. The method of selecting the random sample of 720 companies is now briefly documented.

6.3.4.2 Sampling Method

All entries in the directory were sequentially numbered. Using a uniform distribution random number generator in a database field rendered random numbers between 1 and 7091. Two independent samples were generated in this way, and then duplicates of both directory entry number and company address were removed. This process ensured that two totally independent samples were obtained (i.e. samples of 353 and 360). Having obtained two samples, the following data entry procedures were adopted for compiling a database of marketing managers in catalogue companies.

6.3.4.3 Data Entry for Each Sample Item

The quantity of information available on each company varied considerably. In some cases the entry listed only names for the president, marketing manager and buyer, while other entries only listed company name and address. The sole listing of president's name was generally associated with small companies (i.e. under 20 employees), and preliminary discussions with local companies had revealed that presidents were generally responsible for marketing decisions in small companies. Hence, the following order of precedence was adopted for directing the questionnaire to the most suitable person in the organisation. If the marketing manager's name was listed this was entered; if only the president's name was listed, this was entered; otherwise, the generic title "Vice President: Marketing" was entered.

Having determined that an appropriate sampling frame was available, the overall design and construction of a questionnaire was undertaken. The next section of this chapter is devoted to this discussion.

6.4 THE DESIGN OF A POSTAL QUESTIONNAIRE

The purpose of this section is to provide an overview of the principles applied in designing a postal questionnaire to satisfy the stated research aims. Designing the questionnaire required the definition and operational review of questions, scales and constructs. This heuristic process involved extensive literature search, discussions with academics, and testing of question structures with five practising DBM managers over a period of a year. A recent text on research methods (Frankfort-Nachmias and Nachmias 1996) provided guidelines for the formulation of questions in terms of their content, structure, format and sequence. The research process used to operationalise the dependent and independent variables are now described.

6.4.1 Dependent Variable: Sophistication of DBM Systems

This research required the development of a valid and reliable construct to measure the level of sophistication in DBM systems. Devising measurement scales "....consists of rules for assigning numbers to objects in such a way as to represent quantities of attributes (Nunnally 1978, p. 3)." Where feasible, it is desirable to use existing constructs from published research, preferably in marketing applications; however, the appropriateness of any scale's application must always be carefully considered. A serious challenge of the empirical research was to devise a reliable and valid construct to measure the key attributes of sophisticated database marketing systems.

An examination of the marketing, IS and management literature discussing construct development revealed many deficiencies in the methodologies adopted for defining measures in these disciplines (Heeler and Ray 1972; Peter 1981; Venkatraman and Grant 1986; Sethi and King 1991). Clearly, there will continue to be on-going academic debate about the complicated process of construct development; however, most authors agree that Churchill's paradigm (1979) provides the most rigorous process for construct development. Churchill's eight-step procedure carefully defines empirical data collection, criteria for item elimination, and methods for applying reliability and validity tests. Rigorously following this procedure produced a parsimonious list of items specifying the capabilities and functions of sophisticated DBM systems. The specific descriptions of questions, process methodologies, and statistical tests used to derive a construct from empirical data captured in the first fieldwork study are described in chapter 7.

The next four parts of this section explain and define the data collection necessary to operationalise the four independent variables to fully achieve the research aims. Additionally, it was planned to capture data on several extraneous variables defined in section 6.3.1.

6.4.2 **Independent Variable: Market Orientation of the Company**

The importance of, and increasing academic interest in, market orientation has resulted in three scales being developed to measure this aspect of company culture. Narver and Slater (1990) developed a three component market orientation model - customer orientation, competitor orientation, interfunctional coordination - to measure its effect on the business profitability of 140 strategic business units within a major corporation. Kohli et al. (1993) defined a 20-item market orientation scale (MARKOR) consisting of three marketing factors - intelligence generation, intelligence dissemination, and responsiveness. Deng and Dart (1994) established a four component measure of market orientation, essentially by adding profit orientation to the three components developed by Narver and Slater.

The principles of developing marketing constructs (Churchill 1979), nature of the sample used to validate the construct, and appropriateness of fit with the research aims were used as criteria to select the most appropriate construct from the choices above. All three measures were tested for reliability and validity , but only Narver's and Deng's measures were tested for discriminant validity. Deng's study had the largest sample and, in common with Kohli's study, used companies that varied in size, industry type and location; conversely, Narver used strategic business units within a single corporation. Deng's study required that one question (Q. 9 p. 741), relating to sales force motivation, be eliminated as it did not relate to catalogue marketing, whereas two questions would have to be modified in both Kohli's and Narver's constructs. Deng's study had the most questions, but included questions on profit orientation - an important dimension of companies attempting to achieve competitive advantage. Hence, Deng and Dart's construct of market orientation provided a valid and reliable instrument, based upon a robust research sample, that required only minimal modification to fulfil the study's research aims. No changes to the 5-point scaling methods were deemed necessary, giving a score range from a low of 24 to a high of 120 (indicating very high market orientation). The detailed questions and scaling used to measure this market orientation are shown in Appendix 4.

6.4.3 Independent Variable: Database Size

Initially, it was believed that database size represented an objective measure that could be consistently measured from organisation to organisation; however, preliminary research revealed several factors which complicated the measurement of this variable. First was the time scale for differentiating between active (i.e. recent purchase) and inactive customers (i.e. no recent purchase). This is understandable, as the economic considerations of customer acquisition costs and revenue from mailing list rentals, make some direct marketers reluctant to delete inactive customers from their databases. Second, some organisations, particularly industrial marketers, include inquiries and prospects in their customer database counts. Finally, it was discovered that some companies develop multiple databases to support alternative product groups or catalogues. In some cases the same marketing database is used to support several product groups (catalogues) with similar themes. Conversely, some companies develop entirely different product groups, generally reflecting seasonal demand patterns, to facilitate efficient use of marketing and fulfillment resources. Pilot field research revealed these phenomena in companies of all sizes. Unfortunately, a comprehensive review of DBM texts and papers failed to reveal any satisfactory method of defining the size of marketing databases.

In order to overcome these difficulties the following definitions and methodology were adopted when devising questions to capture data on database size. The *Dictionary of Direct Mail and Mailing List Terminology* (Bodian 1990) gives these definitions:

Active Customer/Buyer One who has made a purchase, usually within the past 12 months (18 months for catalogue marketers). Some list owners, however, may consider a buyer as "active" for varying periods of up to five years.

Inactive Customer List Buyers who have not placed an order or responded during the previous year. Each list owner sets their own criterion as to who is an inactive customer; most use longer periods.

Live Prospect One considered to have good buyer potential.

Inquirer One who has made a request for more information or requested a catalogue. An inquirer name is considered less effective than a buyer name.

Ideally, marketing management should remove inactive customers from their databases to reduce marketing costs and raise response rates. Hence, an operational definition of an "active" customer is one where future communications will, ultimately, still produce an economic return. These definitions were used to develop questions related to inactive customer records which would permit adjustments to be made if these variations in database size definition created measurement errors[2].

The questions developed in Appendix 5 were devised to manage the above ambiguities when assessing database size on the basis of number of customer records. No scaling was applied to this measure, as the number of records form a natural interval scale, although it was envisaged that logarithmic transformation of this variable would be a applied to manage the large variations in database size among companies.

[2] These corrections proved to be unnecessary when assessing the final results.

6.4.4 Independent Variable: Locus of Control of the Marketing Manager

The most common measure of locus of control is Rotter's (1966) Internal - External (I-E) scale. Rotter's scale was used to study role stress in industrial salespersons (Behrman and Perreault 1984) and quoted in a more recent study of role stress in retail store managers (Lusch and Serpkenci 1990). However, Rotter's scale was never devised for work related environments (Phares 1976) and does not relate locus of control to other organisational variables (e.g. lower role stress, autonomy and control, job tenure) as has been shown in some studies (Spector 1982). Hence, a domain specific measure of work locus of control scale (WLCS) was selected to more accurately reflect this personality trait in work environments (Spector 1988).

The WLCS was chosen because of its relationship to other factors (e.g. role stress, job satisfaction), along with a recommendation from an organisational behaviour specialist (Dr. Paul Dobson, City University Business School, London) to use a work related measure. Spector (1988) modified Rotter's scale to measure locus of control in six different work groups, and the repeatability, validity and reliability (Cronbach's alpha > 0.8) obtained in the study were very good. Furthermore, Spector's study demonstrated that his WLCS had a stronger relationship to other organisational variables (e.g. work stress) than Rotter's more general scale. Spector's unmodified work locus of control questions and scaling are detailed in Appendix 6, with scores ranging from 15 (internal) to 96 (external).

6.4.5 Independent Variable: Type of Market Served

No specific data was collected for this variable, as this hypothesis was to be tested by determining whether marketing to purely consumer markets, as opposed to business markets, affected the sophistication of the DBM system. In the first questionnaire, questions 2, 5 and 7 explicitly revealed the type of market served, and in the second questionnaire the first question asked about type of markets served.

6.4.6 Extraneous Variables

Section 6.3.1 explained why the measurement of extraneous variables could be useful in this research. Discussions with marketing managers determined several extraneous factors which could distort measurements in the main study variables. These discussions revealed that background information related to the respondents' education and work experience, title within the organisation, and formal training all represented factors affecting managers' understanding and use of DBM systems. Several organisational factors were also thought to be important extraneous factors; specifically, organisation size (i.e. number of employees) and list rental policies (often a large source of revenue for catalogue companies).

Data captured for these extraneous variables were used, where necessary, to adjust and group data for specific differences among managers and organisational environments. The specific questions and rationale for extraneous variable data collection are given below.

6.4.6.1 Education and Professional Experience

Managers' education, length of professional experience, and formal training might potentially influence the desire for greater marketing information (i.e. locus of control trait). Three questions were devised to capture this information.

Question (a) What is the highest level of formal education and professional development you have completed?

___ High School ___ Bachelor's Degree ___ Doctorate

___ Associates Degree ___ Master's Degree/MBA Other (please specify) ____________

Question (b) How many years experience do you have in the following functions?

Catalog Marketing __ yrs General Mktg __ yrs Computing/IS __ years Accounting __ yrs

Question (c) Have you received formal training in the following database marketing systems topics?

___ Yes ___ No Database software packages (e.g. Oracle, Sybase, Paradox, etc.)

___ Yes ___ No Statistical software packages (e.g. SPSS, multiple regression, etc.)

___ Yes ___ No Spreadsheet packages (e.g. Lotus, Excel, etc.)

___ Yes ___ No Complex modeling techniques (e.g. Neural networks, etc.)

6.4.6.2 Respondent's Title

In section 6.3.3, it was determined that the data for this research was to be captured from the individual responsible for marketing decisions. Exploratory research through interviews in catalogue companies revealed that marketing decisions about targeting and segmentation were taken by individuals with a variety of titles. For instance, in small companies (i.e. < 20 employees) it was common for the President to take these decisions, whereas in larger companies with a functional structure the Vice President of Marketing was ultimately responsible for these decisions. Hence, the position of individuals in the organisational hierarchy (i.e. power) may influence their ability to implement DBM development decisions. This resulted in the following question requesting the respondent's official title.

Question (d): Please indicate your official title.

___ President/Owner ___ Marketing VP/Manager ___ General Manager

Other (please specify): ___________________________

6.4.6.3 Organisational Factors

Two organisational variables were identified as important extraneous variables. First, as stated in section 2.6.1, organisation size and structure can be a barrier to DBM systems' development. Second, an examination of Standard Rate and Data Service *Mailing Lists* indicated that additional targeting capabilities (i.e. list selects) command higher prices for list renters. Consequently, data enhancement systems may be deployed purely to enhance list rental revenues.

Question (e) Approximately how many people does your organization employ?

Less than 5 ___; 5 to 9 ___; 10 to 19 ___; 20 to 49 ___; 50 to 100 ___ ; Over 100 __

Question (f) Do you rent or merchandise your data or mailing lists?

____ Yes ____ No.

Having determined the nature, scaling, size and structure of the questions, the final task of question sequencing is now described in the final part of this section.

6.4.7 Sequence of Questions

A recent study (Tourangeau 1989) has shown that the order in which questions are presented affects the type of response given. Furthermore, Hague (1993, p. 101) warns that "... postal questionnaires are the most difficult to design." Above all, the use of postal surveys requires that the respondent be motivated to complete the questionnaire in an accurate and honest manner (Frankfort-Nachmias and Nachmias 1996). Many survey research texts recommend Kahn and Cannell's (1957) "funnel sequence" of questions as the most appropriate way to gain cooperation from potential respondents. In a funnel sequence, each successive question is progressively narrower in scope. Applying a funnel sequence to this research would place the broader questions about organisation culture (i.e. market orientation) at the beginning of the questionnaire. During exploratory testing of the questionnaire, managers found this layout sequence confusing.

As an alternative, Gorden (1980) describes the appropriateness of an inverted funnel sequence for questionnaire layout. This sequence is best used where the purpose of the questionnaire is to capture factual information regarding systems or situations, as is the case in this research. Adopting an inverted funnel sequence places objective questions relating to DBM systems features and capabilities at the beginning of the questionnaire, while questions about attitudes to work and organisational orientation were placed at the end of the questionnaire. In further tests of the questionnaire, managers found this sequence most relevant to the study of DBM. The final layout of the questionnaire is defined in the following sequence (see Appendix 7).

(i) Measuring attributes that define the level of sophistication in DBM systems (Questions 1 - 8).

(ii) Questions about the number of records managed in the DBM system (Question 9).

(iii) Spector's work locus of control scale (Question 10).

(iv) Deng and Dart's market orientation scale (Question 11).

(v) Extraneous variables (Question 12).

In order to ensure professional standards of neatness and layout, the MicroSoft Office Word 6.1 software package was used to compile the eight-page questionnaire. The questionnaire was the main component of the final postal survey package and process, which is now described in the final section of this chapter.

6.5 COMPONENTS OF THE POSTAL SURVEY PROCESS

The decision to gather data through the use of a postal survey required that a number of principles be followed to obtain an *adequate* response rate. As discussed in section 6.3.4.1, the accuracy of studies is often a trade-off between study accuracy, cost, and researcher time. For these reasons, the study required multiple methods of evaluation to determine whether adequate response rates, and hence, a large enough sample size had been obtained. Specifically, chapters 7 and 8 use analyses of the reliability of constructs, consistency of results from two separate samples, and response distributions to determine whether the results were representative of the entire population.

Frankfort-Nachmias and Nachmias (1996, pp. 227-30) explain various strategies to secure accurate responses and an acceptable response rate. Steps taken to design and integrate the cover letter (Appendix 8), questionnaire instructions (Appendix 9), questionnaire, reply envelope (Appendix 10), and follow-up procedures adhered to the principles in their text. The remaining components of the postal package are now described.

6.5.1 Cover Letter

The cover letter should convince respondents that the study is worthwhile, and then motivate them to return a fully completed questionnaire. A recent study of market surveys of business professionals (Schneider and Johnson 1995) demonstrated the importance of sponsorship, type of appeal, and rewards; accordingly, the findings from this study were applied when structuring the cover letter.

First, university sponsorship was shown to be more effective than commercial sponsorship; therefore, the personalised cover letter was produced on Maryville University stationery. Second, altruistic motivation, in the form of a request to help increase the productivity of DBM systems was framed as a social utility appeal. Such appeals were shown to raise response in university sponsored research surveys. Third, the offering of a monetary reward was not adopted, because Schneider and Johnson's survey showed that this conflicted with social utility appeals from universities. Instead, respondents were offered a copy of "*Harnessing the Power of Database Marketing*" to help them better understand their DBM applications and systems. Another paragraph requested response from the individual responsible for marketing decisions and confirmed the confidentiality of respondents' answers. Each cover letter was personally signed by myself.

6.5.2 Questionnaire Instructions

The cover letter contained the request that the questionnaire be completed by the individual using database information for marketing decisions, in which case it was conceivable that the questionnaire would be passed on *without* the cover letter. Because of this, it was decided to repeat the main appeals for response again in the instructions.

6.5.3 Questionnaire

The eight-page questionnaire defined in this chapter was printed on plain white paper. The use of coloured paper was considered, but Jobber's (1986) review of this aspect of research design found no significant difference in response rate.

6.5.4 Survey Return Envelope

A stamped and addressed return envelope was provided for respondents. A code number, matching the respondent's entry in *The Directory of Mail Order Catalogs*, was merged onto the label for the purpose of tracking responses.

6.5.5 Overall Package

The overall package was assembled using the following method. The questionnaire instructions and questionnaire were collated, and then stapled together. Then, the cover letter, questionnaire and return envelope were matched, collated and clipped together. These items were inserted into an 23 x 29 cm envelope with a Maryville University logo and return address. A large envelope was used to gain managers' attention.

All packages were mailed at the first class postage rate, because US Postal Service regulations require that undelivered first class mail be returned to the sender.

6.5.6 Follow-up Procedures

Follow-up letters to non-respondents are a generally accepted way of increasing response rate. It was planned to adopt de Chernatony's (1990) recommendation to plot a cumulative response curve, and then mail the reminders when a plateau was reached. Unfortunately, discerning a pattern proved difficult, presumably because of the longer mailing times in the US; consequently, follow-up letters were sent after 2 weeks. Kanuk and Berenson's (1975) recommendation that a replacement questionnaire be mailed with the reminder letter was rejected on cost grounds for the first sample. In fieldwork II, this decision was reconsidered, resulting in a second questionnaire being sent to non-respondents.

6.6 CONCLUSIONS

This chapter has justified the use of a postal questionnaire survey as the most efficient research design for gathering data to rigorously test the hypotheses developed in chapter 5. Using the historical perspective presented in chapter 2, a sampling frame composed of catalogue companies was defined as the most credible population of experienced DBM system users from which to gather this data. The research aims and use of a postal questionnaire dictated that a minimum of two fieldwork surveys would be necessary to collect data from this population. Hence, two random samples (i.e. 353 and 360) of potential respondents were derived from an overall population of 7091 catalogue companies.

One random sample was generated to support the first stage of fieldwork, which was primarily designed to specify a construct to measure the level of sophistication in DBM systems as the dependent variable; although, for greater research efficiency questions and constructs to gather data on the independent variables were also included in the questionnaire. Research into the development of marketing and IS constructs determined that Churchill's paradigm should define the process of construct development. Applying Churchill's paradigm was intended to reduce the large number of attributes in sophisticated DBM systems to a smaller, more manageable, number of items as a construct to measure the sophistication of DBM systems. This construct was then incorporated into a revised, shorter questionnaire for the second stage of fieldwork. The second stage of fieldwork used a new random sample of catalogue companies, which was specifically intended to gather additional data for construct and hypothesis testing.

The four independent variables were operationalised in three ways. First, suitable published and tested scales were adopted to measure market orientation and locus of control. Second, the problems of measuring database size were explicitly identified, and questions devised to adjust, if necessary, for differences in the measurement of this variable. Third, it was planned to use differences in the sophistication levels between companies deploying DBM for consumer and business markets to test the fourth hypothesis.

The questionnaire and postal package designs were based on factors known to motivate business executives' willingness to participate in research studies. Following well proven principles was intended to gain respondents' confidence in the credibility of the study, so as to obtain accurate and complete responses to the survey.

The next chapter explains how Churchill's paradigm was applied to develop a reliable and valid measure of the level of sophistication in DBM systems from data collected in the first stage of fieldwork.

CHAPTER 7

FIELDWORK I: DEVELOPING A CONSTRUCT TO MEASURE THE SOPHISTICATION OF DATABASE MARKETING SYSTEMS

7.1 INTRODUCTION

The purpose of this chapter is to describe the procedures and data analyses used to establish a reliable and valid multi-item construct to measure the level of sophistication in DBM systems. When attempting to define or refine DBM systems, marketing managers are often confronted with the problems of determining and justifying new capabilities that can be incorporated into the development of more sophisticated systems. DBM systems have a variety of levels of complexity, and many factors must be carefully integrated to obtain the competitive advantage that an effective system can yield. Hence, this chapter uses the three-element model developed in chapter 3 to define the domain of sophisticated DBM systems. Developing a valid and reliable construct from empirical data is intended to yield the essential quantitative tool for testing the hypotheses defined in chapter 5.

The process and procedures used to define, purify and test constructs in the social sciences are well defined, and have been applied in this research. Construct measurement is the assignment of numerals to a concept (a word that expresses an abstraction formed by a generalization from particulars) that has been deliberately and consciously invented, or adopted, for a special scientific purpose (Kerlinger 1964).

Most marketing, education and psychology researchers are well aware of the methodological problems inherent in construct specification, which can result in measurement error, "because the majority of measures used are based upon constructs that are abstract and difficult to measure" (Cote and Buckley 1988, p. 579). The construct of interest in this research is a mixture of concrete (i.e. DBM systems features) and abstract (i.e. DBM marketing perceptions), which should be less prone to error than purely abstract concepts (Cote and Buckley 1987). Unfortunately, measuring the characteristics of objects is always subject to some error, no matter how precise the instrument. Hence, the effectiveness of the final measure depends to a great extent on the quality and rigour of the approach adopted when building the construct.

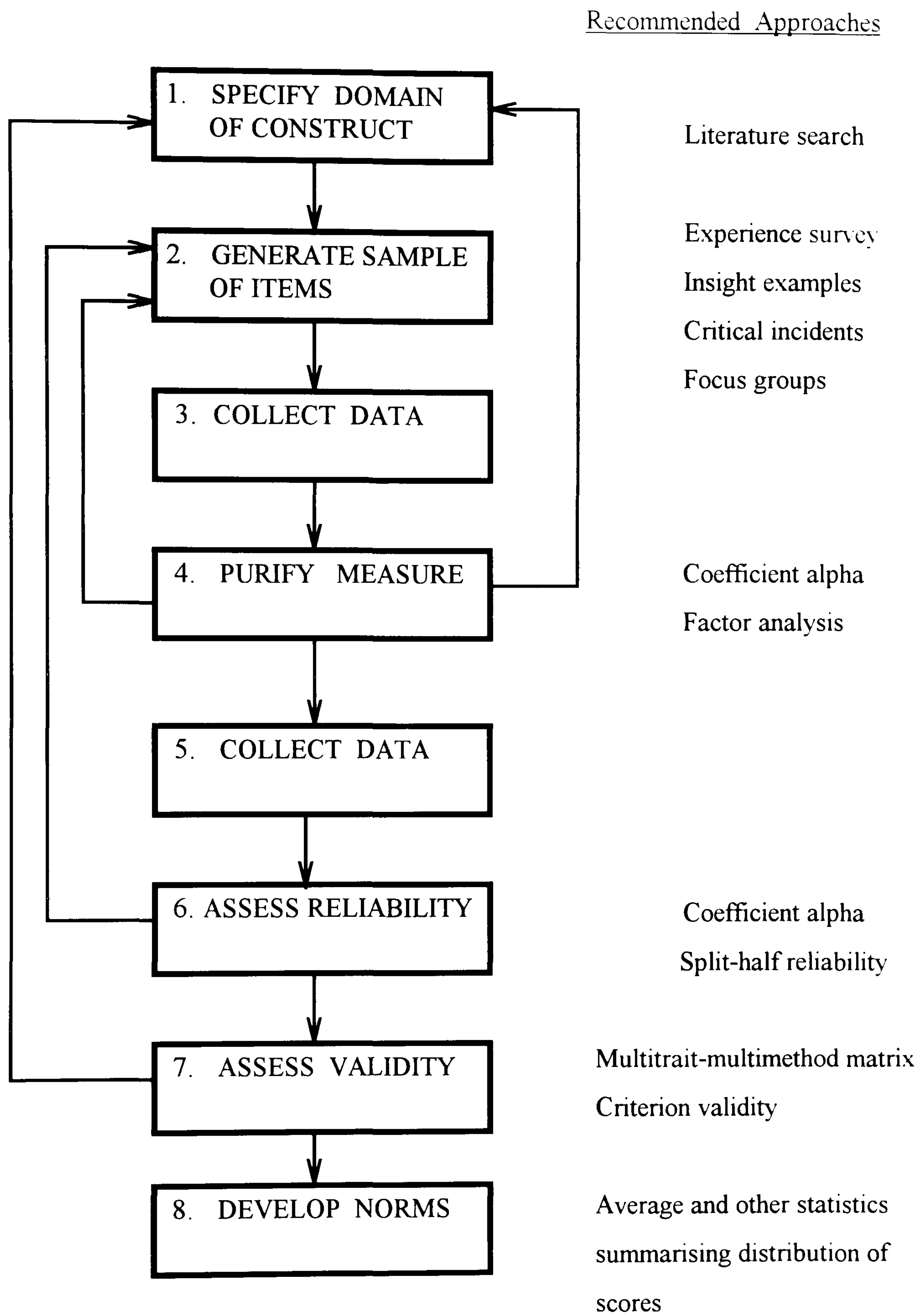
Following Churchill's (1979) paradigm, the methodology used to develop the construct is described as follows. The first section discusses and justifies the construct development methodology adopted, and explains the reasons for its choice. Churchill's paradigm follows a sequential approach, which, for clarity, is presented in four parts. The first step in construct development requires a full definition of DBM's theoretical domain, and its operationalisation as an effective data collection instrument. Subsequent sections describe the statistical analyses and procedures applied for scale purification (i.e. data reduction), reliability confirmation and validity testing. In the final section, it is concluded that a parsimonious, reliable and valid construct to measure the level of sophistication of DBM systems was developed from empirical data collected from catalogue marketers.

7.2 A BRIEF OVERVIEW OF CHURCHILL'S PARADIGM

Lack of appropriate research methodologies and construct validation is a common criticism of marketing (Cote and Buckley 1988), management (Venkatraman and Grant 1986), and IS research (Jenkins 1985). By its very nature the study of DBM systems must be a hybrid of marketing and IS research methodologies. The need for a wide variety of abstract measures in marketing research, and a proliferation of poorly conceived measures (Jacoby 1978), prompted Churchill (1979) to define a rigorous eight-step procedure for developing constructs. In the past two decades, Churchill's paradigm has gained widespread acceptance by marketing researchers; similarly, Sethi and King (1991) recommended that IS researchers adopt this methodology. Hence, the methodology described in this chapter is acceptable to both disciplines.

Much of Churchill's paradigm was founded on Nunnally's (1967, 1978) classic work on the scaling and testing of psychometric models. While much research has focused on alternative methods of assessing reliability and validity, Churchill's paradigm provides a robust procedure for construct development, particularly for multi-item measures as were used in this research. Figure 7.1 illustrates Churchill's paradigm, and the remainder of this chapter will explain how it was applied to the development of a construct to measure the level of sophistication of DBM systems. For clarity of explanation, the eight-step procedure will be presented as the next four sections of the chapter in the following manner.

Steps 1 and 2	Defining construct domain and generating the sample of items.
Steps 3 through 6	Purifying the measure and assessing construct reliability.
Step 7	Assessing construct validity
Step 8	Development of norms



Source: Churchill (1979), p. 66

FIGURE 7.1 CHURCHILL'S PARADIGM FOR DEVELOPING MARKETING MEASURES

7.3 OPERATIONALISING THE MODEL OF DBM SYSTEMS

This section explains how the question items were operationalised using the generic model of DBM systems described in chapter 3. The first step involved developing a sound conceptual definition of the domain of the construct. The second step involved operationalising the concept into a series of question items and defining appropriate measurement scales. By adopting a pragmatic approach to defining the domain, question structure and scaling, every attempt was made to minimise observer bias and ambiguity in the question items and scaling. Several provisional drafts of the questionnaire were completed, and then discussed, during personal interviews with five marketing managers who were frequent users of DBM. Many of their comments and observations were incorporated into the final questionnaire. This work was undertaken and completed in February 1995. These processes, forming the first two steps of Churchill's paradigm, were performed in the following manner.

7.3.1 STEP 1 - Define Construct Domain

As explained in chapter 2, the notions and processes of sophisticated DBM systems have only evolved in recent years, and no full generic model had been published. Chapter 3 provides an explanation of, and theoretical support for, a generic model that defines the three main elements of sophisticated DBM systems. Briefly restated, the three main elements are:

- methodologies for data capture to create a data-rich marketing database;
- market modelling processes;
- performance measurement capabilities.

Figure 7.2 illustrates how the three elements of DBM systems were divided into seven functional categories to form a conceptual framework for operationalising the model.

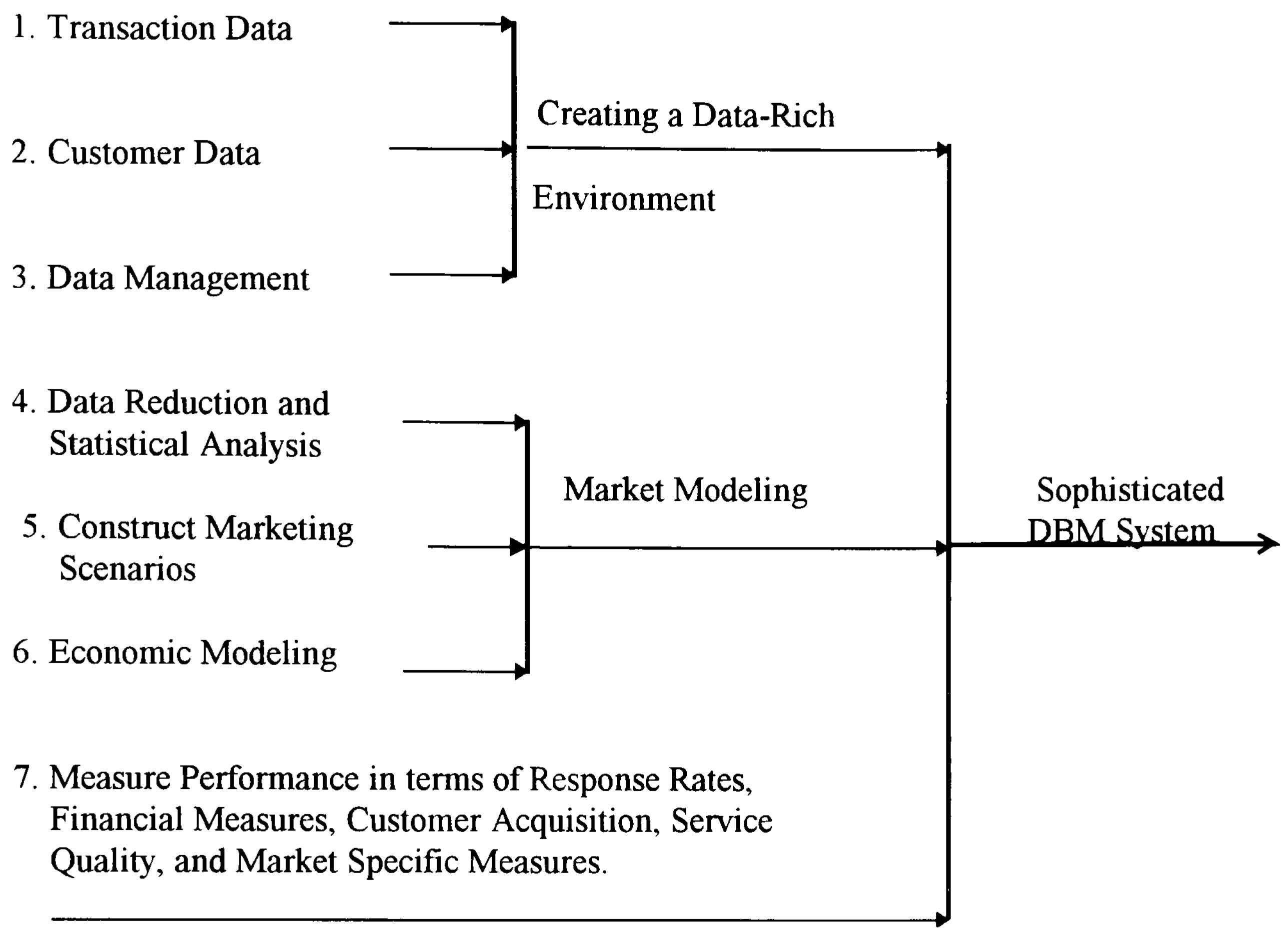


Figure 7.2 A Conceptual Framework of Sophisticated Database Marketing Systems.

Nunnally (1967, p. 175-81) argues that a logically defensible measurement tool is one where the domain sampling model captures *all* items in the domain. However, in practice all items are never used, because only a *sample* of items can be captured. Consequently, a *caveat* of the domain sampling model is the measurement error arising from inadequate sampling of relevant items. Logically, if all items in a scale are drawn from a single construct, then the items should be highly inter-correlated. Conversely, low inter-item correlation may be an indication that some items were not drawn from the same domain, and hence, exhibit error and unreliability. Therefore, the process of eliminating items that do not reflect the domain - scale purification (Step 4) - was essential to ensure that the domain of the construct was properly captured. The next section explains how 81 items, describing seven functional characteristics, were defined as the initial specification of the domain of sophisticated DBM systems.

7.3.2 STEP 2 - Generate Item Sample

Some of the questions used in the provisional questionnaires requested information about companies' data collection and modelling in terms of Yes/No responses. However, managers gave answers in the form , "Yes, but only on 60% of the records"; and "occasionally we prepare a budget, but not always"; and "we update the file four times a year." The basic characteristics of a good information system are its abilities to provide accurate, pertinent, and timely information, which reduce uncertainty and ambiguity in decisions (Mitchell and Volking 1993; Kroenke and Hatch 1994). Nevertheless, it is common for data files to be incomplete, and information selectively prepared for decision makers' preferences. As a result, deriving effective marketing decisions from a DBM system becomes dependent upon two factors: first, the type and availability of data available for analysis; second, the frequency of applying modelling techniques and performance measures.

These observations suggested the use of 5-point ratio scales to measure completeness of data and file management (Questions 1 through 3), and 5-point interval scales to measure frequency of use of data modelling and performance measurement methodologies (Questions 4 through 7) derived from Duncan (1971). These scales were selected to appropriately " represent quantities of attributes" Nunnally (1978, p. 3) for measurement accuracy. Table 7.1 shows a summary of the three scales used to quantify different aspects of DBM systems.

Scaling used with each of the following categorical question groups and score weightings.	5	4	3	2	1
Questions 1 and 2. Capture of transaction and customer profile data.	Data on more than 75% of customer records	Data on 51 - 75% of customer records	Data on 26 - 50% of customer records	Data on 1 - 25% of customer records	Not Collected
Question 3. Frequency of data management processes.	4 or more times per year	2 or 3 times per year.	Once a year.	Used less than once a year.	Not used
Questions 4, 5 , 6 & 7. Use of data for market modeling and performance measurement.	Usually or always used. (81-100%)	Used frequently. (61-80%)	Used half of the time. (41-60%)	Used occasionally (21 - 40%)	Never or seldom used. (0-20%)

Table 7.1: Scales Used to Measure Attributes of DBM Systems.

The following provides the theoretical and practical derivation of each question group derived from the seven categories depicted in Figure 7.2. The details of the seven question categories can be found in Appendix 7 (i.e. Questions 1 through 7), and a summary of question categories and scaling ranges is given in Table 7.2 at the end of this section.

7.3.2.1 Element 1 - Creating a Data-Rich Information Environment

The opportunities to acquire customer and prospect data are growing through sources such as credit applications, purchase records, national censuses, and compiled lists. The creation of effective marketing programmes often requires the merging of data from a wide variety of internal and external sources. Integrating data from a wide variety of sources creates a need for data cleansing - error correction, format standardisation, and duplicate elimination - to ensure efficient database management. All systems contain basic addressable data (i.e. name, street, city etc.) with postal codes which can be used for geographic segmentation. Basic name and address data were assumed to be present on all databases; hence, there are no questions related to these items.

Question 1 - Transaction Data

Question 1 determined data related to the transaction (exchange) process as defined in Bickert's (1992, p. 142) analysis of internal databases. Analysis of response and purchase behaviour can be used for both psychographic (i.e. needs, interests, etc.) and behavioural (i.e. benefits sought, usage, etc.) segmentation. Exact percentage measurements were not requested, because questionnaire testing revealed that most managers were familiar with the general order of their systems, rather than specific numbers. The total scores for this question block ranged from 5 to 55. The time period of three years was chosen from Burnett (1995, p. 97) as an appropriate time span of data records for modelling purposes.

Question 2 - Customer Characteristics

Question 2(a) collected data related to customer characteristics. Tynan and Drayton's (1987) study provided demographic segmentation variables for consumer marketing , and industrial segmentation variables for business marketing. The scaling used was the same as for question 1. This will gave total scores for consumer markets ranging from 5 to 50; Question 2(b) related to industrial markets, giving scores ranging from 6 to 30.

Question 3 - Marketing File Management and Enhancement

These questions were intended to determine management's efforts to maintain an accurate and pertinent marketing database through internal and external data processing procedures. The questions in 3(a) relate to procedures described in Shaw and Stone (1988b, pp. 95-96) for maintaining internal data quality. A 5-point ratio scale was used to measure the frequency of updating.

Questions in 3(b) were used to determine organisations' motivation to seek and utilise external data sources. Some organisations operate mutually beneficial data partnerships or agreements with other organisations (Premkumar and King 1991), which involve sharing or exchanging (swapping) data with both competitors and non-competitors. Furthermore, some systems use external sources of data to provide additional demographic (e.g. customer age, income) data and geodemographic codes (e.g. ACORN, PRIZM) to segment markets. Total scores for this question ranged from 0 to 12 points.

Question 3(c) utilised the same scale (i.e. 5 to 1) to measure the use of recency-frequency-monetary (RFM) systems (Hauser 1992) for removing inactive customers. Furthermore, RFM methods are considered as useful ways of tracking customer transactions (Jackson and Wang 1995) and enhancing profitability (Hughes 1995). Using RFM methods scored 5 points, while the remaining response options were based on time inactivity criteria, scoring 4 to 1 points; logically, old customer information is less valuable for current marketing decisions.

7.3.2.2 <u>Element 2 - Market Modelling</u>

Element 2 assesses companies' market modelling capabilities which are comprised of data analysis, creative marketing scenarios and economic assessment (Little 1979).

This three-step approach (Figure 3.3) was operationalised through three groups of questions which measured organisations' market modelling capabilities.

Question 4 - Quantitative Database Analysis

This group of eight questions measured the frequency of use of alternative analytical methods varying from simple queries (counts) to complex multivariate statistical modelling. Catalogue marketers undertake this activity to identify groups of customers that meet Kotler's (1988) criteria for effective segmentation (i.e. measurable, substantial, accessible, differentiable, actionable). Two recent papers (Coates et al. 1994; Hooley and Hussey 1994a) provided guidance to the range of analytical techniques employed in marketing applications.

An interval scale was used to measure the frequency of use. Clearly, these intervals are not exact; however, most research assumes equal intervals, so that parametric statistical techniques can be applied. Several research papers (Traylor 1983; Crask and Fox 1987) support this as a reasonable and valid assumption. The scores for this question block ranged from 8 to 40. The same scaling methodology was applied on questions 4 through 7.

Question 5 - Developing Marketing Scenarios

The main function of DBM is to effectively communicate with groups of customers (segments) with similar needs. Understanding these needs should facilitate the development of effective marketing programmes aimed at reducing marketing costs, improving profitability and strengthening customer relationships. Questions were derived from both theoretical segmentation texts (Lunn 1986; Kotler 1994) and practical

DBM texts (Shaw and Stone 1988b; Hughes 1991; Nash 1993). Questions in 5(a) and 5(b) were designed to capture the use of *single* segmentation criteria in defining a consumer or industrial group; while the questions in block 5(c) were intended to capture the use of *multiple* segmentation criteria to develop alternative marketing scenarios.

Question 6 - Economic Modelling

One of the key benefits claimed for DBM is the predictability of economic results. Questions 6(a) to (c) were designed to determine how frequently companies used budgeting (Shaw and Stone 1988b, p. 146), economic modelling (Nash 1986, pp. 395-397), and lifetime customer value (Jackson 1989; Keane and Wang 1995) models cited in the literature. Question 6(d) examined the extent to which organisations had developed on-line modelling, expert systems, or artificial intelligence to provide interactive (i.e. real-time) analyses of their marketing plans.

7.3.2.3 Element 3 - Performance Measures

The third element of the DBM model is performance measurement. Accurate measurement of marketing plans provides feedback which guides future data acquisition, market modeling and general management of the marketing process.

Question 7 - Use of Performance Measures to Evaluate Marketing Effectiveness

Shaw and Stone (1988b, pp. 147-154) describe an extensive list of over one hundred performance measures, which can be derived from DBM operations. The final list was reduced to 20 measures by reference to sales performance measures (Churchill et al. 1993, pp. 762-771) and discussions with DBM experts about the types of performance measures they had adopted.

An overall summary of the seven question groups, data processing codes and score ranges is provided in Table 7.2 below.

Question No.	General Description of the Data Collection	Range of Scores	
ELEMENT 1 - CREATING A DATA-RICH ENVIRONMENT			
1.	Accumulation of Transaction Data (TRANS)	11	55
2.(a)	Consumer Customer Characteristics (CON)	10	50
2.(b)	Industrial Customer Characteristics (IND)	6	30
3.(a)	Internal Data Management (FLIN)	4	20
3.(b)	Data Enhancement Processes (FLEX)	3	15
3.(c)	Use of RFM Methods (RFM)	1	5
ELEMENT 2 - MARKET MODELLING CAPABILITY			
4.	Use of Analytical Techniques (ANAL)	8	40
5.(a)	Consumer Segmentation Methodologies (CSEG)	4	20
5.(b)	Industrial Segmentation Methodologies (ISEG)	3	15
5.(c)	Use of Multiple Segmentation Criteria (MSEG)	3	15
6. (a-d)	Economic Modelling Methods (ECON)	4	20
ELEMENT 3 - USE OF PERFORMANCE MEASURES			
7.(a)	General Measures: Marketing Performance(FD)	20	100
7.(b)	Specific Industrial Measures of Performance (ID)	4	20

Note: Data processing codes are shown in parentheses.

TABLE 7.2 Grouping and Scores of Items in the Questionnaire

The next section explains data collection procedures relating to the 81 items, and the rationale for data purification procedures designed to produce a reliable measure of DBM system sophistication.

7.4 PURIFICATION OF THE CONSTRUCT

The purpose of this section is to explain the processes used to collect data; then purify and refine (reduce) the number of scale items to maximise the reliability of the scale. The collection of data on 81 items detailed above may seem excessive, but Churchill (1979) recommends:

> "The emphasis at the early stages of item generation would be to develop a set of items which tap each of the dimensions of the construct at issue. Further, the researcher probably would want to include items with slightly different shades of meaning because the original list will be refined to produce the final measure." (p. 68)

Furthermore, Churchill recommends that scale reliability be established before considering construct validity. As can seen from the theory and equation (4) in section 7.4.2.1, the process of improving reliability focused on minimising random error; this was an intuitively sensible step before attempting the complexities of validity testing explained in 7.5. Hence, steps 3 through 6 were designed as a parsimonious process, one which reduced the number of items and maximised the reliability of the scale.

7.4.1 STEP 3 - Data Collection

A detailed overview of data collection methodology and justification for the sampling frame were provided in chapter 6. Briefly recapping, an eight-page questionnaire was mailed to a random sample of 353 US catalogue companies. From postal returns, it was determined that 320 questionnaires were received. From this sample, 36 were returned fully completed, and another 4 were insufficiently complete or refused to participate in the study. Overall, the response rate was a disappointing 12.5%, probably as a result of the lengthy questionnaire and confidentiality of the data requested. Despite the disappointing response rate, an examination of responses revealed that several national consumer and industrial cataloguers had participated, capturing DBM users with databases ranging from 5,000 to 25,000,000 customer records. Having captured a broad range of DBM system environments, and knowing that the research design required further data collection, it was decided to use the 36 observations received as a basis for the purification process in step 4.

The 81 item scores from the 36 observations were entered into a data file for analysis, specifically the *SPSS for Windows* (Release 6.1) statistical package. The purification process and its theoretical justification are described in the next section.

7.4.2 <u>STEP 4 - Purify the Measure</u>

The calculations performed in this section relate to the provisional list of items shown in Table 7.2. Churchill recommends that reliability assessments be completed before dimensionality checks using factor analysis. Alternatively, Campbell (1976) recommended the use of factor analysis to provide *a priori* grounds for sensible reliability testing. The convenience of microcomputer based statistical packages enabled both methods to be incorporated into a heuristic process. Before explaining this process, it is necessary to briefly overview reliability theory, and explain why Cronbach's alpha was adopted as the most appropriate criterion of measuring reliability.

7.4.2.1 <u>Reliability Theory</u>

There are copious sources of literature on the reliability of measures relating to Spearman's (1904) classic notions of true and error components in scales (e.g. Symonds 1928, Cronbach 1951). The needs of psychologists, sociologists and marketers for reliable scales have promoted a number of classic psychometric texts (Nunnally 1967, 1978; Lord and Novick 1968; Stanley 1971) and specific marketing reviews (Peter 1979; Churchill and Peter 1984; Perreault and Leigh 1989). The following discussion presents the basic notions of reliability theory (Peter 1979), founded on the assumption that any observed measurements are defined by two components.

$X_{observed} = X_{actual} + X_{error}$ Equation (1)

where: X_{actual} is the average score that would be obtained if the person/object were remeasured an infinite number of times;

and X_{error} is the random errors from the true measurement that increase or decrease the true score.

From this it follows that the variance of an observed scale is comprised of a true component and an error component.

$V_{observed} = V_{actual} + V_{error}$ Equation (2)

where: V_{actual} is the variance of the actual component including systematic variance (Note: Identifying systematic variance is a validity problem).

V_{error} is the variance of the error component.

The error variance shown above includes all random and nonsystematic variance. In this research systematic variance would not affect the distance between observations or rank order of DBM systems, but a large error variance would have reduced the reliability of the construct. The reliability coefficient r_{tt} (i.e. the reliability of the observed measures as a measure of true reliability) can be stated symbolically as follows:

$$r_{tt} = \frac{V_{actual}}{V_{observed}}$$ Equation (3)

V_{actual} cannot be measured directly, but from Equation (2) it can be seen that

$$V_{actual} = V_{observed} - V_{error}.$$

Substituting this in Equation (3) gives:

$$r_{tt} = \frac{V_{observed} - V_{error}}{V_{observed}}$$

or restated $r_{tt} = 1 - \frac{V_{error}}{V_{observed}}$ Equation (4)

Equation (4) produces an equation that is both theoretically and intuitively correct i.e. the larger the random error, the lower the reliability of the construct.

The next section reviews the basic methods of reliability measurement.

7.4.2.2 Reliability Measurement

Carmines and Zeller (1979) describe four methods for assessing the reliability of a measurement scale: test-retest , alternative-form, split-halves method, and Cronbach's (1951) alpha test. Of the four methods listed, Cronbach's alpha has, according to the *Social Science Citation Index,* been cited in over 2,000 articles in the past 20 years. As Peterson (1994) observes:

> "Whether by acclamation or citation, coefficient alpha has effectively become the measure of choice for estimating the reliability of a multi-item scale. Indeed, coefficient alpha has become one of the foundations of measurement theory." (p. 382)

Before explaining Cronbach's alpha coefficient, a brief review of the reasons for rejecting the other three methods is provided.

1. Test-Retest Method. This method requires that the same test be administered to the same people after a period of time. The test-retest represents an intuitively appealing procedure to test reliability, but the approach has serious problems and limitations. First, there is the problem of specifying the time between measurement and remeasurement. Using short periods of time (i.e. two weeks) will result in the use of memory, and hence, overestimating reliability. Whereas, longer time periods (i.e. several months) may result in respondents reacting to changes in their environment. Second, in multi-item tests the test-retest correlation is only partly dependent on the correlation between different items, because part of the correlation of sums comes from each item with itself (Nunnally 1967, p. 215). This tends to falsely raise the reliability. Finally, there are the pragmatic problems of expense and getting busy, geographically dispersed marketing managers to respond a second time. For these reasons the test-retest method was rejected for this research.

2. Alternative-Form Method. This method also requires two tests with the same people. However, in the second test an alternative form of the same test is administered. This method was rejected as impractical, as no published alternative scale for measuring the sophistication of DBM systems exists.

3. Internal Consistency: Split-Halves Method. The split-halves method avoids the difficulties of administering two tests by dividing data collected on one occasion into halves. The scores of each half of the data are then correlated to obtain an estimate of reliability. This approach makes the assumption that the halves are approximations to alternative forms discussed above. The main problem with this method is determining how the items are divided into two groups. A typical approach is to divide the groups by odd and even numbered items. The method used to define alternative groups is almost immaterial, as alternative groupings will result in different correlations. For instance, a 10-item (2n =10) scale will, according to Bohrnstedt's (1970) formula, give 126 possible combinations. Hence, this method will not give consistent correlation results between halves due to the wide variety of groupings. As Nunnally (1978, p. 233) observes, "...it is best to think of the corrected correlation between two halves of a test as being an estimate of coefficient alpha." This problem was overcome by another form of internal consistency method: Cronbach's alpha coefficient.

4. Cronbach's Alpha Coefficient. This method has the advantage that it estimates reliability without splitting items or repeating tests. For this reason Cronbach's alpha coefficient (1951) is the most widely used, referenced and accepted measure of reliability (Peterson 1994). The formula for multi-item scales as a generalised measure of internal consistency can be stated as follows:

$$\alpha = \frac{N}{N-1}\left[1 - \frac{j\,\sigma^2(Y_i)}{\sigma_x^{\ 2}}\right] \qquad \text{Equation (10)}$$

where: N is equal to the number of items;

$j\,\sigma^2(Y_i)$ is equal to the sum of the item variances;

$\sigma_x^{\ 2}$ is equal to the variance of the total composite.

Cronbach's alpha reliability measures are easily calculated for subsets of items determined on an *a priori* basis. And conveniently, the SPSS package provided information on the revised alpha value that would result from deleting specific items which are currently included. Both Cronbach (1970) and Nunnally (1978) recommend alpha reliability coefficients exceeding 0.7. If this number is exceeded without discarding items then the reliability of the original scale may be judged as reliable, and remain unchanged. If the alpha is below 0.7 items may be dropped from the original scale to raise scale reliability before commencing factor analysis. The next section explains how Cronbach's alpha was used to purify the DBM systems measurement scale.

7.4.3 Scale Purification Process

The purification process was intended to maximise the alpha coefficient by eliminating items that were not contributing to the scale, or those which were increasing random error. This process is aided by producing a large correlation matrix, and using data reduction techniques such as factor analysis to aid in defining the underlying dimensionality of the construct. Some analysts would argue that factor analysis should be performed on the raw data; however, Churchill (1979) observes that this tends to produce unnecessary dimensions, which cannot be conceptually identified due to "garbage items." Two basic models of factor analysis are often used for this process: common factor analysis and principal component analysis. The main distinction between these two analyses is that in common factor analysis the presence of unique variance is taken into account, whereas in principal component analysis the intrusion of unique variance is ignored. Principal component analysis is generally preferred as it reveals "real" factors, as opposed to the "hypothetical" factors revealed by common factor analysis (Nunnally 1978, p. 332). Child (1990) raises the concern that factors contain some unique variance, but he agrees with most experts that this does not significantly distort the analysis. Problems arising from unique variance are reduced through the process of maximising coefficient alpha described above, which is intended to reduce the error variance component of unique variance. Therefore, principal component analysis was used to provide insights into the dimensionality of the construct, and support the parsimonious process. Hence, the main use of factor analysis was to confirm the dimensionality of the construct.

Studies using the purification process often appear to make questionable assumptions about the distribution of responses from interval scales. It is common practice in scale development to deal with every individual question as an item (i.e. Trans1, Trans2, etc.), and then *assume* that the results from a single five, six or seven-point interval scale are normally distributed. Before making this assumption, histograms of all 81 items were reviewed. As most individual question items were clearly *not* normally distributed this assumption was rejected; instead, it was decided to use the *a priori* assumption that the *sums* of selected items within each question block (i.e. 1, 2 ...7 shown in Table 2) were normally distributed[1].

The constraints of this approach negated the commonly used technique of producing a large correlation matrix (in this case 81 x 81) to determine the distinctive contribution of each item. This technique was replaced with a heuristic process for maximising alpha, which is shown in Figure 7.3. From table 7.2 above it can be seen that Questions 1, 3a, 3b, 3c, 4, 5c, 6a, 6b, 6c, 6d and 7a were common to both industrial and consumer marketers. This observation, combined with a review of item histograms, was used to create an initial scale with five question items as follows:

SUMQ3 = FLIN1 + FLIN2 + FLIN3 + FLIN4 + FLEX1 + FLEX2 + FLEX3 + FRM

SUMQ4 = ANAL1 + ANAL2 + ANAL3 + ANAL4 + ANAL5

SUMQ5 = MSEG1 + MSEG2 + MSEG3

SUMQ6 = ECON1 + ECON2 + ECON3 + DSS

SUMQ7 = FD7 + SUM(FD11 .... FD20)

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[1] A Q-Q plot (i.e. test for normality) for each categorical question used in the final results revealed that this normality assumption was reasonably valid.

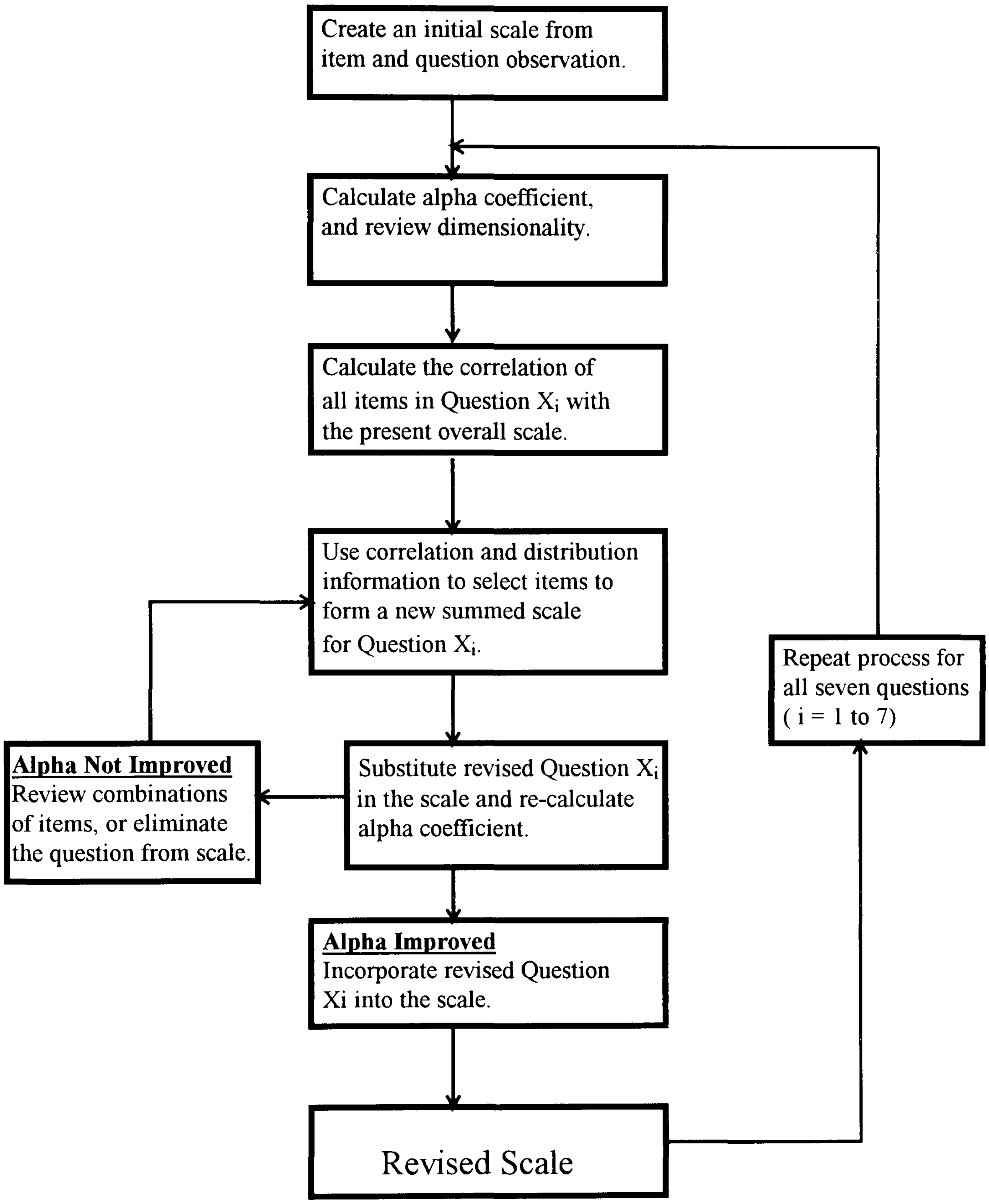

Figure 7.3 Flow Chart of the Process for Maximising Cronbach's Alpha Coefficient

The initial solution resulted in a low reliability coefficient alpha of 0.662, which failed to meet the minimum value of 0.7 recommended in the literature. But when checking dimensionality using principal component analysis as shown in table 7.3, the scores for each item loaded into one factor, indicating strong dimensionality in the underlying construct. As alternative items were tested in the process of maximising the alpha coefficient, these revised sets of items were reviewed to ensure that the underlying dimensionality was being maintained.

Sums of selected items in each question category	Factor Loadings
SUMQ3	0.840
SUMQ4	0.681
SUMQ5	0.680
SUMQ6	0.877
SUMQ7	0.818

Number of factors = 1

Table 7.3 Principal Component Analysis of the Initial Construct Solution

From the inter-correlation matrices for Questions 1 and 2, the initial categorical items for these questions were derived as follows:

SUMQ1 = TRANS1 + TRANS2 + TRANS3 + TRANS4 + TRANS6 + TRANS9

SUMQ2 = CON2 + CON3 + CON8

The revised coefficient alpha of the scale using all seven categorical questions was increased to 0.7243. To avoid a laborious discussion of each step, a summary (Table 7.4) is provided showing the general progression of the iterative process.

STEP NUMBER	COMPONENTS OF THE CONSTRUCT	ALPHA COEFF.	NOTES ON THE ADJUSTMENTS
1	= Q3+Q4+Q5+Q6+Q7	0.662	Initial solution as described above.
2	= Q1+Q2+Q3+Q4+Q5+Q6+Q7	0.724	Added category questions 1 and 2.
3	= Q1+Q2+Q3+Q4+Q5+Q6	0.802	Delete question 7.
4	= Q1+Q2+Q3+Q4+Q5+Q6+Q7	0.838	Add in revised items for question 7.
5	= Q1+Q2+Q3+Q4+Q5+Q6+Q7	0.854	Reduce items in question category 1.
6	= Q1+Q2+Q3+Q4+Q5+Q6+Q7	0.863	Remove one item from Q3, and one item from Q4.
7	= Q1+Q3+Q4+Q5+Q6+Q7	0.856*	Delete question category 2.

* A small increase in alpha is sacrificed, but the remaining scale is more robust i.e. it can be used to measure both industrial and consumer systems without alteration.

Table 7.4 Summary of the Iterative Process used in Scale Construction

This iterative process resulted in the selection of six categorical groupings (Table 7.5) containing 27 items that formed the final construct (Appendix 11). A principal components analysis of the finished scale revealed that the items naturally loaded into a single factor without rotation, thus indicating strong unidimensionality of the construct had been retained (Table 7.6).

CATEGORY QUESTION GROUP	FINAL ITEM SELECTION TO FORM SCALE	RANGE
1	SUMQ1 = TRANS1 + TRANS2 + TRANS4 + TRANS6	5 TO 20
3	SUMQ3 = FLIN1 + FLIN2 + FLIN3 + FLEX1 + FLEX2 + FLEX3 + FRM	7 TO 35
4	SUMQ4 = ANAL2 + ANAL4 + ANAL5 + ANAL7	4 TO 20
5	SUMQ5 = MSEG1 + MSEG2 + MSEG3	3 TO 15
6	SUMQ6 = ECON1 + ECON2 + ECON3 + DSS	4 TO 20
7	SUMQ7 = FD7 + FD12 + FD13 + FD14 + FD17	5 TO 25

Table 7.5 Summary of the Items Comprising the Final Construct

Sums of selected items in each question category	Factor Loadings
SUMQ1	0.8025
SUMQ3	0.7852
SUMQ4	0.6808
SUMQ5	0.6618
SUMQ6	0.8617
SUMQ7	0.8301

Number of factors = 1

Table 7.6 Principal Component Analysis of the Final Construct

As stated earlier, it is desirable that items and measures show high inter-correlation in order to demonstrate that the same domain is being measured. Nunnally (1978) developed a method of testing to reveal whether items have been correctly categorised within scales. His approach considers the correlation of each item with its element-score correlation. Table 7.7 provides evidence that items were correctly assigned to the three elements.

The procedure described in this section was intended to produce a content reliable measure of the level of sophistication of DBM systems. The strength of the results indicated that a very reliable construct had been developed. Following Churchill's paradigm required that further data be collected to confirm the results obtained from the first sample. This is step 5 in Churchill's construct development process.

Element	Item Number	Element 1	Element 2	Element 3
Creating a Data-Rich Environment	Q1-Trans1	**0.561**	0.551	0.528
	Q1-Trans2	**0.512**	0.384	0.473
	Q1-Trans4	**0.517**	0.401	0.502
	Q1-Trans6	**0.699**	0.557	0.477
	Q3-Flin1	**0.555**	0.476	0.373
	Q3-Flin2	**0.720**	0.619	0.623
	Q3-Flin3	**0.624**	0.447	0.251
	Q3-Flex1	**0.534**	0.377	0.431
	Q3-Flex2	**0.602**	0.354	0.255
	Q3-Flex3	**0.564**	0.447	0.400
	Q3-Rfm	**0.503**	0.301	0.304
Market Modeling	Q4-Anal2	0.374	**0.580**	0.299
	Q4-Anal4	0.530	**0.722**	0.426
	Q4-Anal5	0.501	**0.759**	0.373
	Q4-Anal7	0.346	**0.385**	0.212
	Q5-Mseg1	0.409	**0.500**	0.416
	Q5-Mseg2	0.450	**0.549**	0.398
	Q5-Mseg3	0.532	**0.703**	0.477
	Q6-Econ1	0.612	**0.763**	0.738
	Q6-Econ2	0.534	**0.679**	0.503
	Q6-Econ3	0.516	**0.597**	0.313
	Q6-Dss	0.534	**0.666**	0.364
Performance Measurement	Q7-Fd7	0.527	0.525	**0.820**
	Q7-Fd12	0.555	0.458	**0.825**
	Q7-Fd13	0.680	0.622	**0.825**
	Q7-Fd14	0.483	0.585	**0.764**
	Q7-Fd17	0.683	0.557	**0.776**

Note: Critical value of correlation at 5% level (n = 36) is 0.32

Table 7.7 Item to Scale Correlation Matrix for Items in the Final Construct

7.4.4 STEP 5: Collect New Data

The DBM construct was re-assessed by collecting further empirical data from a second random sample of 360 catalogue companies, and is specifically described in the second fieldwork study in chapter 8. For the second study a revised, shorter questionnaire was prepared using the 27-item construct to measure the sophistication of companies' DBM systems. The second stage of fieldwork gathered 69 useable responses from the sample. Capturing responses from a separate random sample of companies provided new data from which the reliability of the construct could be re-evaluated.

7.4.5 STEP 6: Re-evaluate Reliability of the Construct Using New Data

Table 8.8 details the results of this process, and they confirm an overall Cronbach's alpha coefficient of 0.841 based on returns from a total of 105 companies. This value exceeds the 0.7 value normally used, and the 0.77 mean value found in a meta-analysis of 832 studies (Peterson 1994, p. 388).

Rigorously implementing steps 1 through 6 of Churchill's generated a *reliable* measure of DBM sophistication. Unfortunately, this does not guarantee the *validity* of the construct. Accordingly, the requirements and processes associated with validity testing are now described.

7.5 CONSTRUCT VALIDITY

The procedure described previously produced a measure that was an internally consistent and reliable measure of the level of sophistication of DBM systems. Producing an *internally* consistent measure often gives researchers an indication of construct validity, but other tests were still applied for full confirmation. Non-random error, resulting in systematic biasing, prevents scales and indicators from accurately measuring the construct. Althauser and Heberlein (1970) observe that,

> "... matters of validity arise when other factors - more than one underlying construct or methods factors or other unmeasured variables - are seen to affect the measures in addition to one underlying concept and random error." (p. 152)

Validity is defined as "....the extent to which any measuring instrument measures what it is intended to measure" (Carmines and Zeller 1979, p. 17). Nunnally (1978, p. 87) provides a caveat concerning the above definition in this statement: "Strictly speaking, one validates not a measuring instrument but rather some use to which the instrument is put." A further factor to consider in assessing validity is the degree to which the variable is concrete or abstract (Nunnally 1978, p. 95). Measurements of concrete variables (e.g. reaction time) are reasonably well established and may not need to be validated; conversely, many marketing variables are often highly abstract (e.g. satisfaction, recognition) and more prone to measurement error (Cote and Buckley 1987). The DBM construct being validated in this research uses a questionnaire to determine the presence and use of data, modelling methodologies and performance. It could be argued that these are specific observable variables, and hence, validation is unnecessary. But, in Churchill's view, such a construct is only a half-formed hypothesis representing *one* scientist's view of DBM phenomena.

A useful final scale must be capable of differentiating between different levels of sophistication in DBM systems. Nunnally (1978) concluded that complex statistical methodologies and logical intricacies of construct validity still provide only "circumstantial evidence" of the usefulness of a new measure. This discussion is the background to several procedures which were applied to provide evidence of validity for the construct scale.

7.5.1 Content Validity

Content, or face, validity is a common method of validity testing. Nunnally (1978, p. 91) states: "For some instruments, validity depends primarily on the adequacy with which a specified domain of content is sampled." Nunnally provides two qualitative standards for ensuring content validity:

1. A representative collection of items.
2. Sensible methods of test construction.

Sampling difficulties often confound the first standard, particularly in situations where the domain is complex or large. Researching and publishing a generic model of DBM systems was intended to clearly define the domain for this research. The model exposed the elements to management experts, researchers, and academics to obtain general agreement on DBM's domain. Hence, when the content of a measure "looks as if" it represents a construct, then it may be used on a consensus basis (Heeler and Ray 1972).

An examination of items comprising the final scale underlined the importance of file management and market modelling capabilities. The five performance measurement items selected into the construct were ones that enhance managers' understanding of effectiveness, promotion and customer acquisition economics. Typically, these are key features of sophisticated DBM systems described in the literature.

The second standard is more difficult to satisfy. Questions of scaling, weighting, and inclusion of items are often representative of researchers' values. Using factor analysis, as previously described, provided a measure of internal consistency which partially assisted researchers in overcoming these difficulties. The next section describes how an independent criterion-related validity test was developed and applied to further demonstrate the validity of the construct.

7.5.2 <u>Criterion-Related Validity</u>

Criterion-related validity provides objective information on the meaning of measures, which clearly has important pragmatic significance when developing constructs for marketing applications (Heeler and Ray 1972). Nunnally's (1978) ideas on criterion-related validity (which he refers to as predictive validity) help in understanding the importance of this test when measuring DBM activities. Establishing criterion validity is important as,

> "... the purpose is to use an instrument to estimate some important form of behavior that is external to the measuring instrument itself, the latter being referred to as a criterion." (p. 87)

For the purposes of this research this criterion was interpreted as the ability to perform advanced DBM applications for direct marketers.

Hence, an effective measure of sophisticated DBM should have a strong relationship with advanced DBM applications. To avoid observer bias, these applications were independently derived from Schultz and Wang's (1993) survey of the current state of DBM. Their study identified five groups (A - Highest to E - Lowest) of DBM capabilities in descending order of use. The seven highest ranked applications in Group A were then incorporated in the questionnaire as question 8 (Appendix 12). Hence, companies with sophisticated DBM should have developed these DBM applications.

The resulting correlation coefficient calculated between the two measures was 0.697 ($n = 105$, $p < 0.001$), and a scatter diagram shows a strong positive relationship between the two variables (Appendix 13). These results demonstrate that the final construct was strongly associated with an independently defined list of advanced DBM applications.

7.5.3 Convergent-Divergent Validity Testing

Campbell and Fiske's (1959) paper provides a rigorous exposition of convergent-divergent validity testing, mainly emphasising the use of a multitrait-multimethod (MTMM) matrix. Several studies (Ruekert and Churchill 1984; Seymour and Lessne 1984) provided researchers with excellent examples of how these guidelines should be applied and interpreted. Essentially, the approach requires the inclusion of both additional scales and alternative measurement methods. Fully implementing these approaches requires a prior foundation of research and extended data collection. The remainder of this section describes how limited convergent validity tests were performed, and the difficulties of applying divergent validity testing in this field of research.

7.5.3.1 Convergent Validity

Conducting a proper convergent validity would have required showing convergence with a previous established similar construct; this was partially established with the criterion-validation described above. As no such construct exists, convergent validity was investigated by determining the extent to which the components of a domain converged on some underlying common construct providing *internal consistency* (Nunnally 1978) evidence of validity. This method require demonstrating significant correlation among the three elements of DBM sophistication. Deng and Dart (1994) demonstrated this approach as an item-to-scale correlation matrix. Table 7.8 demonstrates significant correlation between the three pairs of elements of DBM systems. These correlation values provided further confirmation that the three components were all measuring the same domain.

	Element 1	Element 2	Element 3
Element 1	1.0	0.771	0.715
Element 2		1.0	0.661
Element 3			1.0
Correlation with construct of DBM system sophistication.	0.925	0.921	0.894

Table 7.8 Correlation between Elements and the Overall Construct.

Further support for convergent validity is provided by the factor analysis. This form of validation often requires that data be "forced" into a one factor solution; however, the results above naturally formed a single factor (table 7.6), indicating strong internal consistency. The high *eigen* value provides further confirmation that the items are measuring a common domain.

Convergent validity provides important evidence of consistency, which is a necessary, but not confirmatory, condition of construct validity. The measure should not only provide convergent validity, but must show that it is novel and not a reflection of some other variable. Such approaches are described as divergent or discriminant validity testing, as is discussed below.

7.5.3.2 Discriminant Validity

Heeler and Ray (1972) believed that the use of "... discriminant validation is absolutely necessary to really pin down the meaning of measures (p. 362)." In order to demonstrate discriminant validity, it would have to be shown that the DBM construct had a poor correlation with some other construct from which it should vary. When fully applying MTMM philosophies, determining true discriminant validity requires the use of both different measuring methods and scales.

Conversely, Peter (1981) argues that making decisions about measures and "maximally different methods" on an *a priori* basis is very difficult. Several studies (Bagozzi and Yi 1991; Peter 1981) reviewing MTMM validity testing were critical of the application and interpretation of MTMM approaches. Besides, from a pragmatic viewpoint, adding other measures would have further lengthened and complicated the survey questionnaire. Therefore, this kind of divergent testing was limited by a lack of prior DBM research, availability of alternative constructs, and survey practicalities. Because of these constraints, it was not feasible to conduct discriminant validity testing.

7.6 STEP 8 - DEVELOPING NORMS

The main purpose of the process described in this chapter was to generate a parsimonious, reliable and valid scale to measure the level of sophistication in DBM systems. This DBM construct, derived from empirical data, has quantitative scale properties and should be capable of measuring the differences between systems. The following criteria summarise the statistical characteristics of the construct, and clearly demonstrate its potential utility for establishing industry norms, benchmarks and research studies.

(a) Scale Reliability. The scale developed from empirical data exhibited high reliability (Cronbach's alpha = 0.86, n = 36) when compared with a mean of 0.77 from a study of 832 constructs (Peterson 1994). In the case of this research, several items were combined to form six categorical items. However, it is common practice in most studies to calculate the alpha coefficient based on each question item retained in the final scale (i.e. 27 items). Adopting this approach revealed an even higher alpha value of 0.92, further confirming the high level of reliability of the final scale.

(b) Dimensionality. A principal components analysis of the final construct resulted in only one factor and very high loadings on each of the six categorical items. This indicated that the six items were all measuring the same factor. Thus, the construct can be said to have a high unidimensionality.

(c) Inter-Correlation of Items. The six categorical items are highly inter-correlated, most at the 1% confidence level.

(d) Parsimony. The number of items was reduced from 81 to 27. Thus a relatively simple measurement scale has been created.

(e) Robust. The empirical data used to develop the construct was obtained from the full spectrum of catalogue companies, not a specific group. Furthermore, the scale can be applied to both consumer and industrial DBM systems without adaptation.

(f) Normality A plot of total scores for the construct indicated that the results from the scale are normally distributed.

The summary of results above suggests that a reliable and valid measure of the level of sophistication in DBM systems was developed from the empirical data collected.

7.7 CONCLUSIONS

Rigorously following Churchill's paradigm yielded a parsimonious, reliable and valid multi-item construct to measure the level of sophistication in DBM systems. However, several influential theorists (e.g. Cronbach, Nunnally) concur that it is difficult, if not impossible, to fully establish the validity of a construct in one study. The literature cited constantly stresses the difficulties of proving the validity of a construct in a single study, because the construct must be subjected to wider academic scrutiny. Evolution in marketing practice will require that this new marketing measure be subjected to rigorous quantitative and qualitative procedures. Ultimately, however, it is hoped that the construct may form the basis of a benchmarking system for DBM system designers, as well as provide an impetus for future DBM research studies.

Generating a large number of items ensured a full description of DBM's domain. The six categorical items selected into the multi-item measure provide empirical support for the three-element model developed in Chapter 3. Overall, the items strongly emphasise market modelling capabilities, which should be expected. Creating a data-rich information environment appears to be dependent upon the collection of detailed transaction data and data management methodologies. Apparently, collecting data on customer characteristics (i.e. demographics) had little impact on the model; whereas, transaction data facilitates behavioural segmentation linked to pricing and product information. This facet of the results was very interesting, and perhaps demonstrated cataloguers' concentration on niche marketing. The selected feedback elements emphasise the importance of controlling promotion expense, customer acquisition cost, and effective selection of products (i.e. sales per page); likewise, these items are intuitively correct. Overall, the generic nature of the items in the resulting construct is common to all DBM systems, consequently implying that this measure could be used to assess the sophistication of DBM systems in a wide variety of environments.

The false assumption of normality for each of the 81 items was overcome by developing categorical scores for each of the seven question groups, and then developing a heuristic approach for maximising Cronbach's alpha coefficient. This was an innovative approach, made possible by the use of PC-based statistical packages, for achieving effective data reduction when faced with a research domain containing a large number of items. Adopting this approach resulted in seven categorical groupings with statistical characteristics that closely approximated the normal distribution, and as a result, complied with the assumptions present in the theory of Cronbach's alpha coefficient.

Gathering empirical data from a broad cross-section of catalogue marketers captured the perspective of the entire business sector - companies whose very existence depended upon the effective deployment of DBM systems. The response of this group to the questionnaire (12.5%) was disappointing, but not unexpected in view of the length of the questionnaire and confidential nature of the strategic information requested. However, the range of database sizes, organisation names, and management level of respondents suggest that an appropriate cross-section of quality data was obtained.

The next chapter explains how the construct was applied in the second stage of fieldwork to capture further data for hypothesis testing.

CHAPTER 8

FIELDWORK II: DATA COLLECTION AND ANALYSIS

8.1 INTRODUCTION

The previous chapter explained how a parsimonious approach was adopted for the development of a reliable and valid construct to simplify data collection and analysis. This facilitated the design of a shorter questionnaire, which was less time consuming for respondents to complete. Improving the efficiency of the questionnaire was important, as the geographic locations of respondents, and nature of the hypotheses, continued to dictate the use of postal survey methods as justified in chapter 6. An improvement in response rates was desired to reduce the possibility of non-response error, and this issue is given detailed consideration in this chapter.

The first three sections of this chapter describe modifications to the questionnaire for the second phase of fieldwork, review practical alternatives to improve response rate, and explain the sampling and mailing process. The final section examines the three data sets collected over a period of a year from catalogue marketers for consistency and bias.

8.2 REVISIONS TO THE QUESTIONNAIRE

The questionnaire developed for phase 1 of the data collection also contained questions and scales to gather data for hypothesis testing. It was anticipated that this might negatively impact response rate, but it also had several benefits. First, it provided insights into the inclination of respondents to complete the long scales used for measuring market orientation and locus of control. Second, it served as a pilot study to determine whether respondents experienced any difficulties with specific questions. Finally, it provided a baseline of statistical data for reviewing the second and third phases of data collection. The first stage of data collection resulted in 36 useable responses. Revisions to the questionnaire and amendments to the questionnaire for the second stage of data collection are described in this section. The robust statistical results for the construct made scaling changes unnecessary.

The construct developed in the previous chapter reduced the number of data items collected on DBM systems from 81 to 27. This resulted in a shorter questionnaire following the principles of design detailed in chapter 6. The directions for questionnaire completion were also shortened and slightly modified to give a simpler appearance; specifically, confidentiality and the benefits of increased knowledge about DBM systems were emphasised. The revisions to the questionnaire used in stage one of the data collection process were as follows.

Question 1 - Type of Market Served

The development of a common construct for both consumer and industrial markets required a new question to determine the different type of markets served by responding companies. This was inserted as Question 1, and asked whether the business focused its products and services on consumers, businesses, or both. This question was inserted at the beginning of the questionnaire to provide categorical data on type of market served, position the respondent, and retain as many common question numbers as possible between questionnaires to ensure orderly data entry.

Consumer and industrial DBM systems can be differentiated by the data collected in Question 1. Hypothesis testing involves comparing the scores for industrial and consumer DBM systems derived from the questions 2 through 7; hence no other data acquisition is envisaged to validate this hypothesis. For clarity the acronyms used in later data analyses are provided in parentheses.

Questions 2 to 7 - Construct to Measure Sophistication of DBM Systems (SOPHTOT)

Chapter 7 provided justification and rationale for the specific inclusion of these items in the construct. For purposes of clarity, and to avoid repetition, a summary table (Table 8.1) is provided showing relationships and score ranges of the final 27 items in the construct.

Question 8 - Construct Validity Test Question (VLDTOT)

As stated in chapter 7, this question was included as a validity test for the construct using questions derives from Schultz and Wang's (1993) survey. Conceivably, this question could have been eliminated in the second phase of data collection to further reduce the length of the questionnaire. But this short scale has high reliability, and strong correlation with SOPHTOT, making it a useful alternative measure of the level of sophistication in DBM systems. Consequently, responses to this question can be used as an alternative test of consistency for both individual responses and the three sets of data collected.

Question Number	Phase 1 Question Number	Description of Data Items	Range of Scores Low	High
ELEMENT 1 - CREATING A DATA-RICH ENVIRONMENT				
Q2-Tran1	Q1-Trans1	Accumulation of Transaction Data	4	20
Q2-Tran2	Q1-Trans2			
Q2-Tran3	Q1-Trans4			
Q2-Tran4	Q1-Trans6			
Q3a-Flin1	Q3a-Flin1	Internal Data Management	3	15
Q3a-Flin2	Q3a-Flin2			
Q3a-Flin3	Q3a-Flin3			
Q3b-Flex1	Q3b-Flex1	Data Enhancement Processes	3	15
Q3b-Flex2	Q3b-Flex2			
Q3b-Flex3	Q3b-Flex3			
Q3c-Rfm	Q3c-Rfm	Use of RFM Methods	1	5
ELEMENT 2 - MARKET MODELLING CAPABILITY				
Q4-Anal1	Q4-Anal2	Use of Analytical Techniques	4	20
Q4-Anal2	Q4-Anal4			
Q4-Anal3	Q4-Anal5			
Q4-Anal4	Q4-Anal7			
Q5-Mseg1	Q5-Mseg1	Use of Multiple Segmentation Methods	3	15
Q5-Mseg2	Q5-Mseg2			
Q5-Mseg3	Q5-Mseg3			
Q6a-Econ1	Q6a-Econ1	Use of Economic Modelling Methods	4	20
Q6b-Econ1	Q6b-Econ1			
Q6c-Econ1	Q6c-Econ1			
Q6d-Dss	Q6d-Dss			
ELEMENT 3 - USE OF PERFORMANCE MEASURES				
Q7-Fd1	Q7-Fd7	Performance Measures	5	25
Q7-Fd2	Q7-Fd12			
Q7-Fd3	Q7-Fd13			
Q7-Fd4	Q7-Fd14			
Q7-Fd5	Q7-Fd17			
		Overall Range for Construct	27	135

Table 8.1 Listing of Questions in the Final Construct

Question 9 - Database Size (DBSIZE and LGDBSIZE)

No changes to the structure of this question were necessary based on the responses received.

Question 10 - Scale to Measure Work Locus of Control (LOCCONT)

Responses to this construct were complete and no changes appeared to be necessary. Changes to questions 1 - 8 provided a suitable space for this question on page 4 of the questionnaire. Hence, the sequencing was slightly changed for the practical reason of minimising the number of pages in the questionnaire. It was not believed, and the consistency of results confirm, that this change affected results in any way.

Question 11 - Measuring Market Orientation of the Organisation (MKTORT)

Responses to this construct were very good, although several respondents from small companies (i.e. employees < 10) indicated problems with the integrating of information from "departments." However, no changes were made to any questions in the market orientation construct.

Question 12 - Background Information on Respondents

No changes to these six questions appeared necessary, and data were gathered on these variables to provide greater clarity of the overall results.

The above revisions to the questionnaire reduced the length of the questionnaire by two pages (25%). This was intended to be more efficient for respondents, and hence encourage greater participation in the study. In the next section, other ways of motivating a greater number of catalogue marketing managers to respond are considered. Increasing response rate was necessary to reduce non-response error and give an indication of whether respondents were a representative sample of the population.

8.3 STIMULATING A HIGHER RESPONSE TO THE QUESTIONNAIRE

A plethora of research papers exist on alternative methods for maximising response in mail surveys (e.g. Pressley and Tullar 1977, Jobber 1986, Schneider and Johnson 1995). Often these papers present conflicting evidence about a wide variety of appeals, incentives and communication ploys used to attain higher levels of response from mailed surveys. The purpose of this review was to determine the best ways of improving response within the specific cost and time resource constraints of this research.

Recent research relating to industrial mail surveys was given greater credence over studies of consumer response, which are completed under different conditions (Jobber 1986). Consumer surveys tend to be shorter than industrial surveys; furthermore, busy executives have become inundated with requests in recent years as " ... the industrial mail survey appears to be increasing in popularity (Mitchell and Nugent 1991, p. 257)." Finally, it must be recognised that the information requested in this survey is of a proprietary nature, defining a valuable strategic resource within these companies. As explained in chapter 6, the typical response rates for similar published surveys of US direct marketers is 12% (e.g. Schultz and Wang 1993). After considering these factors the goal of a useable response rate of 25% was set for the second random sample of cataloguers across the US. For brevity this review covers only methods having demonstrated consistent increases in response rate; specifically, these techniques are telephone pre-notification, monetary incentives, non-monetary incentives, type of appeal, and follow-up mailings.

8.3.1 Telephone Pre-Notification

Mitchell and Nugent (1991) provide a comprehensive review of telephone pre-notification - sometimes described as foot-in-the-door requests - as a method of gaining commitment to participate in industrial surveys. The benefits of this technique are supported by several other studies (Hansen et al. 1983, Jobber et al. 1985), which reported increases in response of 14% from studies of senior buyers and local authority planning departments. Hansen et al. (1983, p. 168) provide a useful logic tree showing possible outcomes of pre-notification phone calls to contact senior managers. While this paper provides useful insights into the process of telephone pre-notification, their study was not sufficiently robust as they only contacted managers in the Minneapolis-St. Paul area, where they were known researchers at the city's major university, with a request to complete a short (40-item) questionnaire.

Mitchell and Nugent's study recognised the cost, time, researcher fatigue and difficulty of reaching senior managers that are endemic to this approach. Furthermore, their study cited a 350% growth in surveys in the UK from 1984 to 1989, demonstrating the increasing demands on managers' time since many of the these research studies were completed. For instance, Pavlides (1993) made multiple telephone contacts with a small sample of marketing managers in merchant banks, and still only obtained a 50% participation rate, mainly due to a reluctance to divulge information of a strategic nature. Some non-respondents were contacted by phone after responses collected in stage one were received, but only 50% could be reached with the first call, which resulted in an average of 4 contacts per hour. The average long-distance cost for a five or six minute call was £1.00. Hence, the resources for pre-notification of 360 respondents was estimated at a minimum of 90 hours of caller time, and at least £360 in long-distance charges. This time resource was not available to the researcher during normal working hours and so a contract telemarketing company was contacted. A cost of £ 1.50 per call was quoted giving a total cost of £540. This was rejected on cost-efficiency grounds when compared with the cost of a follow-up mailing (section 8.3.5).

8.3.2 Monetary Incentives

A number of studies (e.g. Kimball 1961, Pressley and Tullar 1977) have demonstrated the effectiveness of small monetary incentives (i.e. inclusion of a 10 [dime] or 25 [quarter] cent coin) as a method of increasing response in both consumer and industrial surveys. The simplest explanations for this effect are reciprocity (Gouldner 1960) and the sense of importance the questionnaire gives to potential respondents. Clearly, such small financial incentives do not compensate senior managers for their time, but appear to present a symbolic gesture of the importance of their response.

Considering the apparent effectiveness of monetary incentives, it is surprising that few references are made to their use in academic studies or doctoral research. An apparent problem is that some respondents may be indignant at a researcher considering their time of such little value, and thus, they do not respond (Bailey 1987, p. 157). Schneider and Johnson's (1995) recent investigation of the use of monetary incentives in surveys of business professionals concluded:

> "... it is clear that monetary reward, when used in conjunction with help-the-sponsor appeal in university sponsored research, can do more harm than good in terms of the overall response rate." (p. 274)

So as to avoid offending senior marketing managers the inclusion of a monetary incentive to increase response rate was rejected in this research.

8.3.3 Non-Monetary Incentives

Non-monetary incentives (e.g. pens, gifts, information) have a purpose similar to monetary incentives, but in the main have a weaker effect (Hansen 1980). Jobber et al. (1991) reported that a well-chosen gift provided a powerful response stimulus in international surveys. Nevertheless, the enclosure of a gift is philosophically very similar to the use of monetary incentives, and this was rejected for the same reasons as cited in 8.3.2. However, the promise of useful information (i.e. article, survey results) was retained, despite Jobber's (1986, p. 186) observation that this kind of incentive has little effect on response rate. Hence, the article was sent as a courtesy with a letter thanking respondents for their participation, but only if they requested such information.

8.3.4 Type of Appeal

Type of appeal can be either egoistic or altruistic. Ego appeals stress the importance of respondents' interests in participating in a study (i.e. express their opinion, have a voice in decision making). Altruistic appeals can be *help-the-sponsor* requests to complete the survey, or *social utility* appeals to help your profession progress in its knowledge. Jones and Linda (1978) found the social utility appeal more effective than either the ego or help-the-sponsor appeals. Unfortunately, this study didn't investigate the interaction effects of appeals and sponsorship, which can be of considerable importance in survey management. Schneider and Johnson (1995) found that the help-the-sponsor appeal was particularly effective in generating response for industrial surveys when implemented under university sponsorship. As stated above, the response rates to this type of appeal were higher when monetary incentives were not included. Thus, the theme of help-the-sponsor was adopted to open the covering letter. Other altruistic appeals, relating to social utility, were retained from the previous letter.

because they are generally found to enhance survey response (Yammarino et al. 1991, Frankfort-Nachmias and Nachmias 1996).

8.3.5 Follow-Up Communications

Several studies (Jobber et al. 1988; Tullar et al. 1979) demonstrated increases in response rates of 50% from managers by using a follow-up mailing of the questionnaire. Conventional wisdom suggests that recipients who have failed to respond to the first questionnaire will also decline further mailings. Perversely, two reasons explain why managers respond to a follow-up mailing: timing and perceived importance. First, managers sometimes receive the first mailing at a particularly busy time in their annual schedule, whereas the follow-up mailing is received when they are less busy and, perhaps, more prone to participate. Second, the additional cost and time of a follow-up mailing raises the perceived importance of the survey in the recipients' perspective. The additional cost of this alternative was estimated at approximately £200. A follow-up mailing of the questionnaire was planned as a cost-effective method of increasing response rate.

Having specified the revised structure of the questionnaire and cover letter, and determined appropriate methods for increasing response rate, the next sample for data collection was created.

8.4 SAMPLING AND DATA COLLECTION

A second sample of 360 catalogue companies was selected at random from the 7091 companies in *The Directory of Mail Order Catalogs*. Companies contacted in the first sample to create the construct in chapter 7 were excluded from this sample to give insights into possible bias resulting from non-response error in the first sample. The sample size was based on a doubling of the useable response rate achieved in chapter 7 (i.e. 12%) to 25% resulting in an expected yield of 90 responses. This would provide an overall sample of 110 - 125, consistent with other published studies of DBM systems detailed in chapter 6. The name of the company's president or marketing manager was required to be listed in the directory, so as to personally address the covering letter to the appropriate decision maker, which followed Linsky's (1975) finding that personal communication is important in achieving effective response. A revised cover letter was drafted to include a strong help-the-sponsor appeal opening, and a social utility appeal to make a contribution to their industry. Once again the letter made a clear request for the individual responsible for marketing decisions to complete the questionnaire. A deadline for response was not included in the letter as Vocino (1977) had shown that this had little impact on response rate. The letter is shown in Appendix 14.

The "Notes on the Questionnaire" were simplified and again presented on Maryville University stationery. As observed earlier, the strategic nature of the data being requested required that confidentiality of results be clearly emphasised again (Appendix 15).

A stamped, addressed and coded Maryville University envelope was provided for respondents to return the questionnaire (Appendix 16). A stamped envelope was used in preference to a business reply envelope as this had shown a small increase in response when used in a recent study of marketing executives (Clark and Kaminski 1994).

Interestingly, it is a believed that the cost of the stamp raises the perceived importance of the study.

The letter, questionnaire and return envelope were inserted into a 15 x 23 cm envelope with a Maryville University return address. The mailing of the stage 2 random sample was divided into two phases[1]. Figure 8.1 displays the overall sequence of mailings used for the two random samples, and the phase number designated for data analysis purposes. Once again, the survey package was mailed first class to ensure that undeliverable packages would be returned, thus giving an accurate count of the number of questionnaires actually received. This allowed respondents and undeliverable addresses to be removed before sending reminder letters and follow-up questionnaires. The phase 2 mailing was sent out in October 1996.

Plotting a daily cumulative response curve (de Chernatony 1990, Blumberg et al. 1974) was tested during the first mailing as a method for determining the timing of reminder letters. Unfortunately, response stayed constant over a six day period, presumably because of the time delays in mailing and response over such a wide geographic area. The suggestion by some researchers (e.g. Etzel and Walker 1974) that a "rule of thumb" time delay be used before sending out reminders was adopted. Using the experiences from the Phase 1 mailing, this time delay was set at 10 working days. A copy of the reminder letter is shown in Appendix 17.

[1] Stage one sample, used in chapter 7 to gather data for the construct, was designated as the phase 1 mailing. Hence the two mailings from the stage two sample were designated as the phase 2 and 3 mailings for data analysis purposes (see section 8.5).

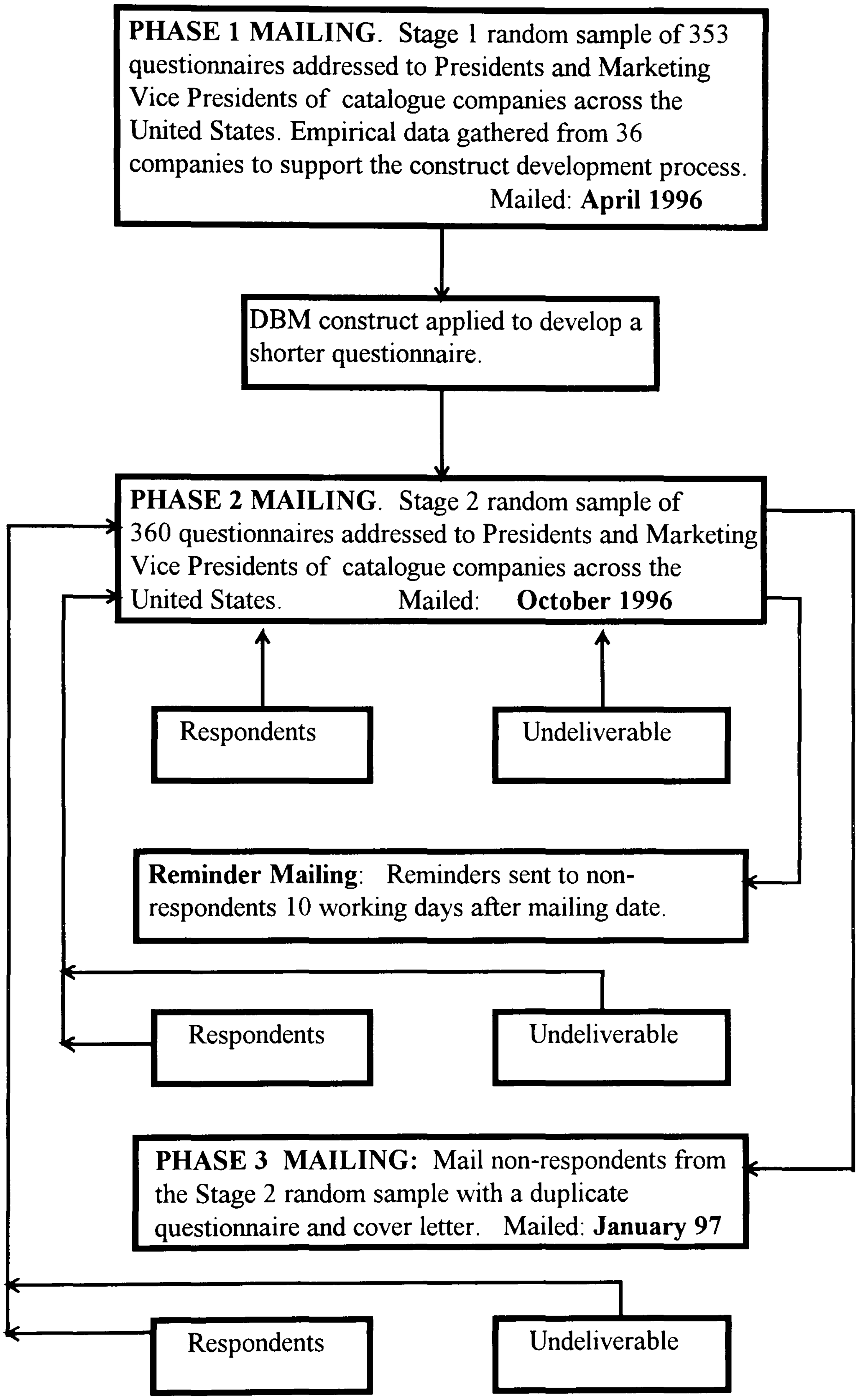

Figure 8.1 Flowchart of the Mailing Process for the Second Sample

Deciding on an appropriate time for the mailing of non-respondents was determined by considering catalogue managers' workload. November and December are the busiest months for most catalogue companies because of the Christmas season. Hence, the follow-up mailing was planned for early January, when managers were thought to have a lighter workload.

The data collected in all three phases of the research process were entered directly into a SPSS 6.1 for Windows 95 statistical package. A total of 105 useable responses were received (Appendix 18), and the next section examines this data for consistency and bias.

8.5 EVALUATION OF THE DATA FOR CONSISTENCY AND BIAS

Normal concerns about possible bias and consistency of data are examined in this section. As explained in section 8.4, data were collected from two independent samples, using three mailings. The results from data gathered from two independent samples, at three different times of the year, could now be compared for consistency and bias. Therefore, the following analyses are presented in this section: a review of response rates; a test of response distribution; a profile of respondents; and descriptive statistics for each of the main research variables.

8.5.1 Response Profiles

Two data samples (i.e. 353 and 360) were selected at random using a uniform random number generator from the catalogue companies listed in *The Directory of Mail Order Catalogs*. As described earlier in this chapter, a disappointing response rate of 12.5% was attained from the first sample, and several changes were introduced to attain a higher response from the second sample. Table 8.2 shows that these measures were effective, producing an overall response of 24.7% from companies contacted in the second sample.

Sample	Sample Size	Postal Returns - Undelivered	Net Survey Forms Received by Companies	Total Responses	Useable Responses	Overall Response Rate (%)
Sample 1	353	33	320	40	36	12.5
Sample 2	360	48	312	77	69	24.7
Overall	713	81	632	117	105	18.5

Table 8.2 Response Analysis of the Two Random Samples

The timing and response rates of the three mailings are shown in Table 8.3. The use of techniques described in this chapter raised the response rate from phase 1 to phase 2 by 33%, and a re-mailing of non-respondents in January 1997 resulted in 77 responses from the 312 delivered, a 24% response rate of companies contacted in the second data sample. Unfortunately, 6 responses were insufficiently complete to be included in the study, and two letters were received from managers refusing, for time and confidentiality reasons, to participate in the study. Whilst this response rate is not as high as the 25% hoped for, it compares favorably with several other published studies of direct marketing listed in chapter 6. The overall useable response rate to the second sample used in phases 2 and 3 of the mailing was 22%.

Mailing Phase	Date Mailed	Quantity Mailed	Postal Returns - Undelivered	Net Survey Forms Received by Companies	Total Responses	Useable Responses
Phase 1	Apr 96	353	33	320	40	36
Phase 2	Oct 96	360	43	317	51	46
Phase 3	Jan97*	266	5	261	26	23
Overall		979	81	898	117	105

* Second mailing of non-respondents from October 1996 mailing of sample 2. Phases 2 and 3 were mailed using the same sample, giving an overall response rate of 24.7%.

Table 8.3 Mailing and Response Data

As stated above, the two random samples were selected using a uniform distribution random number generator. Therefore, determining whether the responses also follow the uniform distribution should reveal bias in the response profile. Wonnacott and Wonnacott (1972, p. 423-437) recommend the chi-square test as a method of testing the goodness of fit between samples and a variety of statistical distributions. Table 8.4 shows the results of a goodness of fit test between the useable responses and the uniform distribution.

Directory Code Category	**Observed Number of Responses**	**Expected Number of Responses**	**$\lvert Obs - Exp\rvert^2$**	**$\frac{\lvert Obs - Exp\rvert^2}{E}$**
1 - 1000	15	14.8	0.04	0.003
1001 - 2000	14	14.8	0.64	0.043
2001 - 3000	12	14.8	7.84	0.530
3001 - 4000	12	14.8	7.84	0.530
4001 - 5000	11	14.8	14.44	0.973
5001 - 6000	15	14.8	0.04	0.003
6001 - 7000	24	14.8	84.64	5.719
7001 - 7100	2	1.4	0.36	0.257
Totals	105	105		8.058

Chi-square = 8.058   Degrees of Freedom = 8 - 1 = 7

Significance level p = .05   Critical Value = 14.07

Accept Ho: No significant difference between the response distribution and the uniform distribution.

Table 8.4 Comparison of Responses with the Uniform Distribution

The chi-square test confirms that overall response pattern followed the same uniform distribution pattern as the original samples.

8.5.2 Descriptive Statistics for the Main Research Variables

The descriptive statistics displayed in Table 8.5 demonstrate considerable consistency across the three phases of data collection. Only 2 of the 15 means were marginally beyond two standard errors from the overall results; however, the intervals between any two phases of data collection were not significant at any level. The statistics for SOPHTOT and VLDTOT indicate that the Phase 1 group was slightly more sophisticated. Possibly, respondents were attracted by the high level of detail in the first questionnaire. The distribution of respondents in terms of database size (LGDBSIZE) appears to be particularly consistent. The next analysis examines the self-reported titles of respondents and their response profiles.

Variable	**Phase 1 (n =36)**		**Phase 2 (n = 46)**		**Phase 3 (n = 23)**		**Overall (n=105)**	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
SOPHTOT	**79.9**	24.1	70.5	21.3	74.0	23.0	74.5	22.9
VLDTOT	14.1	4.2	13.1	3.8	12.7	4.6	13.4	4.1
MKTORT	81.2	14.3	80.4	12.7	**85.1**	14.4	81.7	13.6
LGDBSIZE	4.8	2.3	4.8	2.0	4.8	2.0	4.8	2.1
LOCCONT	31.7	9.9	33.7	8.1	32.6	9.6	32.8	9.0

Note: Bolded figures denote means greater than 2 standard errors from the overall mean.

Table 8.5 Descriptive Statistics of the Main Research Variables

8.5.3 Profile of Respondents

The covering letter requested that the questionnaire be completed by the individual responsible for marketing decisions. Selecting catalogue marketers as the sampling frame was intended to capture the responses of key individuals responsible for using and developing DBM systems as their main marketing information source. The predominant groups of respondents (78%) were designated either President or Marketing Vice President.

Title	Database Size ('000) Mean	Std Dev.	Number of Responses
President	125.0	149.6	37
General Manager	1,006.6	2,339.5	15
Marketing Vice President	1,562.8	4,017.8	45
Communications Director	4,010.4	8,560.1	8

Table 8.6 Summary of Respondents by Title and Database Size

An examination of respondents' titles in relation to database size reveals a clear, and seemingly appropriate, hierarchy of roles (Table 8.6). In small catalogue companies the President retains responsibility for marketing decisions. In slightly larger companies the General Manager coordinates operations and marketing, and is supported by IS and accounting personnel. The next tier of companies have a fully developed functional hierarchy including an individual designated as Marketing Vice President. The largest companies have marketing departments with a Communications Director specifically responsible for customer segmentation and mailing.

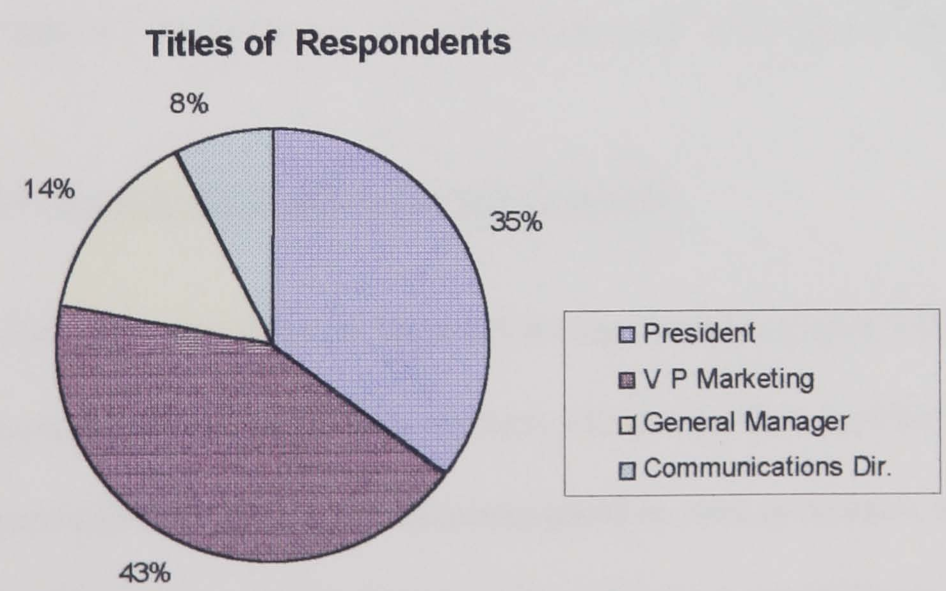

Figure 8.2 Pie Chart of Respondents by Title

A review of the five main research variables by respondent titles is shown in Table 8.7. Both measures of sophistication (SOPHTOT, VLDTOT) indicated that larger systems were more sophisticated, and the difference between the means reported by Marketing VPs and Presidents was significant at the $p < .01$ level. Communications Directors' perceptions of their organisations' market orientation seemed low when compared with other respondents, but no significant difference existed when the t-statistic (sample size < 30) was applied to the standard error of Communications Directors' responses. The results for locus of control are consistent across all four groups of respondents.

Variable	**President (n = 37)**		**General Manager (n = 15)**		**Marketing Vice President (n = 45)**		**Communications Director (n = 8)**	
	Mean	Std Dev	Mean	StdDev	Mean	StdDev	Mean	StdDev
SOPHTOT	66.4	22.0	71.3	22.4	81.1	20.8	80.8	25.1
VLDTOT	12.6	4.0	12.7	3.9	13.9	4.0	15.3	4.9
MKTORT	79.0	12.5	83.7	10.7	84.8	14.3	73.1	16.0
LGDBSIZE	4.0	1.8	4.5	2.2	5.3	2.2	6.6	1.9
LOCCONT	32.0	9.5	33.4	9.2	32.8	8.9	35.0	8.9

Table 8.7 Summary of the Main Research Variables by Respondent Title

8.5.4 Descriptive Statistics for the Construct

The results displayed in Table 8.8 for the construct (SOPHTOT) were highly consistent and correlated with the short validation measure (VLDTOT). These results indicated that either of these measures could be used to measure the sophistication level of DBM systems, despite the questions and scales being different. Cronbach's alpha coefficient exceeded the average of 0.77 found in Peter's (1994, p. 388) meta-analysis of construct studies.

Mailing Phase	SOPHTOT Mean	SOPHTOT Std Dev	Alpha Coeff.	Number of Factors	VLDTOT Mean	Correlation of SOPHTOT with VLDTOT Coeff.	Correlation of SOPHTOT with VLDTOT Significance
Phase 1 (n= 36)	79.9	24.1	0.856	1	14.1	0.7091	$p < .001$
Phase 2 (n= 46)	70.5	21.3	0.833	2	13.1	0.7692	$p < .001$
Phase 3 (n= 23)	74.0	23.0	0.818	1	12.7	0.7548	$p < .001$
Overall (n= 105)	74.5	22.9	0.841	1	13.4	0.7456	$p < .001$

Table 8.8 Correlation and Reliability for Two Measures of Database Sophistication

8.6 CONCLUSIONS

The questionnaire response rate (12%) to the first mailing was disappointing, which raised the problem of non-response bias. Adopting specific measures aimed at improving response rate - an appeal for help, shorter questionnaire, and a follow-up mailing of non-respondents - resulted in a useable response from the second sample of 22%. As a result of these measures the survey captured a total 105 useable responses, which was consistent with other DBM studies cited in this thesis.

Overcoming senior managers' reluctance to divulge proprietary information, which may be of strategic interest to competitors, was a major challenge in this study. Some sophisticated DBM users may have perceived that they had little to gain from participating in the survey; consequently, a potential source of systematic bias is a disproportionate number of responses from less sophisticated DBM system users. However, the study appears to have captured a sufficient number of responses from sophisticated DBM users to reveal factors that promote high levels of DBM capability. Using two different scales to measure the level of sophistication provided strong support for this conclusion.

Tests for bias in the data, and comparison with other studies where possible, did not reveal any specific problems; in fact, the results seem to be reasonably consistent across three phases of data collection. The author cannot prove that the survey results were totally free of bias, particularly as the possibility of non-response error was present. Nevertheless, consistent results were obtained from two random samples, and three survey mailings at different times of the year, for the variables used to define constructs and hypotheses. The survey captured responses from the whole catalogue industry, and encompassed databases ranging from 5,000 to 25,000,000. The profile of respondents illustrates a logical hierarchy of response from senior managers responsible for marketing decisions. Hence, a rigorous analysis of the response data did not reveal any bias or distortion among the three samples, or between the two questionnaires used to compile the data. This does not mean that the data does not contain some systematic bias, but the high degree of normality exhibited by each of the main variables, and consistency of results, tend to refute the presence of bias. These results provided the foundation for hypothesis testing explained in the next chapter.

CHAPTER 9

DATA ANALYSIS AND RESEARCH FINDINGS

9.1 INTRODUCTION

The previous two chapters have explained how data were gathered from 105 catalogue companies. An analysis of the data collected from three surveys verified that the data collected were from appropriate respondents and exhibited reasonable internal consistency. In chapter 5, theories were advanced about four factors that might be associated with the development of sophisticated DBM systems. This chapter analyses the data collected from the three postal surveys to determine whether or not the hypotheses advanced can be refuted.

Before testing hypotheses, the first part of this chapter explains the basic philosophy and guidelines adopted when applying significance testing to this research. The next four sections use a variety of parametric and nonparametric statistical tests to analyse the findings for each of the hypotheses. These results also consider the reliability of the constructs used for testing these hypotheses. Additionally, several extraneous variables also provided additional insights into the overall results, and these analyses are also reviewed. A table summarising the findings for each hypothesis is provided in the conclusions.

9.2 USE AND INTERPRETATION OF STATISTICAL METHODS

The purpose of this section is to define the overall philosophy for the application of statistical methods and hypothesis testing applied later in the chapter. Clarifying the benefits and limitations of inferential statistical testing should ensure that the four hypotheses were correctly evaluated from the empirical data captured in three postal surveys. A sound philosophy for significance testing can be found in Sawyer and Peter's (1983) paper reviewing the interpretation of statistical significance. Their paper offers practical advice for improving the quality of hypothesis testing in marketing research, and their principles were applied to the analyses in this chapter.

Carver (1978) discusses three common misinterpretations of statistical inference which can be found in marketing research literature. First, that the p - value is a summary of the data determining when the null hypothesis may be refuted. As Sawyer and Peter (1983, p. 123) observe,

> "... there is no way in classical statistical significance testing to determine whether the null hypothesis is true or the probability that it is true." (p. 123)

The p- value is merely a number reflecting the level of *probability* that the results obtained occurred by chance. Second, the misconception that the p-value gives a researcher confidence that the result is reliable or can be replicated. This can only be assessed by repeating the method, at different times, to determine whether the sampling process yields equivalent results, as was applied in this research. Third, and perhaps most serious, is the notion that the p - value directly measures the probability of the research hypothesis being true. Typically, a value of $p < .0001$ is viewed as highly significant, and therefore, much more valid than a p - value of say 0.05. Plainly, statistical testing is only one way of operationalising a research hypothesis and is not a complete test. However, it is common practice to use a predetermined p - value (e.g. $p < .05$) to support the inference that sampling error is an unlikely explanation of the results. Sawyer and Peter (1983) add a further misconception among researchers, that greater confidence comes from studies with larger sample sizes. This is clearly a false impression, as sample size is included in the calculation of standard error; consequently, larger samples only reduce the standard error, but do not raise the confidence of the results.

Sawyer and Peter (1983) offer several recommendations designed to address these problems, which are incorporated into the analyses of results for this research.

1. **The Subjectivity of Statistical Tests.** Researchers have control over many factors in the statistical testing process; hence, these should be specified in advance. Using a random sampling process allows for the use of parametric tests when the distribution of results approximates to the normal distribution. Where the assumption of normality is called into question nonparametric tests will be used. This type of test is used as it is

> " ... based on a model that specifies only very general conditions and none regarding the specific form of the distribution from which the sample was drawn (Siegel and Castellan 1988, p. 34)."

Nonparametric tests are particularly versatile, and provide a variety of tests for both categorical and small sample data. The chi-square test is useful for goodness-of-fit analyses where data are categorised (e.g. sophisticated versus unsophisticated) to test hypotheses using differences in frequency. The significance levels and conditions expressed in texts describing parametric (e.g. Erickson and Nonsanchuk 1992) and nonparametric (e.g. Siegel and Castellan 1988) tests are as follows.

Parametric testing:

Sample size $n > 30$ $p < .05$ Two tail test: Critical values for z - test = $\pm$ 1.96 (std dev)

Sample size $n < 30$ $p < .05$ Two tail test: Critical values from t - test tables.

Nonparametric - Chi-square test:

Degrees of freedom: One sample goodness-of-fit = (Categories - 1)

Contingency table = (Rows - 1) (Columns - 1)

Significance $p < .05$ from chi-square tables.

Special conditions for *small samples* ($n < 30$):

Degrees of freedom = 1 (i.e. two categories), expected frequency should be at least 5.

For degrees of freedom > 2 no expected value should be less than 1.

2. Bias Against the Null Hypothesis. Significance tests make the assumption that the null hypothesis is true. However, few variables have exactly a zero mean difference, or zero correlation (Meehl 1967). There is some evidence that researchers and journal editors are biased against the null hypothesis (Greenwald 1975). Presumably, this bias stems from the belief that finding statistically significant results supporting a particular hypothesis is more revealing than accepting the null hypothesis. Therefore, in this research the null hypothesis will only be rejected after several tests reveal statistically significant results, so as minimise the possibility of Type I errors. Moreover, a clear finding for the null hypothesis may in itself provide useful insights for the research.

3. The Need for Descriptive Statistics. Statistical significance tests are often used to substitute for the actual data. Clearly the purpose of any study is to reveal the nature and size of any effects *before* examining its ability to predict and explain observed relationships. Thus, appropriate descriptive statistics are presented with each hypothesis to assist in analyzing the results, which are now considered.

9.3 MARKET ORIENTATION

Four tables present the results obtained using Deng and Dart's (1994) 24-item construct to measure market orientation. These results were used to test the first hypothesis stated in section 5.5.

H_1 - Market orientation is positively associated with the development of sophisticated DBM systems.

The main descriptive statistics for the market orientation construct (MKTORT) are displayed in Table 9.1. Applying Cronbach's alpha revealed a reliability coefficient of 0.88 when using each of the 24 questions as individual items. The distribution of scores for MKTORT approximates to the normal distribution, allowing parametric statistical methods to be applied.

Variable	Statistical Measures (n = 105)				
	Mean	Std Error	Std Dev.	Max. Score	Min. Score
MKTORT	81.72	1.33	13.64	112	49.00

Cronbach's alpha (Items = 27; n = 105) = 0.878.
Exceeded the value of 0.772 from Deng and Dart's (1994 p. 733) own study.

Table 9.1 Descriptive Statistics for Market Orientation

The associations between market orientation and the main research variables are presented in table 9.2. The correlation coefficients indicate that market orientation is most strongly and positively associated with both measures of DBM sophistication. The strength of these relationships provides evidence that organisational culture influences the development of DBM systems. When a $\log_n$ transformation was applied to database size a significant relationship was revealed with market orientation. This result indicates that catalogue companies with large customer databases may be more market oriented than companies with small databases. Protagonists of market-oriented cultures might surmise that these companies captured a greater number of customers because the company was focused on delivering customer value through its products and services.

Variable	Correlation with Market Orientation (n = 105) Correlation Coefficient	Significance level
SOPHTOT	0.4965	p < 0.001
VLDTOT	0.4498	p < 0.001
LOCCONT	- 0.1836	p = 0.061
DBSIZE	0.0261	p = 0.792
LGDBSIZE	0.2136	p = 0.029

Table 9.2 Correlation between Market Orientation and Main Study Variables

Table 9.3 confirms the consistency of the relationship between market orientation and DBM sophistication across all three data samples. Demonstrating consistency of the results further verifies that an association exists between market orientation and level of DBM sophistication.

Mailing Phase	Correlation of Market Orientation with SOPHTOT		VLDTOT	
	Correlation Coefficient	Significance level	Correlation Coefficient	Significance level
Phase 1 (n = 36)	0.5924	p < .001	0.5306	p < .001
Phase 2 (n = 46)	0.3772	p = .010	0.3858	p = .008
Phase 3 (n = 23)	0.5786	p = .004	0.4956	p = .016

Table 9.3 Correlation between Market Orientation and DBM Sophistication Measures

The inter-correlation matrix in Table 9.4 illustrates the strength of associations between the four components of the market orientation construct and the three elements of sophisticated DBM systems (shown in bold). All but one of the results is statistically significant at the 5% level, presenting further support for the relationship between market orientation and sophisticated DBM. It would appear that DBM sophistication is strongly associated with both competitor orientation and profit emphasis. These results indicate the strong emphasis on collecting and using marketing information for competitive advantage in market-oriented organisations.

Variable	COMPONENTS: MARKET ORIENTATION				ELEMENTS OF DBM		
	CUSTORT	COMPORT	INTFCORD	PROFEMP	ELEM1	ELEM2	ELEM3
CUSTORT	1.000	0.3878 p = .000	0.2995 p = .002	0.2951 p = .002	**0.1710** p = .081	**0.2381** p = .014	**0.3087** p = .001
COMPORT		1.000	0.3826 p = .001	0.1957 p = .045	**0.3615** p = .000	**0.3867** p = .000	**0.4059** p = .000
INTFCORD			1.000	0.2123 p = .030	**0.2082** p = .033	**0.2337** p = .016	**0.2328** p = .017
PROFEMP				1.000	**0.3407** p = .000	**0.3424** p = .000	**0.3646** p = .000

Table 9.4 Inter-Correlation between Four Components of Market Orientation and the Three Elements of the DBM Construct

The analyses presented in this section provide strong support for the hypothesis that market orientation contributes to the development of sophisticated DBM systems in catalogue companies.

9.4 DATABASE SIZE

Five tables present the results for database size (in thousands [000]) and natural logarithmic transformation ($\log_n$) of database size. The distribution of the data collected for database size is positively skewed; in such cases it is common to transform the data using natural logarithms so as to obtain a better fit with the normal distribution (Menzefricke 1995, p. 140). The descriptive statistics for database size are shown in Table 9.5. These data are used to test the second hypothesis stated in section 5.6.

H_2 - Database size is positively associated with the development of sophisticated DBM systems.

Variable	Statistical Measures of Database Size (n = 105)				
	Mean	Std Error	Std Dev.	Max. Value	Min. Value
DBSIZE (000)	1,163.0	359.71	3,685.89	25,000.00	5.0
LGDBSIZE	4.83	0.20	2.07	10.13	1.61

Table 9.5 Descriptive Statistics for Database Size

The results in Tables 9.6 and 9.7 display the correlation coefficients for both the observed and transformed measures of database size. The results indicate that both measures of DBM sophistication are positively associated with both values of database size. The strength of these relationships provide evidence that the development of sophisticated DBM systems is associated with the size of the database.

Variable	Correlation with Database Size (000) (n = 105)	
	Correlation Coefficient	Significance level
SOPHTOT	0.3875	$p < .001$
VLDTOT	0.2961	$p < .001$
MKTORT	- 0.0261	$p = .792$
LOCCONT	0.0378	$p = .702$

Table 9.6 Correlation between Database Size and Main Research Variables

Variable	Correlation with Log_n Database Size (n = 105)	
	Correlation Coefficient	Significance level
SOPHTOT	0.6214	$p < .001$
VLDTOT	0.4996	$p < .001$
MKTORT	0.2136	$p = .029$
LOCCONT	- 0.0840	$p = .394$

Table 9.7 Correlation between Log_n Database Size ('000) and the Main Research Variables

Tables 9.8 and 9.9 substantiate the relationships between database size and DBM sophistication across each of the mailing samples, except for one result for the short measure of sophistication (VLDTOT) and database size. Results for both measures of database size are associated with the DBM construct (SOPHTOT) across all three phases of the data sampling.

Mailing Phase	Correlation of Database Size with SOPHTOT		Correlation of Database Size with VLDTOT	
	Correlation Coefficient	Significance level	Correlation Coefficient	Significance level
Phase 1 (n = 36)	0.4132	p = .012	0.2700	p = .111
Phase 2 (n = 46)	0.5056	p < .001	0.4948	p < .001
Phase 3 (n = 23)	0.4078	p = .053	0.4225	p = .045

Table 9.8 Correlation between Database Size and DBM Sophistication Measures

Mailing Phase	Correlation of Log_n Database Size with SOPHTOT		Correlation of Log_n Database Size with VLDTOT	
	Correlation Coefficient	Significance level	Correlation Coefficient	Significance level
Phase 1 (n = 36)	0.6286	p < .001	0.4197	p = .011
Phase 2 (n = 46)	0.6331	p < .001	0.5180	p < .001
Phase 3 (n = 23)	0.6222	p = .002	0.6212	p = .002

Table 9.9 Correlation between Log_n Database Size and DBM Sophistication Measures

The results and analyses presented in this section strongly support the hypothesis that companies with large databases develop more sophisticated DBM systems.

9.5 LOCUS OF CONTROL

Seven tables present the results obtained using Spector's (1988) Work Locus of Control Scale (WLCS), specifically developed to measure inner- and other-directed behaviour within organisational contexts. Low scores on the scale are associated with inner-directed behaviour, high scores are associated with other-directed behaviour. The results in this section are used to test two hypotheses stated in section 5.7.

H3A - Highly inner-directed marketing managers are more likely to develop sophisticated DBM systems.

H3B - Highly other-directed marketing managers are less likely to develop sophisticated DBM systems.

Table 9.10 presents the main descriptive statistics for the responses to the 16-item locus of control construct. The alpha coefficient of 0.81 for reliability compared favourably with the results presented in Spector's study which varied from 0.75 to 0.85 for six samples. The specific results of two samples from Spector's research that can be considered as marketing or management roles are given in Table 9.11 The mean value for this study was significantly ($p < 0.05$) lower than the means for the two roles in Spector's studies. An analysis of respondents' locus of control (Table 9.12) provides an explanation for the difference. Spector devised WLCS to reflect, "... rewards or outcomes including promotions, favourable circumstances, salary increases and general career advancement (p. 335)." Hence, it is plausible that these individuals (i.e. Presidents and Vice Presidents) are more inner-directed than the groups reported in Spector's study.

Variable	Statistical Measures (n = 105)				
	Mean	Std Error	Std Dev.	Max. Score	Min. Score
LOCCONT	32.76	0.88	9.03	54	16

Cronbach's alpha (Items = 16; n = 105) = 0.818

Table 9.10 Descriptive Statistics for Work Locus of Control

Sample Profile	Statistical Measures (Spector 1988, p. 338)			
	Mean	Std Error	Std Dev.	Alpha Coeff
Department Store Sales and Support Employees (n = 41)	36.8	1.55	9.9	0.85
Municipal Managers (n = 496)	36.9	0.42	9.6	0.85

Table 9.11 Descriptive Statistics for Locus of Control from Spector's Study (1988).

Title	Mean	Std Dev.
President (n = 37)	32.00	9.46.
VP Marketing (n = 45)	32.78	8.87
General Manager (n = 15)	33.4	9.19
Communications Director (n = 8)	35.00	8.90

Table 9.12 Work Locus of Control by Respondent Title

The correlation coefficients displayed in Table 9.13 do not indicate any significant association between locus of control and any of the major research variables. The negative signs on the sophistication measures indicate that inner-directed individuals have a weak, but insignificant, impact on the development of sophisticated DBM systems.

Variable	Correlation with Locus of Control (n = 105) Correlation Coefficient	Significance level
SOPHTOT	- 0.0820	p = .406
VLDTOT	- 0.0992	p = .314
MKTORT	- 0.1836	p = .061
DBSIZE	0.0378	p = .702
LGDBSIZE	- 0.0840	p = .394

Table 9.13 Correlation between Locus of Control and Main Study Variables

Examining table 9.14 confirms a lack of association between work locus of control and DBM sophistication across all three data samples. These results verify the lack of relationship between these variables. However, two other analyses were conducted to confirm these results.

Mailing Phase	Correlation of Locus of Control with SOPHTOT		VLDTOT	
	Correlation Coefficient	Significance level	Correlation Coefficient	Significance level
Phase 1 (n = 36)	0.0893	p = .605	0.1089	p = .527
Phase 2 (n = 46)	- 0.1349	p = .371	- 0.0816	p = .590
Phase 3 (n = 23)	- 0.2195	p = .314	- 0.4002	p = .058

Table 9.14 Correlation between Work Locus of Control and Measures of DBM Sophistication

A comparison of the distribution of scores for DBM sophistication in the quartile (26 responses) representing highly inner-directed managers (scores 16 - 26) with the quartile (26 responses) for highly other-directed managers (scores 46 -54). Siegel and Castellan (1988, p. 111) recommend the chi-square test be used to analyse the frequency of data divided into specific categories. This analysis (Table 9.15) again fails to reject the null hypothesis - no significant difference is found between the levels of sophistication for DBM systems achieved by inner-directed and other-directed managers.

Variable		**Level of DBM Sophistication (SOPHTOT)**					**Total**
		Less than 40	40 - 59	60 - 79	80 - 99	Over 100	
Inner	**obs**	5	4	6	7	4	26
Directed	**exp**	4	4	8	7	3	
Other	**obs**	3	4	10	7	2	26
Directed	**exp**	4	4	8	7	3	
		8	8	16	14	6	52

Chi-square = 2.00 Degrees of freedom = 4 Critical Value$_{p = 0.05}$ = 9.49

Accept H_0: No significant difference between the level of DBM sophistication for inner- and other-directed managers.

Table 9.15 Chi-square test of Level of Sophistication for Inner- and Other-Directed Managers

Another analysis focused on the 50 smallest companies, as defined by number of employees, which were examined to determine whether senior managers' locus of control had any impact on the level of sophistication. As most of these managers were designated as President their power to implement sophisticated DBM systems should be high. The mean score (i.e. 32.0) for locus of control was taken as the dividing point for the groupings. Again, the chi-square test (Table 9.16) was applied, but no significant difference was found.

Locus of Control score		Score Range for Sophistication of DBM (SOPHTOT) Less than 40	40 - 59	60 - 79	80 +	Total
16 - 32	obs	4	6	10	7	27
	exp	5.4	4.86	11.34	5.4	
33 - 54	obs	6	3	11	3	23
	exp	4.6	4.14	9.66	4.6	
		10	9	21	10	50

Chi-square = 2.48 Degrees of freedom = 3 Critical Value$_{p = 0.05}$ = 7.81

Accept H_0: No significant difference between the level of DBM sophistication for Inner and Other Directed DBM Managers for small companies.

Table 9.16 Chi-square Test of Locus of Control versus DBM Sophistication Level for Small Companies

The analyses presented failed to reveal any significant impact of participants locus of control on the level of sophistication of DBM systems.

9.6 TYPE OF MARKET

This section reviews the results related to type of market served. Table 9.17 shows the responses received in the survey. Almost half (52) the companies responding serve purely consumer markets, a number of cataloguers (45) sell their products to both consumer and business markets, and a small number (8) of respondents market purely to other businesses. The analyses below are used to test the fourth hypothesis stated in section 5.8.

H_4 - Industrial markets (i.e. business-to-business) promote higher levels of sophistication in DBM systems than consumer markets.

Descriptive statistics for the main study variables and respondents are presented in Tables 9.17 and 9.18. The results for consumer markets, and consumer and business markets, are very similar, particularly the two measures of level of DBM sophistication. However, DBM systems used solely for business-to-business markets indicate higher means for both measures of DBM sophistication. The small number of observations ($n < 30$) makes the assumption of normality questionable. Several approaches were adopted when interpreting these results, and techniques appropriate for small samples were applied to the measures of sophistication.

Type of Market Served	Number of Responses
Consumer	52 (49.5%)
Consumer and Business	45 (42.9%)
Business markets	8 (7.6%)

Table 9.17 Responses by Type of Market

Title of Respondents	Consumer (n = 52)	Consumer & Business (n = 45)	Business (n = 8)
President	22	14	1
General Manager	10	4	1
VP Marketing	19	21	5
Comm. Director	1	6	1

Table 9.18 Title of Respondents by Type of Market Served

Descriptive statistics for the main research variables are shown in Table 9.19. This analysis reveals that the means for both measures of sophistication appear to be higher for SOPHTOT and VLDTOT for pure business-to-business marketers. However, a t-test for equality of means indicates SOPHTOT for business marketers is not significantly different from the mean for consumer markets ($p < 0.05$). Conversely, a t-test for equality of means for VLDTOT reveals that the difference between means for business and consumer markets is significantly different ($p < 0.01$). Interestingly, this is the first disparity noted in the results between the two measures of level of sophistication. This disparity prompted the use of a residual analysis to clarify the impact of type of market. Sometimes it is important to separate observations into a fit part and a residual because "... obvious features of a body of data may obscure more subtle things (Erickson and Nosanchuk 1992, p. 73)."

Variable	Consumer (n = 52)		Consumer & Business (n = 45)		Business (n = 8)	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
SOPHTOT	73.38	23.38	73.13	22.56	88.88	18.16
VLDTOT	13.00*	4.25	13.11	3.76	17.38*	3.16
MKTORT	82.85	13.72	79.67	13.24	86.00	15.31
LOCCONT	31.10	8.78	35.09	8.81	30.50	10.07
DBSIZE (000)	1,1194.9	3,650.7	1,061.3	3,837.4	1,529.9	3,457.5
LGDBSIZE	4.81	2.18	4.73	1.99	5.48	1.89

* Significantly different at $p < 0.01$

Table 9.19 Descriptive Statistics for Main Study Variables by Type of Market Served

9.6.1 <u>Calculation of Residuals</u>

The effects of database size and market orientation were noted earlier in this section and these could be masking the clarity of the results presented. The effect of database size on level of DBM sophistication provided an objective measure as a basis for a calculation of the residual for level of sophistication. Hence, the effect of market orientation will be ignored for the present. This allowed the data to be examined with the effect of database size removed, revealing the residual values for level of DBM sophistication. This was accomplished using a simple regression model to postulate a relationship between $\log_n$ (database size) and level of database sophistication, which was reasonable as a strong linear relationship had already been determined. Correcting for database size allows the residual values to be calculated as an alternative way of assessing level of sophistication in DBM.

Menzefricke (1995, pp. 385-395) explains the mathematical process, and Figure 9.1 illustrates the variable relationships necessary to complete this task. Briefly, the formula and processes used were as follows.

$$y_{obs} = \text{Systematic Part} + \text{Residual}$$

where Systematic Part = $\beta_0 + \beta_1 x$ and Residual = ε

hence $y_{obs} = \beta_0 + \beta_1 x + \varepsilon$

giving residual $\varepsilon = y_{obs} - (\beta_0 + \beta_1 x)$ (Equation 9.1)

Using SPSS 6.1 the line of best fit (i.e. least squares) was calculated giving the following results: $\beta_0 = 41.31$ and $\beta_1 = 6.866$

where y_{obs} = SOPHTOT and x = LGDBSIZE.

calculated:
RESIDUAL ε = SOPHTOT - (41.31 + 6.866 [LGDBSIZE]) (Equation 9.2)

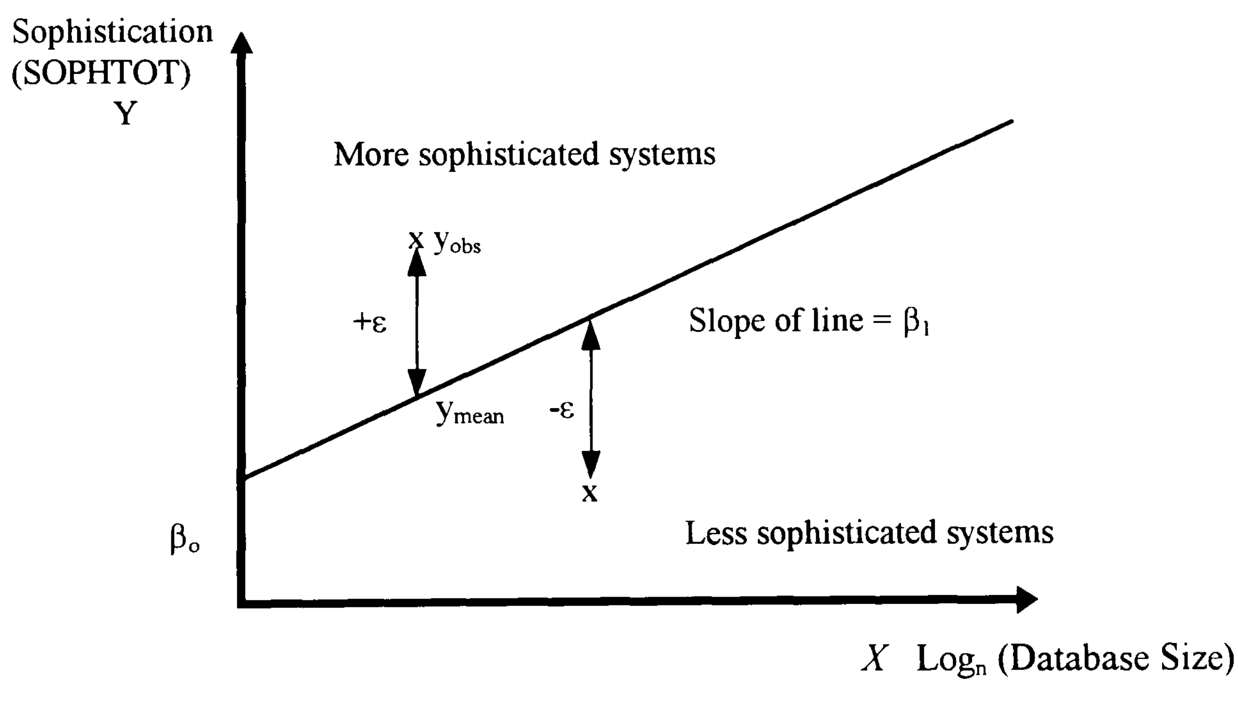

Figure 9.1 Graphical Representation of Residuals Analysis

The regression model presented above contains the following assumptions.

1. **Linearity**. For any given value of x the expected mean value of the residual ε is 0.
2. **Constant Standard Deviation (Homoscedasticity).** The standard deviation of the residual ε is σ, a constant that does not depend on the value of x.
3. **Randomness**. Knowing the residual for one catalogue company is uninformative for predicting the value of another company.
4. **Normality.** For any given value of x, the distribution of the residual values around the regression equation is normal.

Menzefricke (1995) provided a visual test to judge whether assumptions 1 and 2 are valid. The procedure required a plot of ε versus x. The resulting scatter diagram was then divided into three strips containing equal numbers of data points (Appendix 19). The distribution of scatter points around the line indicated that a linear model was a reasonable fit, supporting assumption 1. Assumption 2 required the deviations around the line to be consistent across the three strips. Clearly, the deviations for high values of x did not follow this pattern, and the criterion for homoscedasticity was not met. Checks for randomness and normality proved that assumptions 3 and 4 were reasonable. The failure of the data to meet all four criteria precluded the use of parametric methods; as a result, nonparametric tests were applied to test the data.

Equation 9.2 was used to calculate the residual value ε (RESIDUAL) for each of the respondents. This produced the following results for the 105 respondents.

Range of values: - 40.6 to + 53.4

Positive Residuals = 54 (More sophisticated than the norm for database size)

Negative Residuals = 51 (Less sophisticated than the norm for database size)

The 54 companies with a positive residual represent businesses with more sophisticated DBM systems. A multiple bar (Figure 9.2) is used to display the distribution of positive residuals by size and type of market. A preliminary review of the raw data revealed that the seven highest residual values were all companies which market to either business (B), or business and consumer markets (CB); specifically, they all had small databases. The two highly sophisticated business-to-business marketers help to explain the higher means for this group.

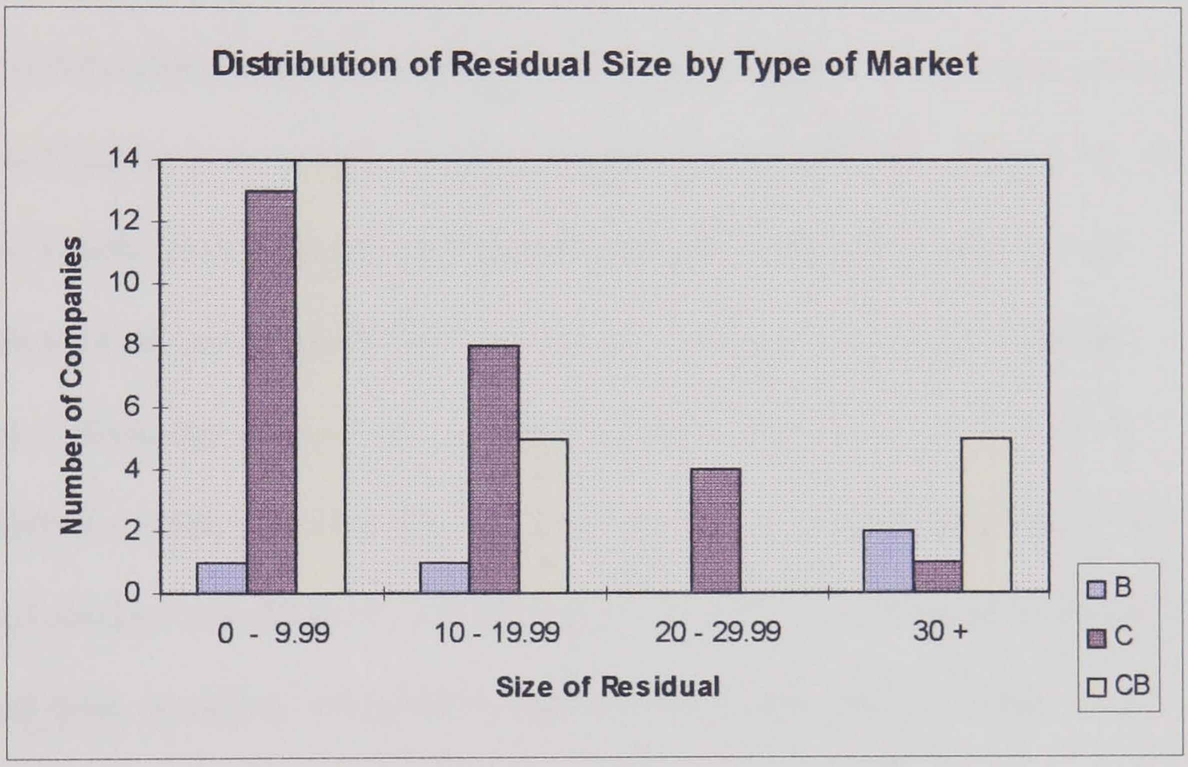

Figure 9.2 Distribution of Positive Residuals by Type of Market (n = 54)

These observations and the distribution of residuals prompted two analyses. First, was an analysis of residuals for the top quartile (26 highest positive residuals) versus the bottom quartile (26 largest negative residuals) to determine whether type of market enhanced or inhibited DBM systems' development. The analysis shown in Table 9.20 indicated, and a chi-square test confirmed, that there was no significant difference between the two distributions.

Sophistication Level by Residuals		Type of Market: Business	Consumer	Business & Consumer	Total
Upper Quartile	obs	3	13	10	26
	exp	1.5	13.5	11	
Lower Quartile	obs	0	14	12	26
	exp	1.5	13.5	11	
		3	27	22	52

Chi-square = 3.22 Degrees of freedom = 2 Critical Value$_{p=0.05}$ = 5.99

Accept H_0: No significant difference between the type of market served and level sophisticated for DBM systems measured by residual scores.

Table 9.20 Chi-square test of Residual Scores by Type of Market

The observation that several business-to-business marketers with small databases obtained high positive residual scores prompted a second analysis. Specifically, the aim of this inquiry was to determine whether marketing to businesses encourages the development of sophisticated DBM systems for companies with *small* databases. Again, a chi-square analysis was used to examine the distribution of 54 positive residuals (i.e. most sophisticated DBM systems) by type of market served and log normal database size (Table 9.21). Menzefricke's (1995) process of dividing the data set into three equal parts was used to establish three categories for database size.

Type of Market		$\log_n$ (Database Size): < 4.01	4.02 - 5.16	> 5.17	Total
Business	obs	1	1	2	4
	exp	1.26	1.48	1.26	
Consumer	obs	6	9	11	26
	exp	8.19	9.62	8.19	
Business & Consumer	obs	10	10	4	24
	exp	7.56	8.88	7.56	
Column Total		17	20	17	54

Chi-square = 4.84 Degrees of freedom = 4 Critical Value$_{p=0.05}$ = 9.49

Accept H_0: No significant difference between type of market and $\log_n$ (database size) for cataloguers with sophisticated level of DBM systems.

Table 9.21 Chi-square Test of Type of Market Versus Database Size for Sophisticated DBM Systems

This analysis failed to reveal any significant difference between type of market and database size for more sophisticated DBM systems. A further analysis of residuals based upon a linear multiple regression model revealed the same results. These analyses failed to reveal any significant effect on the level of DBM sophistication by type of market.

The residuals analysis above revealed the large impact of database size on the overall results. This observation prompted a final check on the findings for market orientation and locus of control using residuals analysis.

9.6.2 Residual Analyses for Market Orientation and Locus of Control

It was important to determine whether database size had an effect on the correlation results for market orientation and locus of control. This was achieved by examining the correlation between the residual values (RESIDUAL) for both market orientation and locus of control. The results in Table 9.22 confirmed that the residual values of level of sophistication were highly correlated with market orientation and the short measure of DBM sophistication (VLDTOT). The results for locus of control also confirmed the previous findings that no significant relationship existed between locus of control and DBM sophistication.

Variable	**RESIDUAL**	
	Correlation Coeff	**Sig. Level**
MKTORT (n = 105)	0.464	$p < .001$
VLDTOT (n = 105)	0.554	$p < .001$
LOCCONT (n = 105)	- 0.038	$p = .700$

Table 9.22 Correlation between Construct Residuals and the Main Study Variables

Finally, having collected data on several extraneous variables, it was appropriate to review whether these factors would further clarify and support hypothesis findings. Reviews of managers' education levels and list rental policies are the final two analyses.

9.7 EXTRANEOUS VARIABLES

Other data were collected as part of the research, and two extraneous variables produced interesting results. Consequently, this section will consider the impact of education level and list rental policies on the sophistication of DBM systems.

9.7.1 Education Level

First, the results for DBM managers' education level and employee size appear logical (Table 9.23) - larger companies employ more qualified managers. After eliminating the single observation of doctorate level qualification, the mean values for sophistication level do not show any significant difference ($p < .05$). This result is interesting, but it is not a fair comparison because individuals qualified at bachelors and masters level are managing larger databases. Therefore, it was necessary to use the residual values as a measure for DBM sophistication, correcting for the effect of database size. Eliminating the single doctorate observation resulted in 104 readings, making a quartile analysis convenient as it divided the data into four equal groups of 26 observation. The readings were sorted in ascending order with the 1st quartile representing the lowest 26 residuals, and the 4th quartile representing the highest 26 residuals (Table 9.24).

Education Level	Sophistication Level		Employee Size
	Mean	Std Dev.	Mean
High School (n = 9)	79.00	20.57	30.22
Bachelors (n = 63)	69.97	21.72	51.59
Masters (n = 32)	80.78	23.70	62.06
Doctorate (n = 1)	114.0	N/A	250.00

Table 9.23 Analysis of Respondents by Education Level

Education Level		Residual of Database Sophistication				
		1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	Total
High School	**obs**	1	2	3	3	9
	exp	2.25	2.25	2.25	2.25	
Bachelors	**obs**	19	17	15	12	63
	exp	15.75	15.75	15.75	15.75	
Masters	**obs**	6	7	8	11	32
	exp	8	8	8	8	
Column Total		26	26	26	26	104

Chi-square = 4.67 Degrees of freedom = 6 Critical Value $_{p = 0.05}$ = 12.6

Accept H_0: No significant difference between education level and level of sophistication in DBM systems measured using residual values.

Table 9.24 Chi-square Test of Construct Residuals by Quartile versus Level of Education

This finding confirmed the results of the first analysis i.e. levels of DBM sophistication are not related to the education level of the marketing manager. This finding was interesting, as it partially supported the locus of control hypothesis findings earlier in this chapter; namely, individual characteristics of managers have little impact on the level of sophistication of DBM systems.

9.7.2 List Rental Policy

The second extraneous variable examined whether policy decisions to merchandise data impacts DBM sophistication. List renters are generally prepared to pay premium prices for increased targeting capability and data quality. Therefore, it is conceivable that catalogue companies deciding to merchandise their data would enhance the sophistication of their system as a way to increase revenue from list rentals. Data was collected using a simple question with a dichotomous response (Yes/No), and the results are shown in Table 9.25. This preliminary analysis revealed that companies merchandising their data were significantly more sophisticated than those not renting lists. However, it was also noted that businesses renting lists had significantly larger databases. Again, a residuals analysis was applied for a more rigorous comparison between the two groups. Examining the residual statistics failed to reveal a significant difference between the two groups.

Variable	Merchandise Lists - YES (n = 57)		Merchandise Lists - NO (n = 48)	
	Mean	Std Dev.	Mean	Std Dev.
SOPHTOT	82.25*	20.98	65.21*	21.72
VLDTOT	14.44*	3.95	12.13*	3.96
MKTORT	83.37	13.67	79.77	13.49
LGDBSIZE	5.86*	2.00	3.60*	1.38
RESIDUAL	0.71	16.22	- 0.82	19.88

* Difference between means significant at $p < 0.01$

Table 9.25 Descriptive Statistics for Main Variables by List Merchandising Policy

The above analysis revealed that catalogue companies with larger databases merchandise their data more frequently than companies with smaller databases. Nevertheless, when the effects of database size were removed, adoption of a list rental policy does not affect the level of sophisticated in DBM systems.

9.8 CONCLUSIONS

This chapter has presented and reviewed the overall research findings, which are summarised in Table 9.26. The results supported the first hypothesis, finding that the level of sophistication in DBM systems was strongly related to the market orientation of the organisation. The relationship was confirmed using three separate measures of DBM sophistication: the construct developed in chapter 7, the short measure of capabilities, and the residual values for SOPHTOT after correcting for database size. Furthermore, this relationship was observed through two separate random data samples and three response phases. A more detailed analysis revealed strong correlation between the three DBM elements and four components of market orientation in every case but one. The overall reliability for the construct of market orientation was Cronbach's alpha = 0.88, which exceeded the value obtained in the original study (Deng and Dart 1994). Viewed as a whole these results provided substantial and consistent evidence that market-oriented organisations develop more sophisticated DBM systems.

Hypothesis	Impact of Independent Variables on the Level of Sophistication of Database Marketing Systems in Catalogue Marketing Companies
H_1 Market Orientation	A market-oriented organisation culture promoted the development of sophisticated DBM systems.
H_2 Database Size	The level of DBM sophistication increased with the size of the database (i.e. greater number of customers).
H_{3A} Inner-Directed Managers	Inner-directed behaviour of managers responsible for marketing had no effect on the level of sophistication of DBM systems.
H_{3B} Other-Directed Managers	Other-directed behaviour of managers responsible for marketing had no effect on the level of sophistication of DBM systems.
H_4 Type of Market	Type of market (i.e. business or consumer) had no effect on the level of sophistication of DBM systems.

Table 9.26 Summary of Research Findings for Each Hypothesis

The results supported the second hypothesis showing an association between level of sophistication in DBM systems and database size. Both measures of sophistication correlated with the absolute size of the database (measured in '000' of records), and the $\log_n$ transformation of database size ('000). Again, this relationship was consistently observed across two separate random samples and three phases of response. Companies with larger databases tended to employ more highly qualified marketing managers, and be more disposed to merchandise their data (i.e. list rental). These results suggest that larger companies, with greater financial revenues and more qualified managers, could have an advantage in developing more sophisticated DBM systems.

Managers' locus of control trait had no impact on the level of sophistication in DBM systems. Both measures of sophistication and the residual measure failed to reveal any association with locus of control. Further analyses following the philosophy that smaller companies DBM systems might reflect managers' desire for increased control over marketing activity also failed to reveal any association. An analysis of managers' qualifications also failed to find any association with DBM sophistication level. Hence, it is concluded that individual characteristics of managers do not have an impact on the sophistication level of DBM systems.

The null hypothesis was accepted after completing analyses of type of market. This result was interesting, as a variety of analyses all resulted in a failure to find any association between type of market served and sophistication of DBM. While several companies have developed highly sophisticated DBM systems for industrial markets, the overall results suggested that most companies do not develop their DBM systems to respond to broad differences in type of markets.

Overall, the results confirmed that two variables were associated with the development of sophisticated DBM systems: market orientation and database size. These two variables seem to predominate in the development of sophisticated DBM systems, and a Type II error would seem unlikely. Similarly, the null hypothesis for all other variables appeared to contain little possibility of a Type I error. The lack of impact of these variables raises interesting pragmatic and theoretical questions which are discussed in the conclusions. This is a *post hoc* study, and hence, does not answer the question of whether highly market-oriented companies acquired more customers than their competitors and, consequently grew into companies with large databases.

The final chapter assesses the implications of these findings within the context of the literature review, and identifies areas for future research.

CHAPTER 10

CONCLUSIONS

10.1 INTRODUCTION

The concluding chapter of this thesis synthesises concepts and results presented in previous chapters. Much of the work in this research focused on developing a generic model of DBM systems, as was advanced in chapter 3. Building on this work, the generic model was used to specify the domain of DBM systems in order to create a valid and reliable construct, based on empirical data, to measure the level of sophistication in specific systems. Ultimately, the construct was used to assess four factors that were believed to influence the sophistication level of DBM systems deployed in catalogue marketing. The results of this study have important theoretical implications for future research, and practical implications for the users and developers of DBM systems.

The purposes of this final chapter are to explain and discuss the findings of this research. First, the results, methodology and limitations of the two constructs used to measure the level of sophistication in DBM systems are discussed. Second, the results of the multi-factor, multi-item construct are used to interpret and appraise the generic model developed in chapter 3. As the model was developed in the early years of this research, some comments on recent technological innovations are included to illustrate how the sophistication level of DBM systems will be enhanced in the future. These discussions provide the foundation for four sections reviewing the effects of market orientation, database size, locus of control of the primary marketing manager, and type of market on the sophistication level of DBM systems. These sections discuss the hypothesis findings within the context of contemporary theories of marketing and management strategy to identify how sophisticated DBM systems can best be deployed to deliver competitive advantage. Evolving from these discussions, and the author's observations of highly successful direct marketers, a further section reconfigures the generic model findings to explain how some companies are deriving sustained competitive advantage from sophisticated DBM systems. The final two sections present the managerial implications to be derived from the study and recommend directions for future research.

10.2 DEVELOPING CONSTRUCTS TO MEASURE THE LEVEL OF SOPHISTICATED DBM SYSTEMS

A significant challenge of this research was to develop, and empirically examine, the properties of a construct to measure the differing levels of sophistication in DBM systems. Chapter 7 explained how Churchill's (1979) paradigm was applied to develop a reliable and valid multi-factor, multi-item construct using empirical data. So far as the author is aware, this study is the first to apply Churchill's rigorous eight-step marketing construct procedure to measure the sophistication of DBM systems. Sethi and King (1991) endorsed this procedure as a method of operationalising studies that move beyond "anecdotes and taxonomy development to empirical testing (p. 468)" in strategic IS research. Hence, the construct methodology developed in this thesis is also useful to researchers wishing to measure the properties of other types of information systems.

While developing a multi-factor, multi-item construct to measure the functional capabilities of DBM systems, a shorter, eight-item measure of marketing capabilities also emerged. Furthermore, the methodology and scales used in this research could be applicable when developing IS constructs for complex systems. The remainder of this section will review the properties of the two constructs, and the general applicability of the methodology employed to empirical research in other areas.

10.2.1 A Multi-Factor, Multi-Item Construct

Developing a parsimonious construct from an 81-item questionnaire ensured a comprehensive coverage of the domain of DBM systems developed from grounded literature research. This allowed the characteristics of sophisticated DBM systems to emerge from the empirical data, rather than being specified by the researcher. The 27 items in the final construct are generic systems capabilities, consequently implying that this measure could be used to assess the sophistication of DBM systems in a wide variety of business environments.

The six categorical items selected to form the construct verify that *all three* elements of the generic model are significant in defining the domain of sophisticated DBM systems, within the context of the catalogue marketing industry. The first element of the model emphasises the importance of complete and continuously updated transaction files that provide management with information on product preferences and trends. Companies should deploy *all three* steps of the modeling process described in element 2, which should enable them to identify market segments that offer superior profitability. Continuous monitoring of the results from key marketing mix performance measures, defined in element 3, provides useful feedback and insights for developing future marketing plans.

While the quantitative results suggest that a valid and reliable multi-factor, multi-item construct with excellent unidimensionality was developed, several limitations must be considered. First, the primary literature cited (i.e. Churchill 1979) constantly stresses the difficulties of proving true validity in a single study, as the construct must be subjected to wider academic scrutiny. Furthermore, this study did not fully follow Churchill's recommendation that Campbell-Fiske's (1959) multitrait-multimethod matrix (MTMM) be used as a methodology for validity assessment. The practicality of MTMM methodology has been criticized by many researchers, including the original author (Fiske 1982), on both pragmatic and theoretical grounds. Specifically, the problem in this research programme was the lack of existing trait research in the DBM domain, which excluded the full use of MTMM methodology. However, at this point in the evolution of DBM research the construct can be seen to have met several commonly used validity criteria; namely face, criterion and convergent validity. In common with other disciplines, evolution in marketing science requires that new marketing measures be subjected to rigorous quantitative and qualitative examination across several studies.

At present the construct is specific to catalogue marketers, but with simple modifications to some items the instrument could be used to develop constructs for database marketers in other sectors (e.g. financial services). Hence this study provides the foundation for a whole new approach to analysing and assessing database marketing systems. The items in the construct may be updated as the field of database marketing develops. The construct forms a foundation for benchmarking systems that should enable managers to analyze and establish their competitive standing within an industry. Furthermore, a reliable and valid measure of the level of sophistication provides a stimulus for further academic research.

10.2.2 An Eight-Item Construct

Another outcome of the construct development process was the discovery of a shorter eight-item construct that demonstrated a consistent correlation with the main construct and other research variables. This measure is different from the one above in that it focuses on the marketing capability outcomes of the DBM system. The eight items were specified from another study (Schultz and Wang 1993) as sophisticated capabilities of DBM systems, and the validity of this short construct was demonstrated through its consistency in two research samples.

Hence, researchers wishing to take a parsimonious approach may find this short measure both reliable and valid. The growth and complexity of marketing information systems suggest that such studies will be of great importance in the future. The presentation of two reliable and valid measures of DBM sophistication provides considerable flexibility for further academic research, which is detailed later in this chapter (section 10.10). In future studies where numerous variables must be investigated, use of such a measure could be very helpful; likewise, in such studies the heuristic methodology developed for reliability maximisation also has many benefits.

10.2.3 Construct Methodology in IS and Marketing Studies

The methodology deployed in this research for producing the 27-item construct has wider implications for future studies with a need for complex marketing and IS constructs. Such studies will present new problems in domain specification, application of the multi-factor, multi-item construct development process, and appropriate definitions of reliability using Cronbach's alpha. It could be argued that the final construct had high reliability and excellent quantitative characteristics because of the methodology employed in this study. Hence, the heuristic scale purification methodology developed in this research (Figure 7.3) is reviewed, as it has several useful characteristics worthy of consideration in future studies of systems with large and amorphous domains.

A major problem when specifying the domain for any research study is that of bias. Meeting Nunnally's (1967) requirement that *all* items in the domain be captured has become increasingly difficult as the number of functional capabilities and attributes of possible interest within most marketing and IS domains have been expanding. For instance, this study started with a comprehensive specification (81 items) of the domain, but it is conceivable that future studies might contain over a hundred items. Historically, most constructs were developed from less than 30 items based upon researchers' own perceptions of the domain, and then only a few items needed to be deleted to maximise Cronbach's alpha. This approach simplified domain specification and reduced the computational time of completing many iterations of Cronbach's alpha. Clearly, this can introduce researcher bias into the domain specification, which may reduce the validity and reliability of the final construct.

Overcoming this problem required specification and collection of a large number of data items. Unfortunately, previously established conventions in construct research are limited by dubious assumptions. Most studies measure responses to each item using a 5, 6 or 7 point Likert scale, and these responses are then *assumed* to be normally distributed. Making an assumption of normality for every item in any study is unlikely to be correct. Taking a large number of these items, as this study did, and using a statistical package to generate distributions for each, revealed that many items were highly skewed and could be eliminated. The remaining items were not assumed to be normal, and hence, were summed together within a number of categories (7 in the case of this research) defined by the comprehensive literature survey. Adding individual items (i.e. 3 - 5 items) together into a category score produced an aggregate item whose statistical characteristic was much more likely to be normal. Then, the heuristic process for maximising alpha was applied to each categorical variable. Although this approach appears laborious, it was relatively easy when using a microcomputer to perform the computations. It should be pointed out that the process of aggregating items into six category groupings yielded lower reliability values (i.e. $\alpha = 0.86$) than calculating the results as 27 individual items (i.e. $\alpha = 0.92$), because of the nature of the Cronbach's alpha formula (Peterson 1994).

Adopting this process appears to offer some benefits to the studies with a large number of items in the research domain (i.e. > 40). First, the requirements for normality of scores when applying Cronbach's alpha and factor analysis would appear to be more rigorously met when using categorical groupings of items instead of individual items. Second, using the heuristic process, in conjunction with appropriate software, allows for single items to be inserted or removed from categories, and the process of maximising alpha to be conducted quickly. Finally, the alpha statistic yields a lower value using the categorical grouping approach, ensuring that researchers have erred on the conservative side of the 0.7 cut-off criterion. Developing and applying this heuristic process would appear to have contributed to the development of a construct with both high reliability and unidimensionality.

Applying the concepts in the main construct and heuristic process to other sectors (e.g. financial services) would be a rigorous test of their ability to produce reliable and unidimensional constructs. Furthermore, the consistent quantitative results for the construct provide support for the generic model as a way of analysing and assessing sophisticated DBM systems. The specific findings from the construct research are now used to review the generic model of DBM devised in chapter 3.

10.3 A GENERIC MODEL OF SOPHISTICATED DBM SYSTEMS

Before reviewing the findings related to the generic model, it is important to understand the research methodology used to establish the three elements of the model. Almost two years of this research was devoted to synthesising ideas and concepts from a broad range of marketing and general management literature, discussions with practitioners of DBM, and reviewing both published and unpublished case material, in order to devise the three-element model of DBM systems used throughout this thesis. In hindsight, it is clear that these exhaustive deliberations over the structure of the model provided a firm foundation for the empirical research. Furthermore, selecting catalogue marketing organisations as the sampling frame ensured that the data captured reflected a group of DBM users whose very existence is dependent upon the effective deployment of DBM systems.

The model presented in chapter 3 of this thesis was intended as a framework, not a prescription, for DBM systems. In common with most other marketing models, it is a simplification of the complex organisational and cognitive processes involved in developing powerful DBM systems, which rely on a solid information technology foundation. However, several real benefits can be derived from an explicit model of

DBM systems. Primarily, it should increase managers' understanding of the main elements of a DBM system, improve communications when such systems are developed across functional boundaries, and offer a benchmarking tool and database functionality guide to system designers. The model has proved to be a robust analytical framework for explaining DBM systems as the informational core of direct marketing strategies to both undergraduate and graduate students. Furthermore, several successful consulting assignments have demonstrated the model's usefulness as an analytical tool to define level of data capture and integration, accent segmentation and modelling methods, and determine critical performance measures.

The model formed the foundation for questionnaire design and scale selection, which was then pre-tested and revised with the help of five DBM practitioners. Consequently, most respondents found the questionnaire easy to complete, indicating that most managers were familiar with the capabilities that define sophisticated DBM systems. The following observations on the nature of sophisticated DBM systems were compiled from an analysis of survey responses of cataloguers with high DBM sophistication scores (i.e. 100 and over), discussions with marketing managers, and items selected by the modelling process to create the construct. The specific findings for each of the three elements of the model are detailed below.

10.3.1 Creating a Data-Rich Information Environment

The first element of the model articulates the need for complete and continuously updated transaction and communication files. The survey revealed cataloguers' dependence upon behavioural data, and the results clearly emphasise the importance of maintaining complete transaction records in sophisticated catalogue marketing systems.

Many catalogues are designed with an emphasis on psychographic segmentation (i.e. appeals to alternative lifestyles, interests and personality types), which are reflected in individuals' response and buying patterns. Hence, it is logical that sophisticated systems provide complete customer purchasing histories. These records support marketers in determining customers' preferences for products and pricing when developing future promotions. However, records of purchasing behaviour are of limited use unless customer contact and promotion histories records are also maintained. Ultimately, the linking of contact and purchasing histories provides useful information about customer acquisition and retention costs for lifetime value modelling.

An interesting outcome of the research was cataloguers' idiosyncratic capture of demographic data (e.g. age, sex, presence of children). The marginal contribution of the items in question 2 resulted in it being dropped from the construct model. This facet of the results is very interesting as there are several explanations for this outcome. First, as previously mentioned, is the catalogue industry's focus on specific niche markets and buying preferences, which may have little or no relationship to customers' demographic profiles. Hence, demographic data are only collected when the idiosyncrasies of the market affect customers' buying decisions (e.g. sex - women's apparel). Second, capturing demographic data in the transaction process can raise customers' privacy concerns. Catalogue companies are reluctant to risk a sale by requesting information that customers might perceive as confidential (e.g. age). A recent discussion with a senior statistical analyst in a large DBM consulting company confirmed that analyses of transaction data - reflecting customers' purchase preferences - are the primary source of information for segmentation decisions. Companies with a need for demographic data can obtain it, if necessary, through the use of external data enhancement services.

The model accentuates the need for frequent updating and cleansing of internal data, combined with the effective use of external data enhancement sources. This finding supports classic information theory; specifically, the importance of accurate, pertinent and timely information for marketing decision making. The complex, and often tedious, tasks of removing inactive customers, merging and purging data in the master file, and appending data from external sources are essential resource investments for sophisticated systems. My observations suggest that the costs of these processes are offset by the savings achieved through eliminating inactive customers, and maximising the opportunities presented by accurately profiling genuine customers. Unfortunately, many organisations seem reluctant to delete inactive customers, and so they maintain records of poor prospects, many of whom have moved away or are deceased. Data cleansing should become more important as customer data are captured from the information superhighways, greater co-operation in data partnerships, and as a need to support multinational DBM systems. Fortunately, these problems are being addressed through new software technologies, which are now being developed to cope with these complicated procedures.

Object-oriented database management systems [ODBMS] (Wetmore 1996) and data warehouses (Gorski 1996) are two new software technologies designed to help companies cope with these new data management challenges. First, object-oriented databases combine the advantages of both flat file and relational database technologies. Implementing ODBMS gives businesses the capability to store complex hierarchies of data, graphics, sound and video. These functions will be useful in developing high quality promotions of the future, which will be specifically developed for, and targeted at, small numbers of high value customers.

Second, data warehouses may prove useful to companies with a need to integrate substantial quantities of internal and external data. Its primary function is to clean, combine and reorganise data, so that the managers can perform market analyses and modelling for decision making more easily. Potentially, these systems can reap the benefits of data-rich information environment envisioned in this thesis; conversely, inappropriately structured data warehouses could be subject to all the IS problems listed in section 4.4.2.

Whatever the technological approaches, it is clear that most organisations are investing in data-rich information environments. But researchers still have little understanding of the organisational forces or management precepts that initiate and shape investment decisions in data acquisition. Later sections of these conclusions shed some light on the effects of culture, database size, managerial influences, and external market environment on these DBM issues. Having or capturing more data is a fundamental prerequisite to attaining the potential competitive advantages of DBM. The results relevant to DBM modelling processes are considered in the next section.

10.3.2 Market Modelling

The items selected through the construct development process contain items from all three steps of the market modelling domain. This finding demonstrated the importance of all three steps in element 2 as being necessary for effective segmentation, product selection and relationship building. For instance, use of single segmentation criteria and simple statistical methods were rejected, whereas items such as use of multiple query criteria, point scoring systems, and regression and cluster analysis were posited as useful methods for identifying market segments. All facets of economic modelling were deemed important, including use of budgets, spreadsheet modelling and lifetime value of customer estimates. While these results are not surprising in themselves, a holistic view reveals the importance some organisations now place on sophisticated methods of modelling customer behaviour.

Furthermore, the most sophisticated DBM systems now utilise marketing decision support systems, which have enhanced capabilities from the new disciplines of artificial intelligence and expert systems; at this time, these approaches are generally associated with large databases (over 1 million records). Interestingly, several small, highly market-oriented companies serving both consumer and industrial markets had implemented decision support systems. The implementation of a decision support system indicates management's commitment to the value of information, dictated by a market-oriented culture in order to achieve high levels of customer satisfaction, which, ultimately, results in continuous growth and profitability.

10.3.3 Performance Measures

Performance measures provide feedback to marketing managers on the current effectiveness of their DBM programmes. The items selected into the construct emphasised feedback elements that enable managers to monitor promotion expense, customer acquisition cost, and effective selection of products (i.e. sales per page). Intuitively, these items are important measures of catalogue marketing productivity.

Some surveys completed in the first fieldwork study revealed sophisticated DBM systems incorporating all 20 measures listed in the questionnaire. This indicated how carefully some companies are monitoring their market environment. Clearly, these companies recognise the importance of implementing market sensing capabilities to monitor trends, improve budgeting accuracy, and expose new market segments.

Overall, it appears that the concepts incorporated into the generic model of sophisticated DBM systems are consonant with those of senior managers in the catalogue industry. This was confirmed by collecting empirical data and applying Churchill's (1979) paradigm to develop a construct for measuring the level of sophistication in DBM systems. Hence, the generic model is not only highly robust from a conceptual perspective, but it also yielded a grounded construct with excellent quantitative properties.

Having developed a sound construct, it was applied to measure the effects of market orientation, database size, individuals' locus of control trait, and type of market on the level of sophistication in DBM systems. The empirical findings for these factors are interpreted in terms of marketing and IS notions of competitive advantage in the next four sections.

10.4 MARKET ORIENTATION

Finding a relationship between sophisticated DBM systems and market orientation adds to the modest, but growing, body of evidence that market orientation is positively associated with superior marketing skills and performance (Jaworski and Kohli 1992, Slater and Narver 1994). A market-oriented culture exploits "... the pattern of shared values and benefits that gives the members of an organisation meaning, and provides them with the rules of behaviour (Deshpande and Webster's 1989, p. 3)." The measurements completed in this study support the notion that market-oriented culture nurtures the development of sophisticated DBM systems to a point where they could become co-dependent.

Results from both measures of sophistication, across a wide range of database (i.e. 5,000 to 25 million records) and organisation sizes, support this theory. The residual and homoscedasticity analyses (Appendix 19) suggest that market orientation has most impact on companies possessing databases with less than 1 million records, because the residual values for these respondents show more variation in the levels of sophistication than companies with larger databases.

A detailed examination of the inter-correlation results (Table 9.4) between four components of market orientation (Deng and Dart's 1994) and the three elements of DBM systems show significant correlation in 11 of 12 items. These results provide important insights into how organisations convert market-oriented culture into distinctive capabilities. Hence, the following conclusions examine the features of sophisticated DBM systems as "distinctive capabilities" that give market-oriented organisations superior customer and competitor orientation, interfunctional coordination, and profitability. This analysis illustrates the integral role of DBM systems in supporting a market-oriented culture. Moreover, the results support several of Day's (1994) core concepts of the capabilities that deliver competitive advantage within market-oriented organisations. Day, a leading marketing strategy theorist, adopted the same theoretical foundations as were used in this research (i.e. the work of

Narver and Slater, Kohli and Jaworski) to contend that an effective *organisational memory* is the foundation for *customer linking* and *market sensing* capabilities which will deliver competitive advantage. These important capabilities are consistent with the main purposes of sophisticated DBM systems described throughout this thesis. Hence, the remainder of this section is devoted to an analysis of how a market-oriented culture supports these three capabilities within the context of the results presented in chapter 9.

10.4.1 Marketing Database as an Organisational Memory

The concept of a data-rich database as an organisational memory of the customer relationship is a constant theme of this research. As Day observes:

> "Organizations without practical mechanisms to remember what has worked and why will have to repeat their failures and rediscover their success formulas over and over again." (p. 44)

Procedures to create and maintain a memory of the customer relationship are an important first step, but this facility in isolation will not deliver competitive advantage. For full effectiveness, information flows from the database must be integrated with managers' mental models of how their competitive environment and internal value chain will react to the use of this new knowledge (Senge 1990). The dynamics of modern markets makes this a very complex task. Segments, marketing mixes and competition need to be continually redefined to maintain the growth and profitability inherent in achieving sustained competitive advantage. Because of these complexities, section 10.8 of this chapter is specifically devoted to explaining how DBM systems can be deployed to deliver *sustained* competitive advantage.

My observations suggest that sophisticated DBM systems enable managers to identify profitable marketing mixes, which then become part of the routine marketing plan. Verbal and mental elaboration of these plans and mixes within the organisation help market-oriented companies to determine a realistic vision of future markets. Companies operating in a data-poor information environment, without a memory of the customer relationship, are very dependent upon the memories and mental models of senior managers for marketing evaluations. This research suggests that sophisticated DBM systems are related to database size (i.e. larger companies have better memories), which creates several issues related to memory loss and distortion. Large companies generally have to cope with the problems of labour turnover, transfers and takeovers, all of which can disrupt the organisational memory and learning process. In small companies a single individual, generally the CEO or president, with a long-term commitment to the company retains these memories. But research shows that an individual's perception of the marketplace may be highly distorted (de Chernatony et al. 1993). Clearly in both situations some managerial memory loss and perceptual distortion are inevitable. Interestingly, this observation is supported by the only insignificant correlation in Table 9.4.

Failing to observe a relationship between customer orientation and a data-rich information environment (element 1 of the DBM model) appeared, at first, to be counter-intuitive. It is not surprising that perceptual questions relating to commitment to customers, and ways of creating customer value, elicit highly positive responses from presidents of small companies (35% of survey). However, many of these small companies rely on data-poor, unsophisticated DBM systems, for managing simple mailing lists for communicating with their customers. While ownership of a mailing list of buyers with a specific interest (i.e. a niche market) confers short-term competitive advantage, it cannot provide useful information for future decisions or updating of managers' mental models of their markets. So managers perceive their companies as being customer-oriented; unfortunately, they lack the data and systems to support their contention.

A memory of the customer relationship is the basis for creating and managing close customer relationships. Several authors (e.g. Christopher et al. 1991, Day 1994) believe that strong customer linking will result in strategic advantages, as will now be reviewed.

10.4.2 Database Marketing Systems for Customer Linking

Most businesses now recognise the need to strengthen communication links with customers to ensure satisfaction and loyalty. Manufacturers distributing their products through retail channels may work closely with a few buyers who represent large chain stores, but have few, if any, direct links with their final customers. Mass service providers (e.g. banks, telephone companies) have to create and maintain transaction accounts for each customer. It is not only the superior value of products and services which create loyalty, but also efficient billing, rewards for business continuity, and customized communications and promotions. Hence, high levels of interfunctional coordination should ensure that all departments contribute to delivering superior customer value. Day (1994) recognises the importance of improving customer linking capability in this statement:

> "Yet even when most relationships are purely transactional, there are still possibilities for gaining advantages by nurturing some elements of a linking capability within the organization. This process begins by analyzing which customers are more loyal or easier to retain and proceeds by seeking ways to maintain continuity with these customers through customized services and incentives." (p. 45)

Again the results in table 9.4 indicate a relationship between interfunctional coordination and all three elements of DBM systems. Porter and Millar's (1985) vision of IT's role in building strong value chains would seem to be more important than ever. Some companies have developed both internal and external networks to deliver greater customer value. New technologies (e.g. object-oriented programming, data warehousing, web sites, e-mail and neural networks) are becoming routine as firms seek to strengthen and develop customer linking capabilities. This research seems to indicate that investments in new technologies are clarified and supported by the shared values of a market-oriented culture, which apparently makes IT strategy easier to articulate and implement.

Finding ways to derive value from improved customer linking systems can be aided by feedback from marketing performance measures. This market sensing capability represents a key competence because it promotes organisational learning about customers and the competitive environment.

10.4.3 The Market Sensing Capabilities of DBM Systems

The ability to accurately measure the outcomes of DBM programmes has been a constant theme of this thesis. Defining and interpreting measurements of marketing activities enable managers to sense trends in consumer behaviour, or competitor action, so as to plan actions to attract or retain customers. Day (1994) asserts that sound market sensing practices, coupled with effective distribution of this information, can lead to competitive advantage. The empirical results in Table 9.4 support Day's contention. Element 3 of the DBM model has the strongest correlation with all four factors of the market orientation construct. These correlation results support the use of performance measures as market sensing devices related to all facets of an organisation's market orientation. Survey responses to the long questionnaire, where 20 performance measures were listed, revealed some sophisticated DBM systems using *all* of these measures. These results confirm Lewington's (1994) view of performance measures as market sensors providing feedback to make incremental improvements in the DBM system, marketing programmes and financial modelling. In market-oriented cultures the informational benefits of performance measures are recognised by all departments as aids to productivity improvement, rather than managerial assessment tools. This allows managers to focus on delivering customer value, as opposed to finding short-term solutions to financial problems, which may produce dysfunctional organisational behaviour affecting long-term results.

Overall, the effects of market orientation would appear to be pervasive throughout an organisation's desire for market information. Competitive successes and enhanced profitability from the use of information systems often result in a co-dependence. Clearly, these capabilities should result in a greater ability to acquire and retain customers than that of competitors, resulting in a larger database of customers. This factor will now be reviewed.

10.5 SIZE OF DATABASE

The findings for this hypothesis support Grant's (1991) resource-based approach to attaining competitive advantage, which views resources and capabilities as the foundation for strategy development. Possession of a database with detailed data on a large number of customers clearly represents a resource that is hard to replicate. Grant views these resources and capabilities as endowing market power:

> "The fundamental prerequisite for market power is the presence of barriers to entry. Barriers to entry are based upon scale economies, patents, experience advantages, brand reputation, or some other resource which incumbent firms possess but which entrants can acquire only slowly or at disproportionate expense." (p. 117)

Both acquiring customers and the development of sophisticated DBM systems involve substantial long-term investments (Fletcher and Wright 1995). These investments are intended to provide a return from sophisticated marketing capabilities, enabling an organisation to perform the complex routines that sustain, maintain and extend their customer database as their primary resource. Consequently, companies attempting to establish themselves in catalogue markets may have to overcome competitors with established customer relationships and sophisticated DBM systems, both presenting significant barriers to market entry. Therefore, finding from empirical research that the size of an organisation's database is positively associated with the level of sophistication in DBM systems has important ramifications for resource-based strategy theory.

The size of database may be a surrogate variable for several factors affecting DBM sophistication. First, acquiring a large database (> 1,000,000 records) of customers takes many years, and represents a substantial investment in both customer acquisition and IT. Hence, these companies have had long experience with, and learning from, the addition of appropriate capabilities to their DBM systems. Second, as the database becomes larger the possibilities of developing new product offerings, or expanding niche marketing activities, become more economic and expedient. Third, companies with large databases generally have significant numbers of IS personnel and large budgets; consequently, efforts to deploy new technology and increase functionality are continuously reviewed. When the IS development process operates within a market-oriented culture, these activities are more likely to be seen as a company-wide initiative, rather than the prerogative of one department. Any or all of these three factors may represent significant barriers to competition.

The emergence of database size as a factor demonstrates the potential role of "cost drivers" (Porter 1985, p. 70) in the development of sophisticated DBM systems. Nearly all of the companies responding to this survey market to customers and prospects across the US from one location. It is generally possible for these companies to exploit the economies of scale in both printing and postage rates, which yield lower unit costs per customer as database size increases. Unfortunately, the gross expenses for printing and mailing increase as the number of customer contacts grows. Hence, substantial cost savings can be derived from improved decisions related to the promotional activity and service levels for different customer segments as a company increases its customer base. Effectively deployed sophisticated DBM systems have greater potential for savings in printing and postage as the database size grows. Consequently, these savings help to overcome investment justification barriers described by Fletcher et al. (1994).

However, the development of sophisticated DBM is not the sole prerogative of companies with large databases. Some companies with small and medium size databases (< 1,000,000 records) have also developed relatively sophisticated systems. Examining the data reveals 14 companies with small and medium size databases in the top quartile of sophisticated DBM scores (SOPHTOT > 94). Interestingly, the average (i.e. arithmetic mean) market orientation (MKTORT) score for these companies is 92.5, as opposed to an overall mean of 81.7 (Table 8.5). This further supports the evidence presented in the previous section, illustrating the effects of market-oriented culture on the development of sophisticated DBM systems in companies with smaller databases.

The observation above raises an important question about the dependent relationship between database size and level of sophistication of DBM system. For the purposes of this research we have assumed that the level of DBM sophistication was dependent upon database size. Clearly, this assumption may be correct for companies that possessed a large database before the technological developments of the 1980's, and hence, implemented incremental DBM capabilities as they became available (see section 2.2). Unfortunately, observing the *true* dependent variable is limited by the nature of a *post hoc* study; this research does not reveal whether these companies attained large databases because of the use of sophisticated DBM systems. However, this study reveals highly market-oriented organisations with small databases are now investing in, and developing, sophisticated DBM systems. Discussions with managers in small market-oriented companies revealed their faith in DBM systems' investments. Most understood the business benefits of effective systems to acquire and retain customers faster than their competitors. For these companies attaining a large database was dependent upon the deployment of sophisticated DBM systems.

Another, and highly plausible, explanation is that these two variables are co-dependent. The author's observations of several companies' DBM developments, linear relationship between the two variables, and the incremental nature of capabilities implementation all suggest a strong co-dependence between these variables. Rationally, coping with increased numbers of customers requires more sophisticated DBM systems, which in turn leads to improved customer acquisition and retention: a virtuous spiral of capabilities and resources. Overall these results support the incremental approach described by Stone and Shaw (see section 4.4.2).

Managers' desire for greater control over marketing activities may also accelerate the development of sophisticated DBM systems. Locus of control was hypothesised as a possible personal trait in marketing managers, affecting their desire for information. The findings for this factor will be considered in the next section.

10.6 PERSONAL CHARACTERISTICS OF MARKETING MANAGERS

The finding that one of the most researched personal characteristics, locus of control, did not affect the sophistication of DBM systems was intriguing. Nearly 80% of the survey responses were completed by CEO's or Vice Presidents of Marketing, who could be considered as powerful individuals in their organisations. The theory, and a large body of research into the effects of locus of control, suggested that the characteristics of inner-directed individuals would encourage the development of sophisticated DBM systems, particularly in small companies. However, neither locus of control nor education level had any impact on the level of sophistication in companies of widely different sizes.

Developing an explanation for this finding raises many interesting issues about how marketing managers interact with their information systems. If we accept that market orientation and database size are important factors in developing sophisticated DBM systems, then it could be observed that these variables stifle or eliminate the influence of managers' individual characteristics. This statement by Kohli and Jaworski (1990, p. 15) asserts the role of individuals in creating a market orientation for the organisation:

> "Because the factors identified are controllable by senior managers, deliberate engendering of a market orientation is possible."

Furthermore, they contend that change and risk orientations are important attitudes representing a desire to enhance customer value and remain competitive. Managers' decisions to sustaining a market orientation through quality guarantees, continual product updating, fast service and data collection involve substantial financial risk, as ultimately customers must perceive these benefits as adding value in the exchange process. Such investments in capabilities designed to improve competitiveness or customer service are important signals that reinforce employees' commitment to a market-oriented culture. These kinds of action require a manager to have a broad vision of the business and the marketplace, as opposed to a desire for control over marketing outcomes. Consequently, this connotes that managers develop and use cognitive frameworks (Kiesler and Sproull 1982), or mental models, to guide decisions on how best to develop their DBM systems.

Managers' mental models help them reduce the uncertainty and abstractions of markets, segments, and competitive forces to simplified mental representations, in order to avoid being overwhelmed by data when making decisions. Day and Nedungadi's (1994) research found four representational modes of mental models used by managers to simplify and impose order on complex and ambiguous competitive environments. Significantly, their research concluded that market-driven managers were the highest users of information, and exhibited the highest degree of stability and consensus within management teams, of any of the four representational modes. Furthermore, businesses with a market orientation reported significantly higher levels of satisfaction with their knowledge of competitive advantage than any of the other three groups. These findings support the contention above, that engendering of a market-oriented culture suppresses or nullifies the effects of individual personality traits.

10.7 TYPE OF MARKET

The findings of this study refute the notion that different types of market affect the level of sophistication in DBM systems, although the research did reveal several small industrial DBM's supported by highly sophisticated industrial DBM systems. In order to interpret this result, the inter-relationship between levels of sophistication in DBM and market orientation must be borne in mind. Several studies (Jaworski and Kohli 1993; Slater and Narver 1994) of the effects of competitive environment on market orientation found *little* or *no* effect from external market factors. For instance, Slater and Narver (1994) examined the effects of four environmental variables - market turbulence, technological turbulence, competitive hostility, and market growth - but found little moderation of the magnitude of market orientation within businesses by these variables. As market orientation and level of sophistication in DBM systems are highly inter-correlated, the findings of this research could be considered as consistent with, and a confirmation of, the findings from these studies.

These findings suggest that companies should not attempt to adjust or alter the sophistication of their DBM systems to match different types of markets, or changes in market conditions. Companies will always be faced with transient market conditions resulting from changing buyer preferences, increased competition, and variations in market growth rate. Nevertheless, by using feedback from a sophisticated DBM system, and remaining market-oriented, companies should be able to model marketing mix decisions so as to determine whether a customer or competitor emphasis is most appropriate to new market conditions. Continuous improvement of products, service and value may be the best defense against competitors. Adept marketers should be able to create alternative marketing scenarios for testing that enable them to learn about market conditions and hence respond in the most effective way.

This author's observations of leading edge DBM companies, and the importance of market-orientated culture in contemporary organisational learning theory (Slater and Narver 1995), led to a proposal as to how DBM systems may be used to support strategies aimed at achieving sustained competitive advantage. The benefits and methods of incorporating sophisticated DBM systems into organisational learning approaches for accumulating market knowledge are explained in the next section.

10.8 DERIVING SUSTAINED COMPETITIVE ADVANTAGE FROM SOPHISTICATED DBM SYSTEMS

Discovering that market orientation and database size are key factors associated with sophisticated DBM approaches may have important implications when attempting to operationalise the information intensive concepts of the learning organisation. In this discussion, I will merge the literature search, my structured observations of successful companies, discussions with experts, and survey results into a holistic view of how businesses can derive *sustained* competitive advantage from their DBM systems.

Cases and examples presented in chapters 3 and 4 demonstrate how sales growth and customer loyalty were supported through the use of DBM systems. In many cases, the success of DBM strategies (e.g. frequent user rewards) engendered competitive imitation; consequently, if every airline, hotel or grocery store implements a frequent user programme, then competitive advantage is nullified. Therefore, *sustainable* competitive advantage is best derived from DBM through less visible processes that are hard to observe and replicate: specifically, the ability to learn faster than competitors (Slater and Narver 1995, Slater 1996) about how specific market segments respond to alternative marketing mixes. Developing the three elements of DBM systems for the purpose of learning about markets is now explained (Figure 10.1).

10.8.1 Element 1: Effective Use of Internal and External Data Sources

Investing resources in improved customer data management is a high priority for most companies. First, smart, club and credit cards aid in the capture of data, which provides essential information on target markets for future promotions.

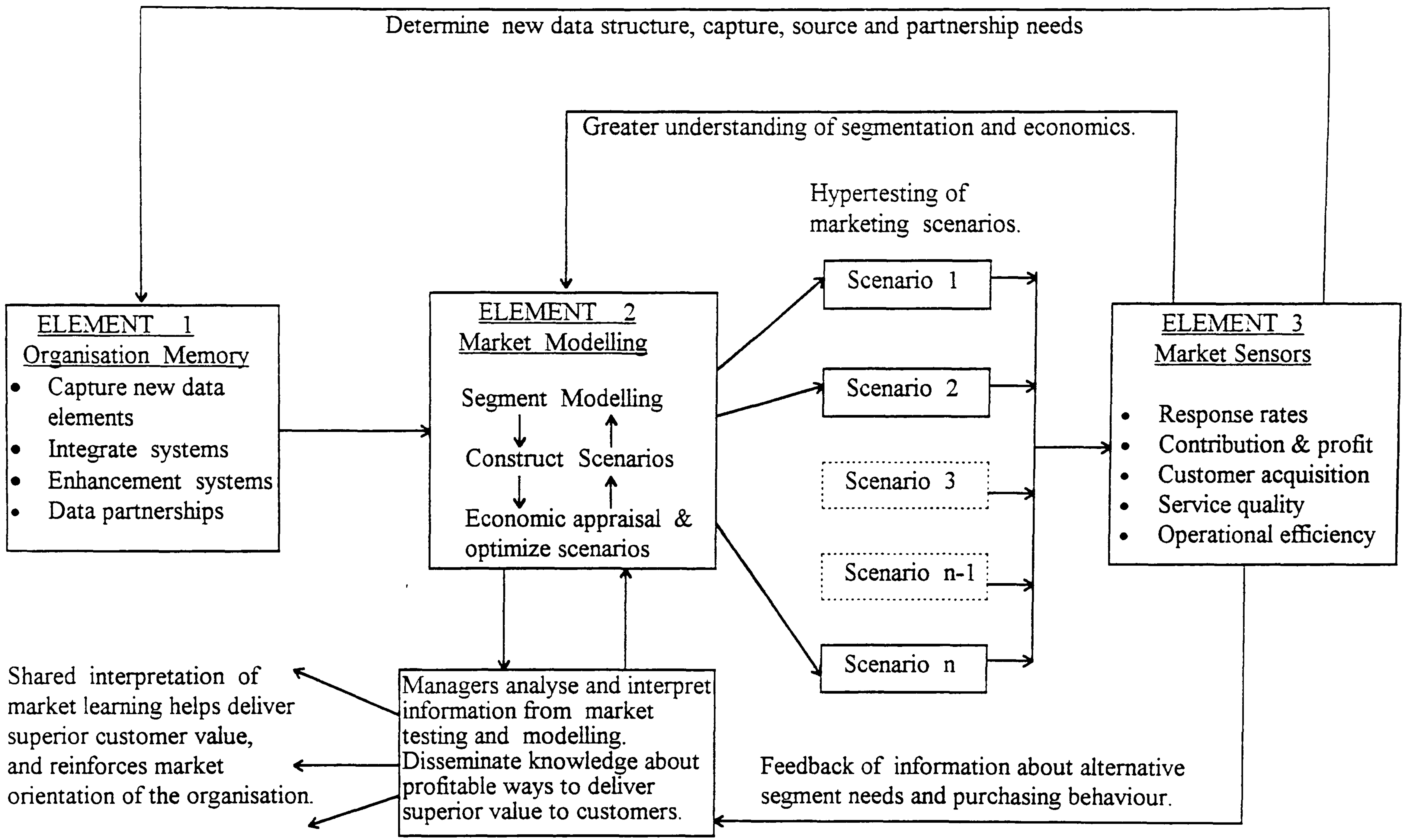

Figure 10.1 Deriving Sustained Competitive from Sophisticated DBM using Learning Organisation Concepts

Second, appending data from external sources can be a cost effective way of supplementing internal data sources. For instance, geodemographic database systems (e.g. PRIZM, ACORN) enhancements are available in the US and Europe as methods for clustering customer groups, and this type of data can be of assistance when analysing buying patterns for marketing research purposes.

Ultimately, many companies will seek to form national and international data partnerships as a way to expand the size of their customer databases in a cost effective manner. Devising strategies to exploit the opportunities presented by the formation of data partnerships requires that businesses move to levels 4 and 5 of Venkatraman's (1991) model (section 4.4.2), requiring a movement towards the advanced "interorganisational information systems" of the future. Data partnerships can provide new sources of DBM efficiency and effectiveness in several ways. The joining of customer databases exploits the economies of scale, builds affinity partnerships (e.g. Beneficial Bank and the Open University), and makes available specialised marketing and IS expertise to develop the DBM system.

The vision and will to build such data-rich information environments are more likely to be nurtured and resourced within organisations having a market-oriented culture. Hence, such measures should yield greater understanding of customer behaviour patterns, which may reduce promotion costs and highlight specific segments when testing new marketing mix scenarios.

10.8.2 Element 2: Market Modelling: Testing Multiple Scenarios

As explained in chapter 3, the purpose of market modelling is to "construct segmented marketing mix scenarios" for testing. However, the permutations and combinations presented by large databases and multiple products are almost infinite (Coates et al. 1994). Hence, a marketing decision support system is a necessary marketing tool for examining and discovering potentially profitable market segments. The purpose of this process is continual examination of market segment responses to new marketing mix combinations through market experimentation: this process I will describe as *hypertesting*.

The process of hypertesting requires that the modelling process be combined with creative communications for the purpose of generating *numerous* marketing propositions, as a way of learning about consumers' purchasing behaviour. Incessant advances in data-driven laser printing technology, telemarketing, and web sites now present marketers with a multitude of alternatives for testing different marketing strategies and tactics. As many marketers already utilise all of these interactive media, the challenge becomes one of developing ways of testing consumer responses to alternative propositions. Databases are then devised that will provide measurable feedback on costs, sales, creative tactics and profitability. This *learning* about the current state of the market enables marketers to select the most profitable marketing mix options; similarly, recognition of new markets could result in strategic benefits that "first-movers" derive from early market entry. Conversely, some tests will not be profitable, but will yield information for future marketing decisions.

10.8.3 Feedback from Performance Measures

Hypertesting must be combined with sophisticated market sensing from a comprehensive array of performance measures. Decisions on the efficiency and effectiveness of both the marketing process and the DBM system are assessed from these performance measurements. Conducting tests yields continuous learning about customers' responses to alternative scenarios, enabling marketing managers to recognise the strengths and weaknesses of their marketing programmes. As Narver and Slater (1995) observe,

> "... because of its inherent flexibility, the learning organization is able to quickly reconfigure its architecture and reallocate its resources to focus on the emergent opportunity or threat." (p. 16)

An organisation must share learning about its markets in order to determine the most feasible reconfiguration of resources to serve new markets. Taking such a proactive approach is intended to maximise the use of internal resources and capabilities, and hence, avoid the problems and disruption of reacting to competitor activity.

Only a few companies have recognised, and been able to exploit, the benefits of hypertesting. This is because the process of hypertesting is complex, and difficult to maintain, particularly for organisations with limited marketing resources. But the growing use of interactive media, supported by increasingly sophisticated DBM systems, is encouraging more companies to conduct tests of consumers' preferences and reactions to new products, pricing and promotion tactics. This author has noted the growth of a new breed of advertising agency (e.g. Rapp Collins Worldwide[1])

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[1] Rapp Collins World-wide revenues in 1994 were \$ 934.4 m. (1993 = \$ 833.2 m).
Source: US Direct Marketing Association Fact Book 1996, p. 28.
Note: Stan Rapp and Thomas Collins authors of *MaxiMarketing* in 1987.

which advises and plans these types of direct marketing campaigns for their clients. These agencies plan tests aimed at unearthing new product preferences and profitable market niches before the competition. Porter (1996) confirms that senior managers will need this kind of information when articulating decisions on strategies which will enable their organisations to survive in the new era of hypercompetition:

> " Deciding which target group of customers, varieties, and needs the company should serve is fundamental to developing a strategy. But so is deciding not to serve other customers or needs and not to offer certain features or services. Thus strategy requires constant discipline and clear communication." (p. 77)

Hence, hypertesting provides information that clarifies strategic decisions based on actual consumer behaviour. Companies without this capability will be forced to fall back on the mental models of their senior management, which, without new learning, can become stale and ineffective; consequently, making it hard to articulate new strategy options.

Clearly, the development and use of sophisticated DBM systems present senior managers with many new issues to consider. The next section contains a review of the managerial implications of this research.

10.9 MANAGERIAL IMPLICATIONS OF THE RESEARCH

The increasing popularity of DBM provides some indication of how attractive the benefits of these systems are. The virtuous spiral of decreasing IS costs, increasing ease of data collection and desire for greater control over marketing activities is making firms more receptive to the adoption of DBM systems. The value to be gained from a DBM system well matched to business requirements is potentially large. However, the design and maintenance of effective DBM systems requires constant re-evaluation of the evolution of markets with technology, which is why companies have yet to realise the full potential of their systems. Many papers articulate the barriers encountered when justifying and developing effective DBM systems. Before embarking on expensive IT and data collection projects, managers should ask themselves some basic questions. Specifically:

- How does DBM fit in with their existing and future marketing plans?
- What are the specific quantitative and qualitative benefits of a DBM system that will improve marketing productivity?
- What organisational changes will be necessary to accommodate a DBM system?

These questions are intended to provoke a situation review, which, if appropriate, evolves into a plan for DBM systems development.

The Henley Report (1995) states that only a few organisations are yet able to exploit the full capabilities DBM, and both strategists and marketers are relatively unaware of the true costs associated with its development. Consequently, in order to fit DBM into the organisation's business plans, managers need both an understanding of its potential and how this contributes to the business strategy. Hence, marketing managers need more education and training to acquire a working understanding of the subject. The proposed model is particularly powerful at highlighting the degrees of sophistication possible and the resources required for implementation. As an aid to organisational learning it has much to contribute. Although the importance of direct marketing and its potential value to an organisation is not a factor explicitly handled by the model, it does offer help in assessing and communicating the implications of a chosen strategy to planners.

10.9.1 Implications of the DBM Systems' Model

The model helps identify existing strengths and weaknesses in the delivery of direct marketing effort. Once a strategy has been chosen, the gaps in the DBM system resources become more apparent. The model helps managers articulate whether further data collection, greater modelling capabilities, or additional performance measures are needed to improve their DBM system. Once established, all databases need constant maintenance, an issue explicitly dealt with by the model. The resources needed to achieve the overall system performance required, in particular specialist expertise, both managerial and model specific, may not be available within the company. Consequently, a managerial benefit from adopting a more structured approach to DBM, through this generic model, is that it raises further questions as to the best way to acquire the relevant knowledge.

Investment in any or all elements may require organisational change. Collection of data from other internal departments could cut across organisational boundaries and raise such issues as standardisation of data formats. Developing more sophisticated systems brings the need for expertise from IT professionals. Collaboration between this group and marketers has not proved easy in the past. Where the development of DBM systems brings the need for a closer, more effective collaboration between work groups, the model can contribute to each group's understanding of the issues involved. However, collaboration depends on more than a common understanding. How to effect specific changes within particular organisational cultures should be given serious consideration by managers; specifically, engendering a market-oriented culture needs particular attention.

New information technologies make market modelling more accessible and affordable, but we need greater understanding of how information derived from database analysis affects managers' marketing decisions. For instance, the DBM model proposed in this paper may be examined in the context of its fit with alternative heuristic modelling methods described by Coates et al. (1994). Feedback from numerous performance measures improve the effectiveness of marketing control systems. Greater understanding of how individual elements of DBM are developed to deliver sustained competitive advantage could be important to designers of future systems. Findings from the quantitative and qualitative research provide important managerial insights into how some companies have succeeded in deriving sustained competitive advantage from their DBM systems. Specifically, these companies exploit a virtuous spiral of DBM capabilities, driven by a market-oriented business culture and information technology innovations, to gain and retain profitable customers.

10.9.2 Deriving Competitive Advantage from DBM Systems

Several sections (2.6 and 4.4.2) of this thesis cite the difficulties and barriers encountered when deriving competitive advantage from sophisticated information systems. But it is clear from the case examples described in this thesis that companies of all sizes were able to grow, and be highly profitable, in competitive environments through effective use of their DBM systems. Figure 10.2 depicts the virtuous spiral of incremental improvements to DBM system functionality which, ultimately, can deliver sustained competitive advantage. Observations from the literature cases, company interviews, and quantitative research are synthesised to describe the primary factors contributing to this development cycle.

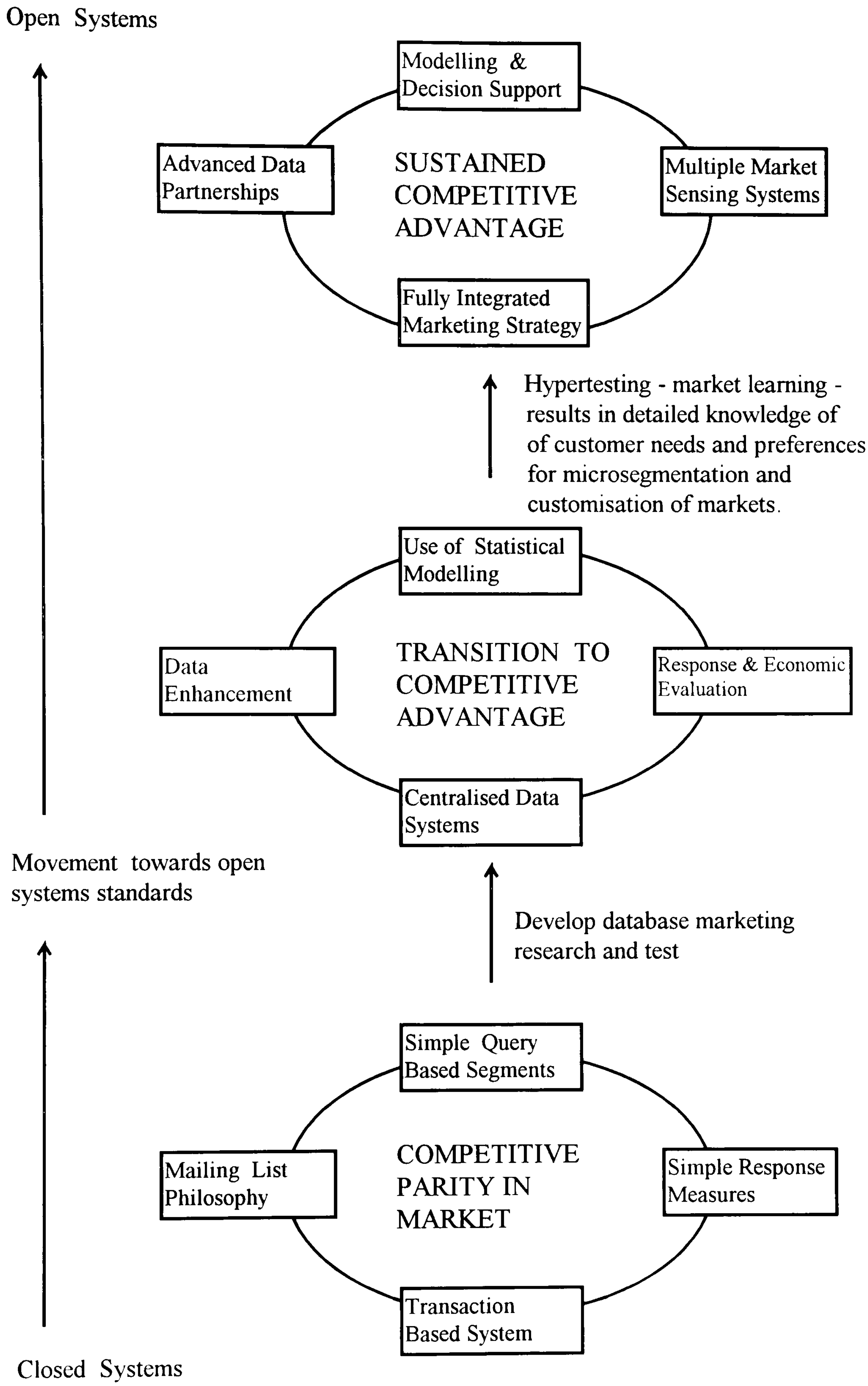


Figure 10.2 The Development Process to Gain Competitive Advantage from DBM Systems

10.9.2.1 The Importance of Market Orientation

Market orientation is an essential business culture in the development of sophisticated DBM systems. Adopting such a pervasive culture has the effect of reducing the inhibitors of DBM systems (Section 2.6) which results in several organisational benefits: IS and marketing staff work in unison to develop systems that enhance customer value; investments in IT are easier to justify; data sources and modelling are constantly reviewed; and performance measures are implemented to provide greater understanding of customers' behaviour and competitors' actions, not to assess managers' performance. Hence, removal of the behavioural inhibitors allows a continual exploration of ways to improve DBM functionality, which can both improve marketing productivity and deliver enhanced customer value.

During the interviews with the presidents of the women's apparel and rubbish receptacle companies both expressed their willingness to make investments in their DBM systems "as an act of faith." This philosophy does not condone frivolous investments, rather it recognises that some investments will result in improved information and customer service that cannot be quantified by normal methods.

The statistical results (Table 9.2) indicate a positive correlation between market orientation and [logarithmic] database size. It is possible that this is a spurious correlation, the case observations strongly suggest that it is indicative of an important relationship: the role of a market-oriented culture in the virtuous spiral of DBM sophistication. New businesses with a market-oriented culture are able to retain customers through effective use of relatively simple DBM systems. Through the effective use of market experimentation and list testing, market-oriented businesses acquire new customers more efficiently than their competitors. This first step reinforces the data capture process as a way of increasing market penetration in existing markets, developing new products (Section 3.3.4), and exploiting opportunities in new market segments. Continuous growth of the customer base increases both sales and profitability, enabling the company to reinvest in more sophisticated DBM systems, personnel, and analyses. The use of hypertesting, described in the previous section, results in faster market learning, ultimately opening a competitive gap to deliver sustained competitive advantage.

From my observations, sustained competitive advantage - high growth combined with high profitability - is the *normal* outcome for highly market-oriented companies using sophisticated DBM systems to determine the most effective use of direct marketing media. Managers receiving feedback from a wide array of market sensors are aware of shifting customer needs and preferences before their competition. Knowledge of segment profitability, enhanced sensitivity to product life-cycle changes, focused development of new products, and lower operating costs are all powerful strategic benefits contributing to direct marketers' ability to sustain their competitive advantage.

Furthermore, marketing managers operating within a market-oriented culture are not confronted with the conflicts or control issues (Section 2.6.1) other cultures (i.e. financial or production orientation) seem to engender. Companies with a strong market orientation proactively adopt new technological innovations which enhance marketing information and customer service. Consequently, faster progress to higher levels of DBM sophistication enables the company to grow its customer base faster than competitors as in the case of Dell Computer.

10.9.2.2 Information Technology Issues

How do managers of DBM systems cope with incessant innovations in IT? As observed in Section 2.6.2, the proliferation of proprietary DBM systems has created a number of problems that developers of strategic systems must overcome. Typically, in the past, managers with little experience of DBM were tempted to start new ventures with low-cost, stand-alone proprietary packages with little or no networking capability. These software packages were often characterised by constrained data capture, weak modelling capabilities, and few performance measures. Such *closed* systems benefited proprietary software companies because they "lock-in" a company to a specific vendor (Holtham 1994). Therefore, managers adopting proprietary DBM systems should be careful to investigate the compatibility, adaptability and interconnectivity of these software packages. Such problems are also common for businesses (e.g. banks) still using COBOL programs in a mainframe environment - changes to database structures can take over a year. Failing to overcome these limitations can confine companies to competitive parity in their markets.

As the size of an organisation's customer base grows, there is a need for greater integration of files and use of generic database systems to facilitate greater data interchange and connectivity within the business. Customer growth, and the need to handle a larger number of incoming calls, requires a centralised database that can be accessed by a large number of users. Database processing should also be accompanied by the use relational database software and networks for flexibility of data processing and storage. Improved data capture and access to files allows for the automatic integration and updating of more performance measures. The results from these measures provides greater insight into segment profitability and directs statistical modelling for market testing. Greater market knowledge and the competitive advantages derived from increased sophistication result in further investments focused on sustaining the competitive advantages.

Business growth, new products, potential acquisitions and data partnerships create an even greater need for flexibility in DBM systems' design. Because it is difficult to forecast how future competitive advantages will be derived from information technology innovations and applications, determines that information portability to new, and as yet undefined, systems configurations is essential. Hence, sophisticated DBM systems should be built on *open* systems standards for hardware and software platforms using public (non-proprietary) operating systems, user interfaces, applications standards and networking protocols. Adopting open standards should permit the development of software that is easily upgraded and that will operate on new hardware platforms as they become available. Future DBM systems will have to capture data from new interactive media (e.g. interactive TV), develop artificial intelligence modules to support specific segmented marketing strategies, compile and deliver multimedia customised catalogues, and interpret the results from hypertesting activities.

The future depicted above is enriched through the application of object technology, which if successfully implemented will have a dramatic effect on how DBM systems will be developed, managed and updated. It is highly likely that object-oriented programming will becoming the new standard, making distributed objects the leading edge of present information technologies. The following hypothetical business scenario illustrates how an object-oriented database management system (ODBMS), combined with Internet bandwidth enhancements, could deliver future selling propositions.

10.9.3 The Future: An Illustrative Example

This hypothetical case example illustrates how an ODBMS could be used in the future to market men or women's apparel: Virtual Couturier's Limited. By applying artificial intelligence to a customer's file the company assembles a personalised catalogue of apparel and accessories using a previous history of buying behaviour; in addition, the company includes some new apparel lines they are testing for future print catalogues. A total of 100,000 personalised catalogues are e-mailed to their customers. While scanning through the catalogue the customer notices that clothing is imaged by a model identical to their own clothing size. Using a sidebar the customer selects different fabrics, colours, accessories, or a salespersons commentary on the main features of different designs. After the customer has finalised their selections and checked inventory, the order is sent electronically directly into the cataloguer's database with a payment authorisation from their e-credit account to Virtual Couturier's. The cataloguer only stocks accessory items under £60, so orders for suits, jackets and dresses are forwarded immediately to specific manufacturers for direct shipment to the customer. The customer's account is automatically credited with a loyalty bonus of 10% of purchase value for using the e-catalogue system. The customer receives the items 48 hours after placing the order.

The above system has important economic advantages over present catalogue and retail operations. Virtual Couturiers has not only eliminated all printing and postage costs, but all the time delays inherent in this marketing process. Expensive items are held in stock by the manufacturer, reducing inventory and concentrating production on the most popular designs and colours. Customers entering their orders directly into an Internet site database, greatly reducing the costs of toll-free telephone calls and sales personnel. As orders are entered by customers, marketing performance monitor response by customer segment giving real-time access to marketing research information The convenience, customisation and economics of such an integrated DBM system should deliver and sustain competitive advantage for companies capable of implementing such interactive marketing systems.

10.9.4 Organisational Learning

As markets and competition are continually shifting, competitive advantage comes in unexpected ways as data are subjected to new analyses. Sustained competitive advantage comes from faster, and pre-emptive, learning about new trends and customer groupings, and generating new options for marketing action. It is this author's opinion that this kind of market intelligence gathering will become commonplace for entrepreneurial, market-oriented companies in the future. Hypertesting, combined with extensive performance measures, supports an incremental approach to marketing improvement. Employees at all levels should be trained to contribute to the flexibility of information flow focused on continuous improvement of customer value. This will engender a market-oriented culture, and a company described by Stalk et al. (1992, p. 62) as "...a giant feedback loop that begins with identifying the needs of the customer and ends with satisfying them."

Over the six-year period of this research the scope and use of direct marketing techniques have both grown, and changed, with the emerging field of electronic interactive marketing (Schultz 1997). Marketers now have available a wide variety of interactive communication tools (e.g. telemarketing, Internet, e-mail, interactive television), which allow individuals to respond in many ways. As Deighton (1996) observes, significant portions of marketing budgets are now allocated to *interactive marketing* because of two features, "... the ability to address an individual, and the ability to gather and remember the response of that individual (p. 151)." This statement recognises the key coordination role of sophisticated DBM systems, enabling marketing managers to cope effectively with the opportunities presented by these new marketing tools. Consequently, traditional mass marketing managers must learn to cope with new techniques and economics of electronic commerce as markets fragment to more adequately reflect specific customer needs.

10.10 RECOMMENDATIONS FOR FUTURE RESEARCH

Competitive advantages gained from the implementation of effective DBM programmes will result in new investments to develop increasingly sophisticated DBM systems. This author's observations of DBM systems, and frequent discussions with marketing managers and consultants in leading companies, have revealed a number of promising research directions which could contribute to further understanding of these complex systems. Although this research focused on catalogue companies, recent literature reveals companies in all business sectors are now deploying DBM as part of their strategy; hence, many research studies are now feasible.

The model and constructs developed in this research present a useful framework, methodology and measurement tools to analyse DBM systems. The three-element model will assist researchers in defining the precise constituents of DBM in different industries, and hence, develop constructs for research in specific sectors. The methodology presented in this research may be used to evaluate the enhanced functionality of DBM systems as new IS technologies (e.g. data warehouses, object-oriented programming) evolve. Hence, a research agenda for both myself (Sections 10.10.1 and 10.10.2) and other researchers is presented which will clarify the role of DBM systems in contemporary marketing, IS and strategy theory.

10.10.1 Linking Sophisticated DBM Systems to Business Performance

This research has provided many examples of how companies can and have used sophisticated DBM to increase profitability and maintain outstanding growth. While there is a significant body of evidence to suggest that a link exists between the deployment of sophisticated DBM and business performance, it is only anecdotal evidence. Several studies (Jaworski and Kohli 1992, Slater and Narver 1994, Greenley 1995) of market orientation and performance explain alternative methodologies for researchers wishing to establish such links. These studies can be combined with the tools and concepts developed in this research as a foundation for researching any such links.

10.10.2 Sophistication of DBM Systems in the Retail Sector

A recent consultant's report, *Database Marketing Standards for the Retail Industry* (Coopers & Lybrand 1997), proposes three levels of sophistication for DBM systems as standards which commit retailers to more customer-focused methods of business operation. The three levels of DBM operation are defined as ways of responding to the competitive threats from direct marketers.

Level 1: Direct Marketing. Management of customer lists and basic promotions around the specific needs of customer segments.

Level 2: Customer Relationship Marketing. The standard for this requires that retailers apply a more sophisticated tailored approach and technological tools to manage their relationships with customers.

Level 3: Customer-centric Relationship Management. Customer information is used to create a dialogue with individual customers to ensure their loyalty.

Cataloguers and retailers compete for the same customers. The construct developed in this research could be used to measure the level of sophistication in retail DBM systems. This research will have two main objectives. First, to determine whether market orientation and database size are correlated with the level of sophistication in retail DBM. And second to compare the two industries in terms of customer size and DBM sophistication. Furthermore, where survey responses were obtained from publicly quoted companies, it would be possible to compare the profitability (i.e. return on equity) of cataloguers and retail companies. A comparative study of this nature could reveal important differences and similarities in the levels of sophistication for these two business segments.

10.10.3 Market Knowledge and Learning from Database Marketing Systems

The finding that sophisticated DBM systems and market orientation are strongly linked presents several directions for future research. Notably, these directions are principally within the notions of the learning organisation presented in this thesis. According to Slater and Narver (1995), organisational learning is fostered within a cultural foundation of market orientation and entrepreneurial drive. Within such learning theories, the ability to learn faster than your competitors is viewed as the only source of sustainable competitive advantage, particularly when operating within dynamic and turbulent markets. Their learning theory could be linked and tested with the revised model of DBM systems presented earlier in this chapter (section 10.8). Within the domain of sophisticated DBM systems and learning organisations two areas of research would appear to be particularly useful.

First, the notion of DBM systems as providing a "memory of the customer relationship," operating within a market-oriented organisation, has many themes overlapping with Sinkula's (1994) view of organisational learning as a three stage process consisting of information acquisition, information dissemination and shared interpretation. This study has demonstrated a strong link between database marketing and the information flows as described in market orientation. A recent paper (DeTienne and Thompson 1996) clearly promotes DBM as a route to greater understanding of the learning organisation:

> "Database marketing may be problematic for some theorists in that it involves the retention of concrete, rather than general, information, but it also provides an opportunity to increase the observability and measurability of organizational learning phenomena." (p. 17)

This author's observations propose a relationship between higher levels of DBM sophistication and organisational learning. For instance, some direct marketers (i.e. Dell, Gateway 2000), with a strong entrepreneurial emphasis and heavily dependent upon DBM, have demonstrated sustained growth in competitive markets. Empirical research could reveal how these companies deploy and develop their DBM systems to acquire and disseminate knowledge to improve operating and marketing productivity.

Second, the primary purpose of sophisticated DBM is to operate as a decision support system (DSS) for marketing managers. Blattberg and Hoch's (1990) laboratory research indicated that predictive decision-making proficiency is enhanced when managers' intuitive skills are combined with database models. Unfortunately, little is known about how marketing managers devise mental models to extract information from database systems for the purpose of decision-making. This growing need for an understanding of managers' mental models is demonstrated by the body of recent literature on this topic (e.g. Porac and Thomas 1990, Huff 1990, de Chernatony et al. 1993, Day and Nedungadi 1994). Potentially, such analyses might reveal the knowledge structures and mental categorisation processes used to resolve the ambiguity and uncertainty confronting managers trying to learn about their markets (Day 1994).

Understanding these processes would need fine-grained research focusing on the attributes that managers' perceive as most important in their DBM systems for effective decision making: the value placed upon different types and sources of data, the choice and application of statistical modelling techniques (Venugopal and Baets 1994), and the selection and relative weighting of performance measures are some of the areas which could be of interest. Such research could be useful in educating and training a new generation of marketing managers who will have to cope with "real-time marketing" (McKenna 1995). Furthermore, these insights could help in articulating the IS structures needed to design effective data warehouses (Gorski 1996), and provide the "knowledge base" (Dubelaar et al. 1991) to accommodate future developments in expert systems. Variations of these studies could also be usefully applied to another area of growing interest: the global DBM system.

10.10.4 Global DBM Systems

The use of direct marketing as a method for expanding into foreign markets is of growing interest to many companies (Topol and Sherman 1994), particularly when they wish to exploit the global communications capabilities of the Internet. Clearly, many companies may wish to exploit the competitive advantages of improved information and communications in their international markets (Fletcher and Wheeler 1989). However, designing and developing DBM systems capable of overcoming the basic idiosyncrasies of software designated to handle a single language, currency or postal coding system can be daunting (di Talamo 1993). Once, again the three-element model provides a useful analytic tool to research and define the use of DBM systems to develop marketing strategies in international markets.

The final suggestion for future research is designed to determine a link between sophisticated DBM systems and stronger customer relationships, which, ultimately, result in increased brand loyalty.

10.10.5 Brand Recognition

A strong argument for investing in sophisticated DBM is its perceived role in building strong relationships with customers (Boussofiane 1996) i.e. enhancing brand loyalty through direct, personalised communications. But some brand advocates have claimed that a "mail order, market trader" culture damages brand image (de Chernatony et al. 1997). However, the growth of frequent user programmes, desire for cross-selling, and affinity marketing have effected a convergence of brand and direct marketing. For instance, Marks and Spencer deployed its customer database for a direct marketing launch of its financial services business under its core brand. Similarly, many direct marketers have created strong brand recognition (e.g. L. L. Bean, Dell) through their ability to deliver consistent customer value. Both marketers and academics apparently believe that sophisticated DBM systems are a key factor in the process of higher levels of brand recognition and loyalty. A study of this proposition is urgently needed, considering the large investments in both DBM systems and brand recognition.

10.11 CONCLUDING STATEMENT

Over the period of this research, interest in the use of DBM systems has grown considerably. Sophisticated DBM systems are enabling organisations to segment their markets, build stronger relationships with their customers, and derive greater market information about individuals' purchasing habits, which are the fundamental requirements of effective marketing planning. In the near future, the virtuous spiral of new technology will increase the feasibility of economically managing one-to-one marketing of products, prices and communications, which will act as a further stimulus to the adoption and use of DBM systems. Hence, it seems likely that the recent trend of companies shifting greater portions of their marketing budget into direct marketing strategies, supported by DBM, will continue. Yet, academic research and texts on general marketing theory do not fully reflect this shift. A lack of education and availability of advanced research are limiting the understand of a new generation of managers who are responsible for implementing these strategies. A new era of electronic commerce is upon us; unfortunately, marketing courses and texts are not yet educating managers to cope with this challenge.

APPENDICES

Appendix 1: Summary of Porter's Theories of Competitive Advantage

The Five Forces Determining Competitive Intensity within Markets

The first core concept describes competitive analysis as a way of examining the nature and extent of a corporation's competition within its industry (Porter, 1979 and 1980). Porter's analysis focuses on five forces that determine the competitive intensity and long-term profit potential of an industry:

(1) threat of new entrants and the barriers to competition;
(2) rivalry among existing firms in the industry;
(3) threat of substitute products or services in the marketplace;
(4) bargaining power of suppliers;
(5) bargaining power of buyers.

After completing an analysis of industry attractiveness Porter recommended that firms consider their relative position within an industry in order to determine an appropriate strategy.

Positioning in a Marketplace

Porter's model provides three dimensions for positioning in an industry that he describes as "generic" competitive strategies for outperforming other businesses in a particular [market] industry:

1. **Cost Leadership** - concentrating on functional decisions that exploit the economies of scale, experience curve, and cost advantages, the main aim being to produce and market a comparable product more efficiently than competitors.

2. **Differentiation** - the ability to provide unique products and services in terms of some dimension valued by customers; for example, brand image, product quality, special features, or after-sale service for which the customer will pay a premium price.

3. **Focus** - the capability to gain competitive advantage through cost or differentiation strategies in a narrow segment of the marketplace.

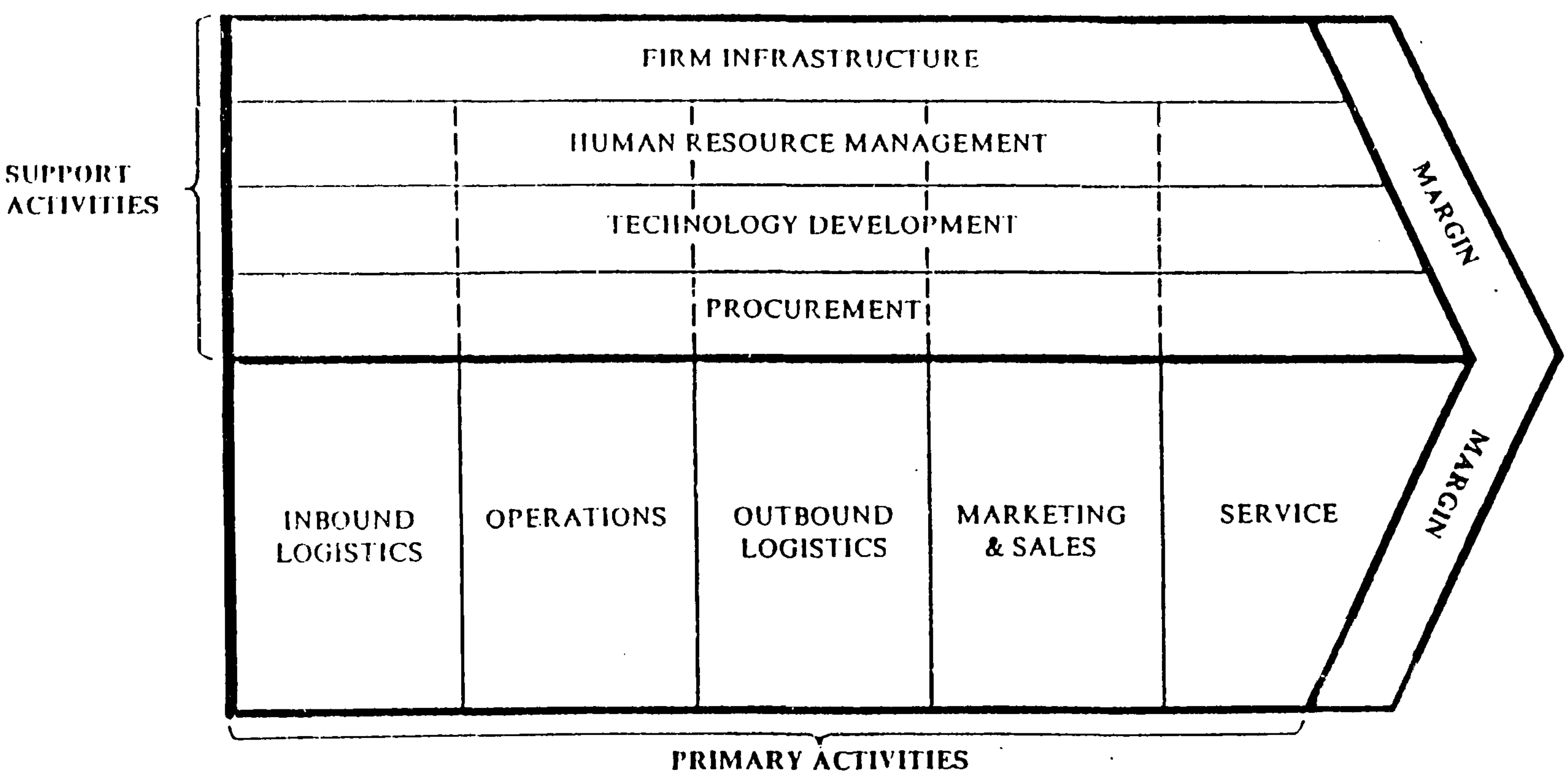
COMPETITIVE SCOPE		COMPETITIVE ADVANTAGE: Lower Cost	COMPETITIVE ADVANTAGE: Differentiation
	Broad Target	1. Cost Leadership	2. Differentiation
	Narrow Target	3A. Cost Focus	3B. Differentiation Focus

Porter (1985, p.12)

Porter's Generic Strategies

<u>Value Chain Analysis</u>

Porter (1985) proposed "value chain analysis" as a systematic way of examining the nature and extent of synergies, cost reduction possibilities, and quality improvements among the internal activities of a firm. The purpose of this kind of analysis was to achieve high operational effectiveness, thus achieving higher profitability through lower overall costs.



Porter's Value Chain Analysis

Appendix 2: Phases in Database Marketing (Shaw and Stone 1988b).

Growth process

Technology benchmarks	100% batch processing on external bureau	80% external batch 20% on-line processing	70% batch processing 20% on-line processing 5% minicomputer processing 5% personal computing	60% batch processing 25% on-line processing 10% minicomputer processing 5% personal computing
Applications portfolio	Direct mail	Direct mail, telemarketing sales support on separate databases at end user locations	Migration to central database with applications at end user location. Personal computing to support management control	Interfaces are established with non-marketing systems
Systems planning and control	Lax	More lax	Marketing management plan and control data resources and applications, and coordinate communication with customer	Database marketing as a profit centre or value added user chargeback
Marketing organization	Specialization for learning direct marketing methods	Multiple organisation units independently developing buyer databases	Database marketing centre as centre of excellence and leadership and custodian of data	Database marketing centre has responsibility for strategy as well as tactical marketing planning
User awareness	Reactive and tactical Senior marketing management is superficially involved	More reactive. Islands of middle marketing management develop isolated applications	Driving force: user is directly involved with data entry and data use	Participatory: user and database marketing centre are jointly accountable for data quality and for effective application
	PHASE 1 Mystery lists	PHASE 2 Buyer databases	PHASE 3 Coordinated customer communication	PHASE 4 Integrated marketing

Source: Database Marketing (1988b), Shaw and Stone (p. 54).

Appendix 3: Sample Size Calculations for Small Populations

Narins (1994) provides a sample size formula with a correction for finite populations. The formula is as follows:

$$\frac{(Py)(Pn) + (\text{Std. Error})(\text{Std. Error})}{(\text{Std Error})(\text{Std Error}) + \frac{(Py)(Pn)}{N_1}} = N$$

where: Standard Error = $\dfrac{\text{Acceptable level of error}}{\text{Level of confidence (z)}}$

Py and Pn are the responses to a dichotomous variable, usually set at Py = Pn = 0.5 for its most conservative value. Using an acceptable level of error from 5% to 10 % and level of confidence z = 1.96 to calculate standard error and N_1 = 7091 gives the following sample sizes.

Acceptable level of error	Level of confidence z = 1.9 (95%)	Standard Error	Sample size N
5% (0.05)	1.96	0.0255	383
6% (0.06)	1.96	0.0306	266
7% (0.07)	1.96	0.0357	196
8% (0.08)	1.96	0.0408	150
9% (0.09)	1.96	0.0459	119
10% (0.10)	1.96	0.0510	96

Note: The formula cannot be modified to suit the multi-category variables as used in this study; however, assuming dichotomous variables the most conservative situation has been assumed, avoiding the danger of underestimating sample size.

Appendix 4: Construct to Measure Market Orientation

Source: Deng and Dart (1994)

SCALING

Please indicate how well the following statements describe your organization's orientation to customers, competitors and marketing operations?	1 Not at all	2 A little bit	3 Some - what	4 Quite well	5 Very Well
We encourage customer comments - even complaints - because they help us do a better job.					
After sales service is an important part of our business strategy.					
We have a strong commitment to our customers.					
We look for ways to create customer value in our products/services.					
We measure customer satisfaction on a regular basis.					
In our company, marketing's most important job is to identify and help meet the needs of our customers.					
We define product/service quality in terms of customer satisfaction.					
We regularly analyze our competitors' marketing programs.					
We frequently collect external market data to help direct our new product/service plans.					
Our (tele)salespeople are instructed to monitor and report competitive activity.					
We respond rapidly to competitors' actions.					
Our top managers often discuss competitors' marketing programs.					
We target opportunities based on competitive advantage.					
In our company, the marketing people have a strong input into the development/selection of new products/services.					
Market information is shared with all departments.					
All departments are involved in preparing company plans.					
We do a good job of integrating the activities of each department.					
The marketing people in our organization interact frequently with other departments such as fulfillment, finance, manufacturing etc.					
In our company, marketing is seen as a guiding philosophy for the entire organization.					
Our accounting system could fairly quickly determine the profitability of each of our product/ service lines.					
Our accounting system could determine the profitabilityof different sales territories.					
Our accounting system could determine the profitability of each customer.					
Our accounting system could determine the profitability of each mailing , telemarketing program.*					
We have a good idea of sales potential of each of our markets.					

* Slightly modified from it original form.

Appendix 5: <u>Database Size Questions</u>

(a) Please indicate the current total number of customer records in your database(s).

Total records managed: ____________________ if you're **unsure of the exact number;** please **check an approximate size** in one of the ranges given below instead:

___ Under 10,000	___ 100,000 - 249,999	___ 1 - 2 million
___ 10,000 - 24,999	___ 250,000 - 499,999	___ 2 - 5 million
___ 25,000 - 49,999	___ 500,000 - 749,999	___ 5 - 8 million
___ 50,000 - 100,000	___ 750,000 - 999,999	___ Over 8 million

(b). Do you consolidate all of your customer records into a single database:

___ Yes ___ No **If NO,** how many separate databases do you operate?

___ Two databases ___ Three databases ___ Four or more (please specify how many)

9 (c). Do you include inactive customers (i.e. no purchases in the last 2 years) and prospects in your database:

___ Yes ___ No

If YES; approximately what percentage of your database records would be classified as inactive customers and /or prospects, based upon the most recent analysis of your organization's database.

___ Less than 5%	___ 20 - 29 %	___ 60 - 69 %
___ 5 - 9 %	___ 30 - 39 %	___ 70 - 79 %
___ 10 - 14 %	___ 40 - 49 %	___ More than 80%
___ 15 - 19 %	___ 50 - 59 %	___ Don't Know

Appendix 6: Spector's Work Locus of Control Scale

SCALING 1 2 3 4 5 6

Please indicate your level of agreement/disagreement with the following statements.	Disagreement			Agreement		
	Strong	Moderate	Slight	Slight	Moderate	Strong
A job is what you make it.*						
People can pretty much accomplish whatever they set out to accomplish.*						
If you know what you want out of a job, you can find a job that gives it to you.*						
If employees are unhappy with a decision made by their boss, they should do something about it.*						
Getting the job you want is mostly a matter of luck.						
Making money is primarily a matter of good fortune.						
Most people are capable of doing their jobs well if they make the effort.*						
In order to get a really good job you need to have friends or relatives in high places.						
Promotions are usually a matter of good fortune.						
When it comes to landing a really good job, who you know is more important than what you know.						
Promotions are given to employees who perform well on the job.*						
To make a lot of money you have to know the right people.						
It takes a lot of luck to be an outstanding employee on most jobs.						
People who perform their jobs well generally get rewarded for it.*						
Most employees have more influence on their supervisors than they think they do.*						
The main difference between people who make a lot of money and people who make a little money is luck.						

* Denotes reverse scoring items.

Appendix 7: Fieldwork I: Questionnaire

Questions 1. Please indicate the type and availability of **transaction data** items in your marketing database. (Note: Complete history means since customer acquisition, or last three years.)

Question 1. Please indicate the % of customer records which contain the following transaction data.	Data on 1 - 25% of customer records	Data on 26 - 50% of customer records	Data on 51 - 75% of customer records	Data on more than 75 % of customer records	Not Collected	Don't Know
Dates of promotions/communications.						
Complete history of purchase items.						
Complete history of purchase dates.						
Complete history of purchase values.						
Payment method - credit card, check etc.						
Data on product groups/categories						
Purchase media (eg mail, phone, fax).						
Merchandise return records.						
Credit history or rating (eg bad debt)						
Customer acquisition origin (e.g. list source, referral etc.)						
Complaints, delivery, out-of-stock data.						

Question 2. Please indicate the type and availability of **customer characteristics** which are on your marketing database.
Separate question blocks and are provided for **consumer** and **industrial** market characteristics.
If you service both types of market, complete both; otherwise, only complete one section.

QUESTION 2. Please indicate the % of customer records which contain data on the following customer characteristics.	Data on 1 - 25% of customer records	Data on 26 - 50% of customer records	Data on 51 - 75% of customer records	Data on more than 75 % of customer records	Not Collected	Don't Know
(a) CONSUMER MARKETS						
Home phone number						
Type of dwelling						
Sex of purchaser						
Customer age /Date of birth						
Presence/absence of children						
Number of children						
Education level (e.g. H. S., B.S. MA)						
Customer's approx. income						
Marital status (Married, Single)						
Occupation						
(b) INDUSTRIAL MARKETS						
Standard Industrial Classification (SIC).						
Number of employees.						
Annual sales ($)						
Asset value ($)						
Original equipment vs. retail buyers						
Corporate title/role of buying decision maker (eg CEO, Buyer etc.)						

Question 3. Please indicated your organization's frequency of customer record updating and data addition.

Question 3. Please indicate the frequency of the following additions and changes made to your marketing database.	4 or more times per year.	2 or 3 times per year.	Once a year.	Used less than once per year.	Not used	Don't Know
3 (a) Internal File Changes						
Update addresses and /or remove non-deliverable addresses (NIXIE's).						
Add postal codes (zip+4) and/or carrier route information.						
Merge data from other internal files available in your organization.						
Add new data fields to improve management information						
3 (b) External Data Additions						
Share /swap/exchange (no charge) data/lists with other organizations.						
Enhance your customer file with geodemographic data (e.g. ACORN, PRIZM)						
Use enhancement/data overlays (e.g. age, income, Sic code) from external vendors to add data to your file.						

Question 3 (c). Do you separate, deactivate or remove inactive customers (i.e. non-purchasing) from your marketing database:

___ Yes ___ No (Go to question 4) ___ **Don't Know**

If Yes is your decision based upon points or time criteria, please check one option.
Points formula: Based upon recency, frequency and/or monetary value ___
Time criteria: ___ One year ___ 1 - 2 years __ 2 - 3 years ___ 3 years or more

Question 4. Please indicate your organization's use of the following analytical approaches to define specific groups of customers, or gain a better understanding of your markets.

Question 4. Please indicate the frequency of use of following methods to define groups of customers, or gain a better understanding of your marketplace?	Usually or always used (81-100%)	Used frequently (61 - 80%)	Used half of the time (41 - 60%)	Used occasionally (21 - 40%)	Never or seldom used (0 - 20%)	Don't know
Counts using a single query criterion (e.g. age under 30 years)						
Counts using multiple query criteria (e.g. women under 30 living in Missouri).						
Bar graphs, pie charts or other graphical presentation techniques.						
Use a points scoring system based upon multiple customer criteria.						
Simple or multiple regression techniques						
Use AID (Automatic Interaction Detection) or CHAID						
Cluster Analysis						
Neural networks						

Question 5. To what extent does your organization use your database to create marketing plans and promotions based upon *single* or *multiple* segmentation factors to create customer groupings? Separate question blocks and are provided for consumer and industrial market segmentation. If you service both types of market, complete both (a) and (b); otherwise, only complete one section.

Question 5. To what extent does your organization develop marketing plans /promotions based upon the following single segmentation factors?	**Usually or always used (81-100%)**	**Used frequently (61 - 80%)**	**Used half of the time (41 - 60%)**	**Used occasionally (21 - 40%)**	**Never or seldom used (0 - 20%)**	**Don't know**
(a) Consumer Segmentation						
Geographic factors (e.g. zip codes, SCF)						
Demographic factors (e.g. age, income)						
Psychographic factors - lifestyles, interests (e.g. backpacking, fishing)						
Cultural factors - ethnic background, religion, language.						
(b) Industrial Segmentation						
Geographic factors (eg cities, states)						
Size of organization (eg number of employees)						
Standard Industrial Classification (SIC) Codes						
Type of buyer (eg retail vs original equipment)						

Question 5 (c). To what extent are *multiple* segmentation criteria combined to create marketing plans for the purpose of :	**Usually or always used (81-100%)**	**Used frequently (61 - 80%)**	**Used half of the time (41 - 60%)**	**Used occasionally (21 - 40%)**	**Never or seldom used (0 - 20%)**	**Don't know**
Niche marketing - focus marketing mix on the special needs of small groups.						
Promoting the benefits of specific product/service benefits (eg pricing, quality).						
Building relationships with special customers through discounts, sales, rebates.						

Question 6. To what extent does your organization use its marketing systems to assist in the following approaches to economic and profitability forecasting decisions?

Question 6. To what extent do you use economic modeling to assist in marketing decisions?	**Usually or always used (81-100%)**	**Used frequently (61 - 80%)**	**Used half of the time (41 - 60%)**	**Used occasionally (21 - 40%)**	**Never or seldom used (0 - 20%)**	**Don't know**
How often do you: (a) create budgets based on database information?						
(b) use spreadsheets and/or accounting packages to conduct 'what-if' analyzes on alternative marketing choices?						
(c) calculate the lifetime value of customers?						

Question 6 (d). Has your organization developed marketing decision support systems that use models, expert systems or artificial intelligence to provide analyses of your marketing plans?

___ Yes ___ No ___ Don't Know

If Yes: Do you use them ___ Very Frequently ___ Frequently ___ Infrequently ___ Never

Question 7. Organizations use information from marketing databases to measure the effectiveness of lists (target audience), promotion, pricing and product decisions. Please indicate how often you use the following marketing performance measures.

7 (a). To what extent do you use any of the following performance measures to provide feedback on marketing program effectiveness?	Usually or always used (81-100%)	Used frequently (61 - 80%)	Used half of the time (41 - 60%)	Used occasionally (21 - 40%)	Never or seldom used (0 - 20%)	Don't know
Response rate (%)						
Average order size						
Total orders received						
Dollar revenue by product group						
Number of customers						
Dollar sales by customer grouping						
Promotion cost per sales dollar						
Profitability/contribution per customer						
Number of complaints/problems						
Bad debt as % of sales						
Response rate from purchased lists						
Sales ($) from purchased lists						
Cost of acquiring new customers						
Cost of re-activating customers						
Order response mode (i.e. phone, mail)						
Customers specified as inactive						
Sales per page						
Out-of-stock orders						
Customer returns by product						
Time from order to delivery						
Other measure (please specify):						

Does your organization market to **business/industrial customers?**
If yes; please answer Question 7(b), otherwise go to Question 8.

Question 7 (b). To what extent do you use your DBM system to measure or track the following?	Usually or always used (81-100%)	Used frequently (61 - 80%)	Used half of the time (41 - 60%)	Used occasionally (21 - 40%)	Never or seldom used (0 - 20%)	Don't know
Cost per sales call.						
Cost per lead						
Lead conversion rate						
Other measure (please specify):						

Question 8. The following are statements about the development level of various capabilities/applications of different aspects of your database marketing system.

Question 8. Please indicate how well developed the following database marketing applications/ capabilities are in your organization/business.	**Very Well** Developed	**Quite Well** Developed	**Partially** Developed	**Not at all** developed
Analytical modeling tools to identify potential new customers.				
Methods to identify under-performing customer groups in your file.				
Methods to aid in the identification of new markets.				
Methods of appending internally developed research or outside vendor information to enable you to better understand your customer base.				
Methods of tailoring products or services to specific groups rather than mailing the same promotion to every customer.				
Methods of providing feedback from customers that will assist in the development of new products.				
Identification of merchandise selection by coding of customers' purchases (i.e. using product group codes).				

Question 9 (a). Please indicate the current total number of customer records in your database(s).

Total records managed: ____________________ **if you're unsure of the exact number; please check an approximate size** in one of the ranges given below instead:

___ Under 10,000	___ 100,000 - 249,999	___ 1 - 2 million
___ 10,000 - 24,999	___ 250,000 - 499,999	___ Over 2 - 5 million
___ 25,000 - 49,999	___ 500,000 - 749,999	___ Over 5 - 8 million
___ 50,000 - 100,000	___ 750,000 - 999,999	___ Over 8 million

Questions 9 (b). Do you consolidate all of your customer records into a single database:

___ Yes ___ No **If NO,** how many separate databases do you operate?

___ Two databases ___ Three databases ___ Four or more (please specify how many)

Question 9 (c). Do you leave inactive customers (i.e. no purchases in the last two years) in your database:

___ Yes ___ No

If YES; approximately what percentage of customers would be classified as inactive based upon the most recent analysis of your organization's database.

___ Less than 5%	___ 20 - 29 %	___ 60 - 69 %
___ 5 - 9 %	___ 30 - 39 %	___ 70 - 79 %
___ 10 - 14 %	___ 40 - 49 %	___ More than 80%
___ 15 - 19 %	___ 50 - 59 %	

Question 10. Please indicate how well the following statements describe your organization's orientation to customers, competitors and marketing operations.	Not at all	A little bit	Somewhat	Quite well	Very Well
We encourage customer comments - even complaints - because they help us do a better job.					
After sales service is an important part of our business strategy.					
We have a strong commitment to our customers.					
We look for ways to create customer value in our products/services.					
We measure customer satisfaction on a regular basis.					
In our company, marketing's most important job is to identify and help meet the needs of our customers.					
We define product/service quality in terms of customer satisfaction.					
We regularly analyze our competitors' marketing programs.					
We frequently collect external market data to help direct our new product/service plans.					
Our (tele)salespeople are instructed to monitor and report competitive activity.					
We respond rapidly to competitors' actions.					
Our top managers often discuss competitors' marketing programs.					
We target opportunities based on competitive advantage.					
In our company, the marketing people have a strong input into the development/selection of new products/services.					
Market information is shared with all departments.					
All departments are involved in preparing company plans.					
We do a good job of integrating the activities of each department.					
The marketing people in our organization interact frequently with other departments such as fulfillment, finance, manufacturing etc.					
In our company, marketing is seen as a guiding philosophy for the entire organization.					
Our accounting system could fairly quickly determine the profitability of each of our product/ service lines.					
Our accounting system could determine the profitability of different sales territories.					
Our accounting system could determine the profitability of each customer.					
Our accounting system could determine the profitability of each mailing, telemarketing program.					
We have a good idea of sales potential of each of our markets.					

Question 11. Please indicate your level of agreement/disagreement with the following statements.	Disagreement			Agreement		
	Strong	Moderate	Slight	Slight	Moderate	Strong
A job is what you make it.						
People can pretty much accomplish whatever they set out to accomplish.						
If you know what you want out of a job, you can find a job that gives it to you.						
If employees are unhappy with a decision made by their boss, they should do something about it.						
Getting the job you want is mostly a matter of luck.						
Making money is primarily a matter of good fortune.						
Most people are capable of doing their jobs well if they make the effort.						
In order to get a really good job you need to have friends or relatives in high places.						
Promotions are usually a matter of good fortune.						
When it comes to landing a really good job, who you know is more important than what you know.						
Promotions are given to employees who perform well on the job.						
To make a lot of money you have to know the right people.						
It takes a lot of luck to be an outstanding employee on most jobs.						
People who perform their jobs well generally get rewarded for it.						
Most employees have more influence on their supervisors than they think they do.						
The main difference between people who make a lot of money and people who make a little money is luck.						

Question 12 Please provide brief background information on your organization and experience.

12 (a) What levels of formal education and professional development have you completed?

___ High School ___ Bachelor's Degree ___ Doctorate
___ Associates Degree ___ Master's Degree/MBA Other (please specify)___________

12 (b) How many years experience do you have in the following functions?

Catalog Mktg __ yrs General Mktg __ yrs Computing/IS __ yrs Accounting __ yrs

12 (c) **Have you received formal training in the following database marketing systems topics?**

___ Yes ___ No Database software packages (e.g. Oracle, Sybase, Paradox, etc.)
___ Yes ___ No Statistical software packages (e.g. SPSS, multiple regression, etc.)
___ Yes ___ No Spreadsheet packages (e.g. Lotus, Excel, etc.)
___ Yes ___ No Complex modeling techniques (e.g. Neural networks, linear programming, etc.)

12 (d) **Please indicate your official title.**

___ President/Owner ___ Marketing VP/Manager ___ General Manager Other:__________

12 (e) **Approximately how many people does your organization employ?**

Less than 5 ___; 5 to 9 ___; 10 to 19 ___; 20 to 49 ___; 50 to 100 ___; Over 100 __

12 (f) **Do you sell your mailing data (i.e. lists)?** ____ Yes ____ No.

Thank you very much for completing this questionnaire.

Please use the postage paid return envelope provided: return to:

John Lewington
John E. Simon School of Business
Maryville University
13550 Conway Road
St. Louis MO 63141-7299

Appendix 8: Fieldwork I: Cover Letter

MARYVILLE
UNIVERSITY
SAINT LOUIS
The John E. Simon
School of Business

13550 Conway Road
St. Louis, MO 63141 7299
Phone: 314 576 9418
Fax #: 314 542-9085

Name
Title
Organization
Address 1
Address 2
City State Zip

April, 1996

Dear "merge name or Director of Marketing"

We are undertaking a major survey of database systems used by catalog marketing companies. Your participation in the study is important, because the results will help managers to develop more productive database marketing systems appropriate to their organizational needs.

The questionnaire should be completed by the most senior marketing manager using customer information from your database for marketing decisions. If you are not this person, please pass the questionnaire on to the appropriate individual. We have tried to make the questionnaire quick and easy to complete; most questions only require a check mark on each line. Please answer each question so that we can complete our analysis.

In early tests of the questionnaire, some marketing managers have commented that the survey acted as a self-audit of their database marketing methods. We hope that completing the survey will encourage a review of your database marketing system. If you would like further suggestions on possible refinements to improve your database marketing system, we will send you a copy of a recent article: ***Harnessing the Power of Database Marketing*** .

Your answers will be entirely **CONFIDENTIAL** and at no stage will any reference be made to specific individual's responses.

Please return the completed questionnaire in the postage paid envelope and mail it back to me. Thank you for your participation in the survey; it is an important contribution to the development of database marketing. We hope that completing the questionnaire will be an interesting experience.

Yours sincerely,

John Lewington
Asst. Professor of Marketing
The John E. Simon School of Business

MARYVILLE UNIVERSITY

13550 Conway Road
St. Louis, MO 63141-7299

NOTES ON THE QUESTIONNAIRE

This survey relates to **both consumer and industrial** (i.e. business to business) catalog marketers, and some questions are specific to each topic. In order to make your responses quick and easy to record most questions only require a **single check mark** (✓ or X) in the appropriate box on that line. For example:

Question 1. Please indicate the % of customer records which contain the following transaction data.	Data on 1 - 25% of customer records	Data on 26 - 50% of customer records	Data on 51 - 75% of customer records	Data on more than 75 % of customer records	Not Collected
Dates of promotions/communications.	✓				
Complete history of purchase items.				✓	
Complete history of purchase dates.		✓			

If you wish to write any brief comments on the questionnaire, please do so.
The questionnaire should take about 15 minutes to complete.
Your responses are ***completely confidential*** and will only be used for the purposes of this research.

Improving Your Organization's Database Marketing Productivity
We know that improving your database marketing system is a high priority, so we're offering respondents two useful pieces of information that may ***help in developing your organization's database marketing system.***

1. **Harnessing the Power of Database Marketing**
An article providing a model, and examples of, advanced database marketing applications.
2. **Analysis of the Survey Results**
A summary analysis of the survey explaining the essentials of maintaining and developing effective database marketing systems.

☐ Yes, please send me this information.

Name: ______________________________
Company: ____________________________
Address: _____________________________
City: _______________ State:___ Zip: _________

or attach/enclose your business card.

Thank you,

John Lewington

John Lewington

Phone and Voice Mail: 314-529-9680
E-Mail: jal@maryville.edu
Fax: 314-542-9085

MARYVILLE
UNIVERSITY
SAINT LOUIS

13550 Conway Road
St. Louis, MO 63141-7299

John A. Lewington 2210
John Simon Business School
Maryville University
13550 Conway Road
St. Louis, MO 63141

Appendix 11: Construct To Measure the Level of Sophistication in DBM Systems

Questions 2. Please indicate the type and availability of transaction data items in your marketing database. (Note: Complete history means since customer acquisition, or last three years.)

Question 2. Please indicate the % of customer records which contain the following transaction data.	Data on 1 - 25% of customer records	Data on 26 - 50% of customer records	Data on 51 - 75% of customer records	Data on more than 75 % of customer records	Not Collected	Don't Know
Dates of promotions/communications.						
Complete history of purchase items.						
Complete history of purchase values.						
Data on product groups/categories						

Question 3. Indicate your organization's frequency of customer record updating and data addition.

Question 3. Please indicate the frequency of the following additions and changes made to your marketing database.	4 or more times per year.	2 or 3 times per year.	Once a year.	Used less than once per year.	Not used	Don't Know
3 (a) Internal File Changes						
Update addresses and /or remove non-deliverable addresses (NIXIE's).						
Add postal codes (zip+4) and/or carrier route information.						
Merge data from other internal files available in your organization.						
3 (b) External Data Additions						
Share /swap/exchange (no charge) data/lists with other organizations.						
Enhance your customer file with geodemographic data (e.g. ACORN, PRIZM)						
Use enhancement or data overlays (e.g. age, income, SIC code) from external vendors to add data to your file.						

Question 3 (c). Do you separate, deactivate or remove inactive customers (i.e. non-purchasing) from your marketing database:

___ Yes ___ No (Go to question 4) ___ Don't Know

If Yes is your decision based upon points or time criteria, please check one option.

Points formula: Based upon recency, frequency and/or monetary value ___

Time criteria:___ One year ___ 1 - 2 years ___ 2 - 3 years ___ 3 years or more

Question 4. Please indicate your organization's use of the following analytical approaches to define specific groups of customers, or gain a better understanding of your markets.

Question 4. Please indicate the frequency of use of following methods to define groups of customers, or gain a better understanding of your marketplace?	Usually or always used (81-100%)	Used frequently (61 - 80%)	Used half of the time (41 - 60%)	Used occasionally (21 - 40%)	Never or seldom used (0 - 20%)	Don't know
Counts using multiple query criteria (e.g. women under 30 living in Missouri).						
Use a points scoring system based upon multiple customer criteria.						
Simple or multiple regression techniques						
Cluster Analysis						

Question 5. To what extent does your organization use your database to create marketing plans and promotions based upon *multiple* segmentation factors to create customer groupings?

Question 5. To what extent are *multiple* segmentation criteria combined to create marketing plans for the purpose of :	Usually or always used (81-100%)	Used frequently (61 - 80%)	Used half of the time (41 - 60%)	Used occasionally (21 - 40%)	Never or seldom used (0 - 20%)	Don't know
Niche marketing - focus marketing mix on the special needs of small groups.						
Promoting the benefits of specific product/service benefits (eg pricing, quality).						
Building relationships with special customers through discounts, sales, rebates.						

Question 6. To what extent does your organization use its marketing systems to assist in the following approaches to economic and profitability forecasting decisions?

Question 6. To what extent do you use economic modeling to assist in marketing decisions?	Usually or always used (81-100%)	Used frequently (61 - 80%)	Used half of the time (41 - 60%)	Used occasionally (21 - 40%)	Never or seldom used (0 - 20%)	Don't know
How often do you: (a) create budgets based on database information?						
(b) use spreadsheets and/or accounting packages to conduct 'what-if' analyzes on alternative marketing choices?						
(c) calculate the lifetime value of customers?						

Question 6 (d). Has your organization developed marketing decision support systems that use models, expert systems or artificial intelligence to provide analyses of your marketing plans?

___ Yes ___ No ___ Don't Know

If Yes: Do you use them ___ Very Frequently ___Frequently ___ Infrequently ___ Never

Question 7. Organizations use information from marketing databases to measure the effectiveness of lists (target audience), promotion, pricing and product decisions. Please indicate how often you use the following marketing performance measures.

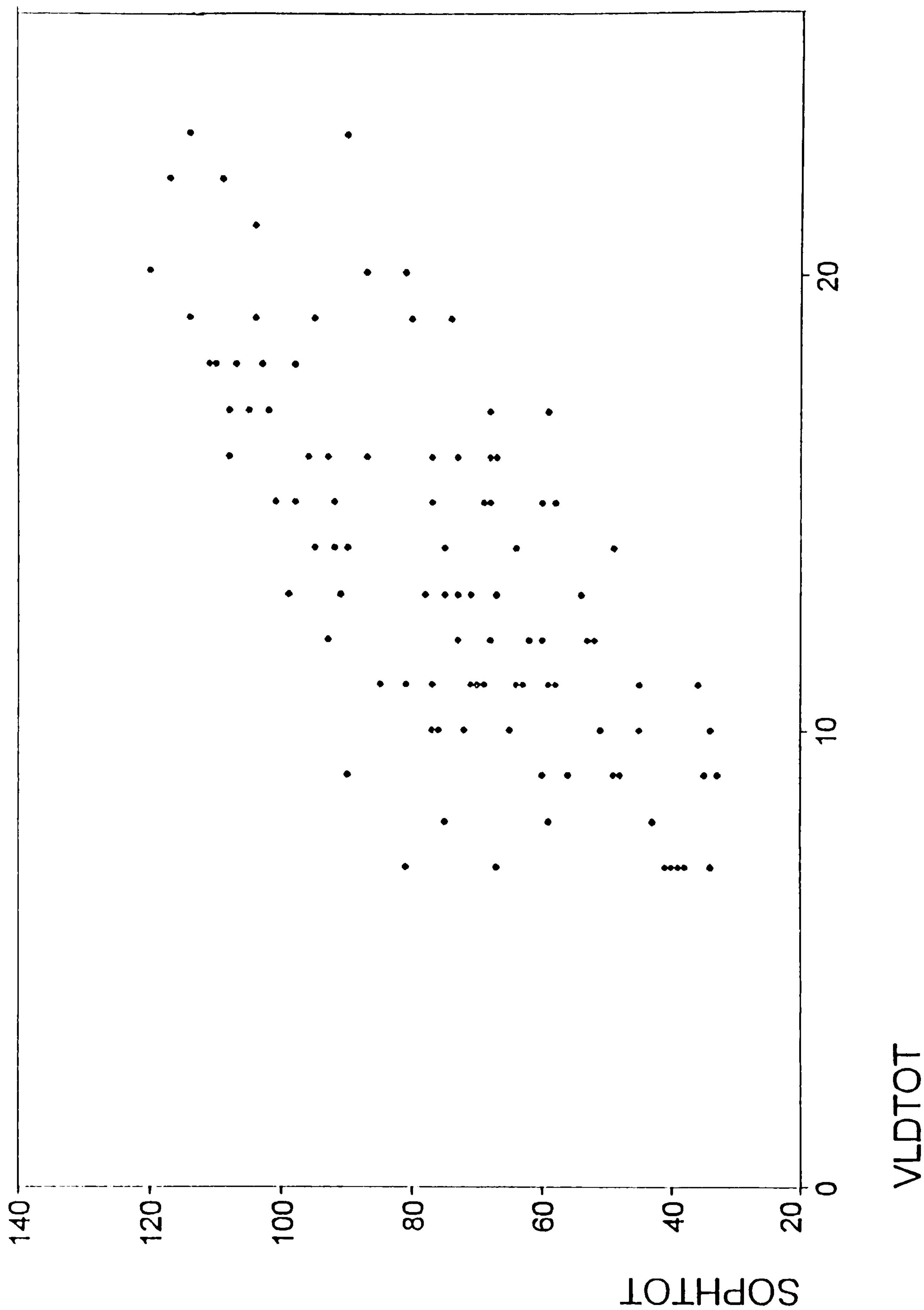
7. To what extent do you use any of the following performance measures to provide feedback on marketing program effectiveness?	Usually or always used (81-100%)	Used frequently (61 - 80%)	Used half of the time (41 - 60%)	Used occasionally (21 - 40%)	Never or seldom used (0 - 20%)	Don't know
Promotion cost per sales dollar						
Sales ($) from purchased lists						
Cost of acquiring new customers						
Cost of re-activating customers						
Sales per page						

Appendix 12: Criterion Validity Test Questions

Question 8. The following are statements about the development level of various capabilities/applications of different aspects of your database marketing system.

Question 8. Please indicate how well developed the following database marketing applications/ capabilities are in your organization/business.	**Very Well** Developed	**Quite Well** Developed	**Partially** Developed	**Not at all** developed
Analytical modeling tools to identify potential new customers.				
Methods to identify under-performing customer groups in your file.				
Methods to aid in the identification of new markets.				
Methods of appending internally developed research or outside vendor information to enable you to better understand your customer base.				
Methods of tailoring products or services to specific groups rather than mailing the same promotion to every customer.				
Methods of providing feedback from customers that will assist in the development of new products.				
Identification of merchandise selection by coding of customers' purchases (i.e. using product group codes).				

Appendix 13: __Scatter Diagram of DBM Construct versus Advanced DBM Applications__



Appendix 14: **Fieldwork II: Cover Letter**

MARYVILLE
UNIVERSITY
SAINT LOUIS
The John E. Simon
School of Business

13550 Conway Road
St. Louis, MO 63141-7299
Phone: 314 576 9418
Fax #: 314 542-9085

October 2, 1996

«FirstName»
«Job Title»
«Company»
«Address1»
«Address2»
«City», «State» «PostalCode»

Dear «Name or Title»:

SURVEY OF DATABASE MARKETING SYSTEMS

I need your help in a major survey of database marketing systems used by catalog companies. Your cooperation is important as the results will help cataloguers design more effective information systems, which should improve response and reduce escalating marketing costs (e.g. paper, postage).

Some marketing managers have commented that the survey acted as a self-audit of their database marketing methods. We hope that completing the survey will encourage you to review your database marketing practices. If you wish to explore new database marketing ideas, we will send you a copy of a recent article: *Harnessing the Power of Database Marketing*.

The questionnaire should be completed by the person responsible for marketing decisions: if you are not this person, please pass the questionnaire on to the appropriate individual. The questionnaire has been designed for easy response; please answer all questions to afford a complete analysis. Your answers will be entirely confidential and at no stage will any reference be made to specific responses.

Thank you for giving a few minutes of your time to participate in the survey; it will be an important contribution to the development of database marketing. Please return the completed questionnaire in the postage paid envelope as soon as possible. I hope that completing the questionnaire will be an interesting experience.

Yours sincerely,

John Lewington
Asst. Professor of Marketing
Phone and voice mail: 314-529-9680 E-mail: jal@maryville.edu

Appendix 15: Fieldwork II: Instructions for the Questionnaire

MARYVILLE
UNIVERSITY
SAINT LOUIS

13550 Conway Road
St. Louis, MO 63141
Phone: 314 529-9300
Fax # : 314 542-9085

NOTES ON THE QUESTIONNAIRE

- The attached survey relates to **both consumer and industrial** (i.e. business to business) catalog marketers; questions are applicable to all sectors. In order to make your responses easy to record, most questions require a **single check mark** (✓ or X) in the appropriate box on that line.
- Your responses are **completely confidential** and will only be used for the purposes of this research.
- I know that improving your database marketing system is a high priority, so respondents will receive **two** useful pieces of information that may **help in developing your organization's database marketing system.**

  1. **Harnessing the Power of Database Marketing**
     An article providing a model, and examples of, advanced database marketing applications.

  2. **A Benchmark Analysis of Your Database**
     A summary analysis of your marketing database characteristics relative to others of a similar size. This may be a valuable information for developing your database marketing system in the future.

☐ Yes, please send me this information.

Name: ______________________________
Company: ______________________________
Address: ______________________________
City: ________________ State: ____ Zip: __________

or attach/enclose your business card.

Thank you,

John Lewington

John Lewington
Phone and Voice Mail: 314-529-9680
E-Mail: jal@maryville.edu

Appendix 16: Fieldwork II: Revised Questionnaire

Question 1. What is the primary focus for your business?

____ Consumers ____ Business/Organizations ____ Both: Consumers and businesses.

Questions 2. Please indicate the type and availability of transaction data items in your marketing database. (Note: Complete history means since customer acquisition, or last three years.)

Question 2. Please indicate the % of customer records which contain the following transaction data.	Data on 1 - 25% of customer records	Data on 26 - 50% of customer records	Data on 51 - 75% of customer records	Data on more than 75 % of customer records	Not Collected	Don't Know
Dates of promotions/communications.						
Complete history of purchase items.						
Complete history of purchase values.						
Data on product groups/categories						

Question 3. Indicate your organization's frequency of customer record updating and data addition.

Question 3. Please indicate the frequency of the following additions and changes made to your marketing database.	4 or more times per year.	2 or 3 times per year.	Once a year.	Used less than once per year.	Not used	Don't Know
3 (a) Internal File Changes						
Update addresses and /or remove non-deliverable addresses (NIXIE's).						
Add postal codes (zip+4) and/or carrier route information.						
Merge data from other internal files available in your organization.						
3 (b) External Data Additions						
Share /swap/exchange (no charge) data/lists with other organizations.						
Enhance your customer file with geodemographic data (e.g. ACORN, PRIZM)						
Use enhancement or data overlays (e.g. age, income, SIC code) from external vendors to add data to your file.						

Question 3 (c). Do you separate, deactivate or remove inactive customers (i.e. non-purchasing) from your marketing database:

___ Yes ___ No (Go to question 4) ___ Don't Know

If Yes is your decision based upon points or time criteria, please check one option.

Points formula: Based upon recency, frequency and/or monetary value ___

Time criteria:___ One year ___ 1 - 2 years ___ 2 - 3 years ___ 3 years or more

Question 4. Please indicate your organization's use of the following analytical approaches to define specific groups of customers, or gain a better understanding of your markets.

Question 4. Please indicate the frequency of use of following methods to define groups of customers, or gain a better understanding of your marketplace?	**Usually or always used (81-100%)**	**Used frequently (61 - 80%)**	**Used half of the time (41 - 60%)**	**Used occasionally (21 - 40%)**	**Never or seldom used (0 - 20%)**	**Don't know**
Counts using multiple query criteria (e.g. women under 30 living in Missouri).						
Use a points scoring system based upon multiple customer criteria.						
Simple or multiple regression techniques						
Cluster Analysis						

Question 5. To what extent does your organization use your database to create marketing plans and promotions based upon *multiple* segmentation factors to create customer groupings?

Question 5. To what extent are *multiple* segmentation criteria combined to create marketing plans for the purpose of :	**Usually or always used (81-100%)**	**Used frequently (61 - 80%)**	**Used half of the time (41 - 60%)**	**Used occasionally (21 - 40%)**	**Never or seldom used (0 - 20%)**	**Don't know**
Niche marketing - focus marketing mix on the special needs of small groups.						
Promoting the benefits of specific product/service benefits (eg pricing, quality).						
Building relationships with special customers through discounts, sales, rebates.						

Question 6. To what extent does your organization use its marketing systems to assist in the following approaches to economic and profitability forecasting decisions?

Question 6. To what extent do you use economic modeling to assist in marketing decisions?	**Usually or always used (81-100%)**	**Used frequently (61 - 80%)**	**Used half of the time (41 - 60%)**	**Used occasionally (21 - 40%)**	**Never or seldom used (0 - 20%)**	**Don't know**
How often do you: (a) create budgets based on database information?						
(b) use spreadsheets and/or accounting packages to conduct 'what-if' analyzes on alternative marketing choices?						
(c) calculate the lifetime value of customers?						

Question 6 (d). Has your organization developed marketing decision support systems that use models, expert systems or artificial intelligence to provide analyses of your marketing plans?

___ Yes ___ No ___ Don't Know

If Yes: Do you use them ___ Very Frequently ___Frequently ___ Infrequently ___ Never

Question 7. Organizations use information from marketing databases to measure the effectiveness of lists (target audience), promotion, pricing and product decisions. Please indicate how often you use the following marketing performance measures.

7. To what extent do you use any of the following performance measures to provide feedback on marketing program effectiveness?	**Usually or always used (81-100%)**	**Used frequently (61 - 80%)**	**Used half of the time (41 - 60%)**	**Used occasionally (21 - 40%)**	**Never or seldom used (0 - 20%)**	**Don't know**
Promotion cost per sales dollar						
Sales ($) from purchased lists						
Cost of acquiring new customers						
Cost of re-activating customers						
Sales per page						

Question 8. The following are statements about the development level of various capabilities/applications of different aspects of your database marketing system.

Question 8. Please indicate how well developed the following database marketing applications/ capabilities are in your organization/business.	Very Well Developed	Quite Well Developed	Partially Developed	Not at all developed
Analytical modeling tools to identify potential new customers.				
Methods to identify under-performing customer groups in your file.				
Methods to aid in the identification of new markets.				
Methods of appending internally developed research or outside vendor information to enable you to better understand your customer base.				
Methods of tailoring products or services to specific groups rather than mailing the same promotion to every customer.				
Methods of providing feedback from customers that will assist in the development of new products.				
Identification of merchandise selection by coding of customers' purchases (i.e. using product group codes).				

Question 9 (a). Please indicate the current total number of customer records in your database(s).

Total records managed: ____________________ if you're unsure of the exact number; please check an approximate size in one of the ranges given below instead:

___ Under 10,000	___ 100,000 - 249,999	___ 1 - 2 million
___ 10,000 - 24,999	___ 250,000 - 499,999	___ Over 2 - 5 million
___ 25,000 - 49,999	___ 500,000 - 749,999	___ Over 5 - 8 million
___ 50,000 - 100,000	___ 750,000 - 999,999	___ Over 8 million

Question 9 (b). Do you consolidate all of your customer records into a single database:

___ Yes ___ No **If NO,** how many separate databases do you operate?

___ Two databases ___ Three databases ___ Four or more (please specify how many)

Question 9 (c). Do you leave inactive customers (i.e. no purchases in the last two years) in your database: ___ Yes ___ No

If YES; approximately what percentage of customers would be classified as inactive based upon the most recent analysis of your organization's database.

___ Less than 5% ___ 20 - 29 % ___ 50 - 59 %
___ 5 - 9 % ___ 30 - 39 % ___ 60 - 69 %
___ 10 - 19 % ___ 40 - 49 % ___ More than 70%

Question 10. Please indicate your level of agreement/disagreement with the following statements.	**Disagreement**			**Agreement**		
	Strong	**Moderate**	**Slight**	**Slight**	**Moderate**	**Strong**
A job is what you make it.						
People can pretty much accomplish whatever they set out to accomplish.						
If you know what you want out of a job, you can find a job that gives it to you.						
If employees are unhappy with a decision made by their boss, they should do something about it.						
Getting the job you want is mostly a matter of luck.						
Making money is primarily a matter of good fortune.						
Most people are capable of doing their jobs well if they make the effort.						
In order to get a really good job you need to have friends or relatives in high places.						
Promotions are usually a matter of good fortune.						
When it comes to landing a really good job, who you know is more important than what you know.						
Promotions are given to employees who perform well on the job.						
To make a lot of money you have to know the right people.						
It takes a lot of luck to be an outstanding employee on most jobs.						
People who perform their jobs well generally get rewarded for it.						
Most employees have more influence on their supervisors than they think they do.						
The main difference between people who make a lot of money and people who make a little money is luck.						

Question 11. Please indicate how well the following statements describe your organization's orientation to customers, competitors and marketing operations.	Not at all	A little bit	Somewhat	Quite well	Very Well
We encourage customer comments - even complaints - because they help us do a better job.					
After sales service is an important part of our business strategy.					
We have a strong commitment to our customers.					
We look for ways to create customer value in our products/services.					
We measure customer satisfaction on a regular basis.					
In our company, marketing's most important job is to identify and help meet the needs of our customers.					
We define product/service quality in terms of customer satisfaction.					
We regularly analyze our competitors' marketing programs.					
We frequently collect external market data to help direct our new product/service plans.					
Our (tele)salespeople are instructed to monitor and report competitive activity.					
We respond rapidly to competitors' actions.					
Our top managers often discuss competitors' marketing programs.					
We target opportunities based on competitive advantage.					
In our company, the marketing people have a strong input into the development/selection of new products/services.					
Market information is shared with all departments.					
All departments are involved in preparing company plans.					
We do a good job of integrating the activities of each department.					
The marketing people in our organization interact frequently with other departments such as fulfillment, finance, manufacturing etc.					
In our company, marketing is seen as a guiding philosophy for the entire organization.					
Our accounting system could fairly quickly determine the profitability of each of our product/ service lines.					
Our accounting system could determine the profitability of different sales territories.					
Our accounting system could determine the profitability of each customer.					
Our accounting system could determine the profitability of each mailing, telemarketing program.					
We have a good idea of sales potential of each of our markets.					

Question 12 Please provide brief background information on your organization and experience.

12 (a) What levels of formal education and professional development have you completed?

___ High School ___ Bachelor's Degree ___ Doctorate
___ Associates Degree ___ Master's Degree/MBA Other (please specify)___________

12 (b) How many years experience do you have in the following functions?

Catalog Mktg __ yrs General Mktg __ yrs Computing/IS __ yrs Accounting __ yrs

12 (c) Have you received formal training in the following database marketing systems topics?

___ Yes ___ No Database software packages (e.g. Oracle, Sybase, Paradox, etc.)
___ Yes ___ No Statistical software packages (e.g. SPSS, multiple regression, etc.)
___ Yes ___ No Spreadsheet packages (e.g. Lotus, Excel, etc.)
___ Yes ___ No Complex modeling techniques (e.g. Neural networks, linear programming, etc.)

12 (d) Please indicate your official title.

___ President/Owner ___ Marketing VP/Manager ___ General Manager Other:__________

12 (e) Approximately how many people does your organization employ?

Less than 5 ___; 5 to 9 ___; 10 to 19 ___; 20 to 49 ___; 50 to 100 ___; Over 100 __

12 (f) Do you sell your mailing data (i.e. lists)? ____ Yes ____ No.

Thank you very much for completing this questionnaire.

Please use the postage paid return envelope and return to:

John Lewington
John E. Simon School of Business
Maryville University
13550 Conway Road
St. Louis MO 63141-7299

Appendix 17: <u>Reminder Letter</u>

MARYVILLE
UNIVERSITY
SAINT LOUIS
The John E. Simon
School of Business

13550 Conway Road
St. Louis, MO 63141-72[illegible]
Phone: 314 576-94[illegible]
Fax #: 314 542-90[illegible]

October 17, 1996

«FirstName»
«JobTitle»
«Company»
«Address1»
«Address2»
«City», «State» «PostalCode»

Dear «Name or Title»:

Recently you received a questionnaire requesting data on the nature and operation of your organization's database marketing system. Only a limited number of questionnaires were mailed; your response is very important to the accuracy of the survey.

Please take a few minutes to complete the questionnaire and return it in the stamped addressed envelope already sent. I would greatly appreciate your input to the study, and remind you that all responses will remain **strictly confidential**.

If this reminder has crossed in the post with your reply, please accept my thanks for your valuable help.

I look forward to your reply.

Yours,

John Lewington
Assistant Professor of Marketing
314-529-9680
E-mail: jal@maryville.edu

Appendix 18: Summary of Data Gathered

	sophitot	vldtot	mktort	dbsize	lgdbsize	loccont	conbus	residual	title	edulevel
1	75.00	13.00	84.00	178.00	5.18	33.00	IC	-1.78	M	M
2	77.00	18.00	70.00	155.00	5.04	24.00	C	1.07	P	B
3	81.00	20.00	87.00	175.00	5.16	31.00	C	4.24	P	M
4	100.00	16.00	85.00	1400.00	7.24	41.00	C	18.96	C	M
5	68.00	16.00	67.00	10.00	2.30	32.00	C	10.89	M	M
6	98.00	18.00	80.00	60.00	4.09	20.00	C	26.59	P	B
7	76.00	10.00	68.00	75.00	4.32	33.00	IC	5.06	P	M
8	64.00	11.00	76.00	10.00	2.30	18.00	IC	6.89	P	B
9	59.00	11.00	99.00	38.00	3.64	23.00	C	-7.28	P	B
10	39.00	7.00	66.00	10.00	2.30	37.00	C	-18.11	P	M
11	59.00	17.00	59.00	140.00	4.94	31.00	IC	-16.23	P	B
12	92.00	14.00	88.00	485.00	6.18	23.00	C	8.24	M	H
13	34.00	7.00	58.00	90.00	4.50	25.00	IC	-38.20	C	H
14	105.00	17.00	90.00	3000.00	8.01	35.00	IC	8.73	M	B
15	90.00	14.00	79.00	175.00	5.16	47.00	IC	13.24	C	B
16	35.00	9.00	70.00	10.00	2.30	53.00	IC	-22.11	P	B
17	39.00	7.00	71.00	18.00	2.89	17.00	C	-22.15	G	B
18	101.00	17.00	73.00	25000.00	10.13	38.00	IC	-2.83	C	M
19	101.00	15.00	101.00	625.00	6.44	30.00	C	15.60	G	M
20	80.00	19.00	81.00	237.00	5.47	20.00	C	1.16	P	H
21	73.00	18.00	103.00	18.00	2.89	49.00	IC	11.85	M	B
22	88.00	13.00	87.00	625.00	6.44	48.00	IC	13.50	P	M
23	92.00	15.00	80.00	15.00	2.71	31.00	IC	32.11	P	M
24	117.00	22.00	98.00	175.00	5.16	47.00	IC	40.24	P	M
25	93.00	12.00	81.00	6000.00	8.70	31.00	C	-8.03	M	B
26	90.00	23.00	80.00	150.00	5.01	29.00	IC	14.30	C	B
27	60.00	16.00	72.00	5.00	1.61	43.00	IC	7.65	M	B
28	114.00	19.00	70.00	24000.00	10.09	39.00	C	3.45	M	D
29	75.00	8.00	62.00	75.00	4.32	33.00	IC	4.06	M	M
30	100.00	17.00	82.00	39.00	3.66	18.00	I	41.55	G	B
31	95.00	14.00	79.00	5.00	1.61	38.00	IC	42.65	M	H
32	110.00	18.00	112.00	10000.00	9.21	21.00	I	5.46	M	B
33	63.00	12.00	61.00	178.00	5.18	33.00	IC	-23.78	M	B
34	71.00	13.00	90.00	75.00	4.32	27.00	C	.06	P	H
35	40.00	7.00	59.00	10.00	2.30	24.00	C	-17.11	P	B
36	89.00	13.00	95.00	100.00	4.61	20.00	C	28.08	M	B
37	73.00	13.00	77.00	175.00	5.16	37.00	C	-3.76	G	M
38	77.00	10.00	87.00	178.00	5.18	41.00	C	.24	G	B
39	120.00	20.00	88.00	40.00	3.69	22.00	IC	53.37	M	B

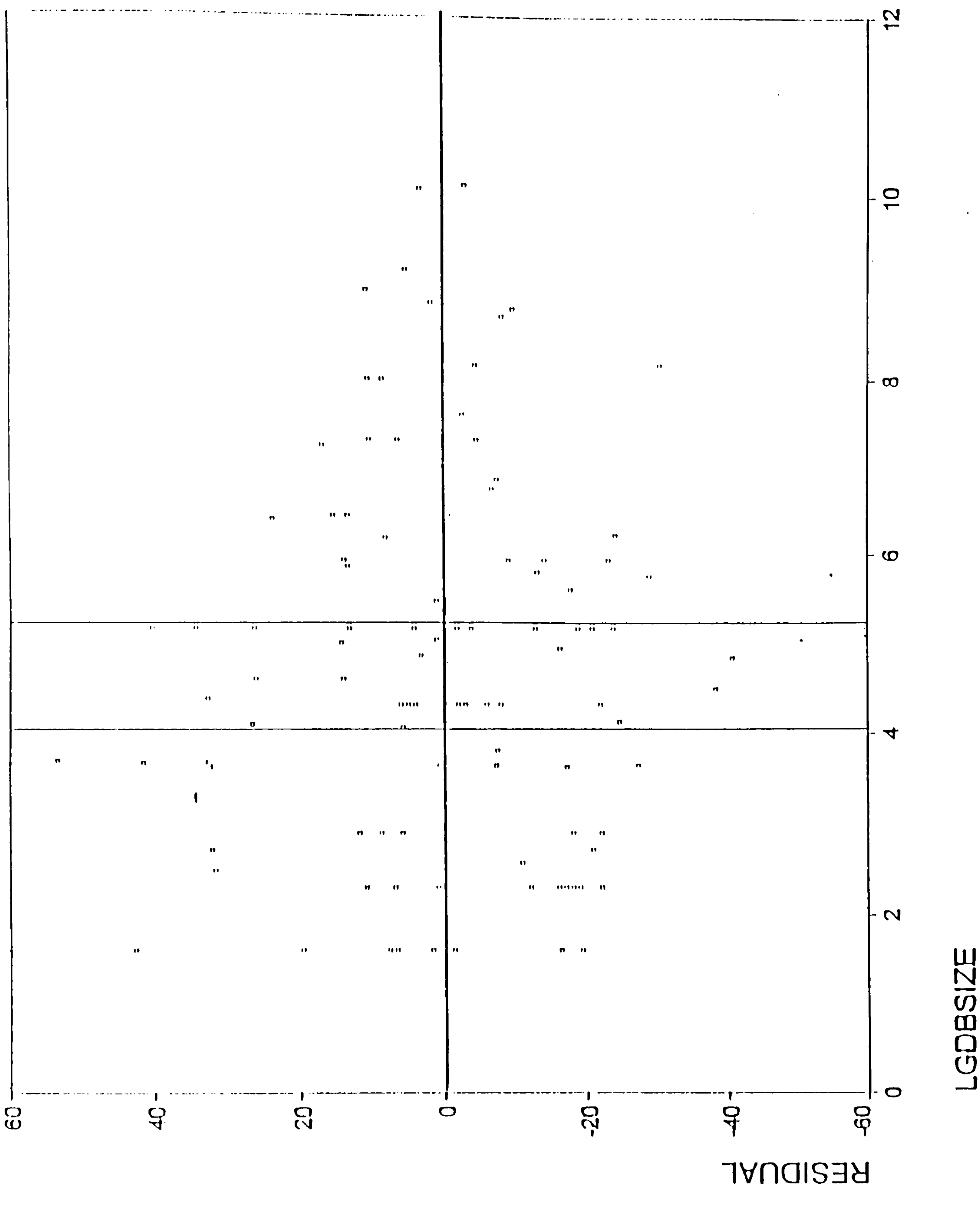
1-1

	sophtot	vidtot	mktort	dbsize	lgdbsize	loccont	conbus	residual	title	edulevel
40	69.00	11.00	74.00	75.00	4.32	25.00	C	-1.94	P	B
41	72.00	10.00	61.00	5.00	1.61	40.00	C	19.65	G	B
42	38.00	11.00	67.00	5.00	1.61	42.00	C	-16.35	P	M
43	70.00	11.00	78.00	18.00	2.89	35.00	C	8.65	M	B
44	33.00	9.00	76.00	5.00	1.61	22.00	C	-19.35	P	M
45	43.00	8.00	49.00	18.00	2.89	30.00	C	-18.15	P	B
46	67.00	18.00	93.00	18.00	2.89	33.00	IC	5.85	M	B
47	85.00	11.00	68.00	625.00	6.44	38.00	C	-.50	M	B
48	87.00	20.00	85.00	1500.00	7.31	23.00	I	-4.81	C	B
49	69.00	15.00	90.00	55.00	4.01	49.00	IC	.19	P	B
50	52.00	12.00	86.00	312.00	5.74	26.00	IC	-28.73	M	B
51	39.00	7.00	68.00	38.00	3.64	35.00	IC	-27.28	P	M
52	65.00	10.00	67.00	75.00	4.32	32.00	I	-5.94	M	B
53	64.00	13.00	88.00	5.00	1.61	49.00	IC	1.66	P	B
54	56.00	9.00	85.00	175.00	5.16	27.00	IC	-20.76	P	M
55	49.00	9.00	79.00	75.00	4.32	38.00	IC	-21.94	M	B
56	59.00	11.00	83.00	375.00	5.93	47.00	C	-22.99	M	B
57	63.00	11.00	96.00	75.00	4.32	35.00	IC	-7.94	M	M
58	39.00	7.00	73.00	15.00	2.71	47.00	C	-20.89	M	B
59	64.00	14.00	63.00	175.00	5.16	36.00	C	-12.78	P	B
60	91.00	13.00	66.00	2000.00	7.60	42.00	IC	-2.49	M	B
61	102.00	17.00	102.00	1500.00	7.31	35.00	IC	10.49	M	M
62	95.00	19.00	95.00	350.00	5.86	33.00	I	13.48	M	B
63	68.00	17.00	66.00	75.00	4.32	45.00	I	-2.94	M	H
64	60.00	12.00	84.00	500.00	6.21	36.00	C	-23.97	P	M
65	90.00	15.00	86.00	1500.00	7.31	38.00	IC	6.49	M	M
66	77.00	15.00	91.00	75.00	4.32	43.00	IC	6.06	G	H
67	60.00	16.00	82.00	327.00	5.79	32.00	C	-13.05	G	B
68	71.00	11.00	80.00	75.00	4.32	27.00	IC	.06	M	M
69	93.00	16.00	76.00	3500.00	8.16	19.00	C	-4.33	M	B
70	40.00	9.00	92.00	13.00	2.56	29.00	C	-10.91	M	B
71	51.00	10.00	82.00	5.00	1.61	36.00	IC	-1.35	P	B
72	67.00	13.00	69.00	3500.00	8.16	33.00	IC	-30.33	C	B
73	74.00	19.00	79.00	120.00	4.79	44.00	I	-.17	M	M
74	111.00	18.00	98.00	175.00	5.16	29.00	IC	34.24	M	B
75	107.00	18.00	89.00	3000.00	8.01	30.00	C	10.73	M	M
76	60.00	15.00	62.00	175.00	5.16	32.00	IC	-18.76	M	B
77	58.00	11.00	100.00	10.00	2.30	20.00	C	.89	M	B
78	45.00	11.00	82.00	62.00	4.13	17.00	C	-24.64	G	B

c:\spsswin\printlab.sav

	sophtot	vidtot	mktot	dbsize	lgdbsize	loccont	conbus	residual	title	edulevel
79	77.00	11.00	81.00	75.00	4.32	26.00	IC	6.06	P	M
80	114.00	23.00	102.00	8000.00	8.99	27.00	C	10.99	M	M
81	87.00	16.00	86.00	100.00	4.61	40.00	C	14.08	P	B
82	81.00	11.00	94.00	850.00	6.75	31.00	IC	-8.61	M	B
83	49.00	14.00	83.00	37.50	3.62	35.00	C	-17.18	G	B
84	59.00	8.00	98.00	5.00	1.61	36.00	C	6.65	G	B
85	45.00	10.00	73.00	10.00	2.30	41.00	IC	-12.11	G	B
86	109.00	22.00	107.00	600.00	6.40	18.00	C	23.78	M	M
87	90.00	9.00	89.00	12.00	2.48	54.00	C	31.64	M	H
88	41.00	7.00	79.00	10.00	2.30	41.00	C	-16.11	P	B
89	92.00	15.00	83.00	6500.00	8.78	42.00	IC	-9.58	G	B
90	103.00	18.00	84.00	175.00	5.16	30.00	C	26.24	P	B
91	96.00	16.00	104.00	375.00	5.93	16.00	C	14.01	P	M
92	75.00	14.00	83.00	58.00	4.06	33.00	C	5.82	P	B
93	104.00	19.00	92.00	80.00	4.38	28.00	I	32.61	P	H
94	38.00	7.00	64.00	10.00	2.30	36.00	C	-19.11	P	B
95	75.00	13.00	110.00	75.00	4.32	25.00	C	4.06	M	M
96	60.00	9.00	80.00	45.00	3.81	40.00	IC	-7.44	G	B
97	68.00	12.00	72.00	375.00	5.93	29.00	C	-13.99	P	B
98	34.00	10.00	81.00	127.00	4.84	22.00	IC	-40.66	P	B
99	104.00	21.00	94.00	7000.00	8.85	32.00	C	1.91	G	M
100	67.00	7.00	70.00	38.00	3.64	16.00	IC	.72	M	B
101	73.00	12.00	79.00	375.00	5.93	31.00	C	-8.99	P	B
102	62.00	12.00	60.00	268.00	5.59	44.00	IC	-17.69	C	B
103	81.00	7.00	90.00	950.00	6.86	43.00	C	-7.38	M	M
104	78.00	13.00	87.00	130.00	4.87	28.00	IC	3.28	M	M
105	98.00	18.00	108.00	1500.00	7.31	29.00	C	6.49	M	B

Appendix 19: Visual Test of Residuals for Linearity and Homoscedasticity



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