

The Role of Data Warehouses in Support of Organisational Requirements for Strategic Marketing Information

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ABSTRACT

There is a growing literature addressing the use of information in support of marketing, which emphasises its importance, yet recognises that too rarely are organisations able to provide or apply it, in practice. However, the majority of contributions, to date: have been theoretical; have focused on individual dimensions of the information application and have not considered how information requirements can best be satisfied. This research, attempts to rectify these omissions by empirically exploring the role of data warehouses in support of strategic marketing activities. The research was conducted through a series of in-depth case studies at eight of the UK's largest and most sophisticated companies. The research provides important new evidence that data warehouses play a critical role in the provision of information in support of market segmentation, new product development and competitor analysis activities.

1. INTRODUCTION

It has long been argued that an 'information revolution' is taking place that is having a significant impact upon all aspects of organisational life (Hamel & Prahalad, 1994), to the extent that information is now viewed as 'vital to the success of the business' (McPherson, 1996). However, information will only be perceived as having value if it is easily accessible (e.g. Goodman, 1993); and it can be delivered at an appropriate level of quality (e.g. Wang and Strong, 1996). Whilst the accessibility and quality of information are both undoubtedly important prerequisites for the realisation of value, it is only through the application of information, in critical decision making contexts, that it has the potential to truly deliver real and sustainable value. For example, information has the potential to deliver value when it is applied in support of corporate planning (Montgomery and Weinberg, 1998) or where it is used to facilitate organisational change (Doherty & Doig, 2003). Figure 1 presents a schematic representation of the relationship between information provision, information application and information value, and highlights, through shadows, the areas addressed in this study.

It has long been recognized that "management must establish an information system that enables it to discover customers' real needs and to use the information to create satisfying products". (Dibb et al, 1991). Indeed, the application of information for marketing purposes is another area where a significant thread of literature has been developed in recent years (e.g. Montgomery & Wienberg, 1998; Cravens, 1998). However, the research presented in this paper seeks to make an important new contribution by exploring the role of data warehouse technology in support of an organization's requirements for strategic marketing information.

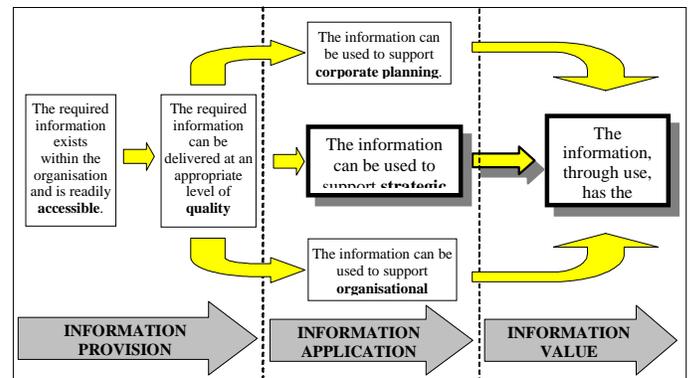
2. LITERATURE REVIEW

A central message of marketing textbooks is that effective marketing is dependent upon the availability of well focused, high quality

information (e.g. Dibb et al, 1991). An interest in the role of marketing information has also permeated much of the academic marketing literature. However, many information-intensive areas of strategic marketing, such as segmentation, new product development and competitor analysis have received relatively little empirical attention. The aim therefore of this section is to review the literature that exists in these areas, before exploring the role data warehouses might have to play in providing such information, and finally highlighting the gaps that this study has been designed to help fill.

- **Segmentation:** The segmentation of markets is a critical activity of all marketing departments, which is heavily dependent upon the availability of information (Johnson, 1995). Consequently, information systems and technologies have 'provided the opportunity for improved market segmentation and target marketing' (Foxman and Kilcoyne, 1993). However, as Wyner (1999) recognises, in practice marketers often lack the 'detailed information on the customer, such as transaction histories and account information' that are vital to the identification and utilisation of segments.
- **Product Development:** Products typically offer a complex bundle of tangible and intangible attributes including functional, social, and psychological utilities or benefits (Dibb et al, 1991). Undertaking the development of products that consist of these complex attributes is difficult and requires a significant amount of information (Wind and Mahajan, 1997). As Sheremata (2000) recognised, 'organizations trying to develop new products must solve a steady stream of problems to attain their goals ... solving these problems requires new knowledge and information'. How-

Figure 1: The Relationship between Information Provision, Application and Value



ever, recent research has raised concerns about the ability of many firms to acquire, share and apply information to enhance the outcome of new product introductions (Sethi, 2000).

- **Competitive Analysis:** Competitive analysis is an information-intensive activity that has the aim of identifying the relative strengths and weaknesses of all the competing businesses in the market-place (Hamel and Prahalad, 1994). Its importance was underlined by Beal (2000), who observed, '*obtaining and analyzing information on competitors' lowering or raising its product prices may enable a firm to formulate and implement strategic actions to maintain current customers or secure additional ones*'. However, in practice, such analyses can be extremely difficult because as Porter (1980) noted, effective competitor analysis '*requires a great deal of data, much of which is not easy to find without considerable hard work*'.

The literature demonstrates the growing importance of information in support of marketing. However, there is a need for more research in this area as most of the contributions to date have been theoretical rather than empirical and have tackled a single aspect of strategic marketing, rather than adopting a more holistic approach. There is also a need for research into how strategic marketing information can best be supplied, as organisations are rarely able to satisfy their information requirements. The data warehouse is an increasingly important technology that might have the potential to support an organisation's requirements for strategic marketing information. Data warehouses can be defined as: '*subject-orientated, integrated, time variant, and non-volatile collection of data in support of the management decision-making process*', which have the potential to store and process huge quantities of data in a form that is appropriate to the needs of managers. (Subramanian et al, 1997). Whilst the potential of data warehouses to '*improve decision-making and organizational performance*' is readily recognized, there is an urgent need for more academic studies, as most of the '*current literature is written by practitioners*' (Watson et al, 2002). Cooper et al (2000) have produced one important piece of work that does subject the contribution of data warehouses to rigorous academic scrutiny, in the context of marketing support. However, this was a detailed case study of just one organization, so there is still the need for additional studies to provide a wider perspective.

3 Research METHOD

To explore, in-depth, the broad research objective articulated at the end of the previous section, a multiple case study approach (Yin, 1994) was adopted as it is ideal for exploring the provision and application of marketing information, *in situ*, within a variety of large and highly sophisticated commercial organisations. Moreover, it was possible to adopt a '*participant observation*' approach as one member of the research team was employed as the '*Principal Business Analyst*', on a number of significant data warehousing projects. As he had unrestricted access to a wide variety of relevant information and key personnel, each project made a highly appropriate case study.

Over a five-year period the principle researcher was employed on eight major projects which were aiming to greatly enhance the host organisation's provision and application of information through the development and implementation of large-scale data warehouses. In each case, he was seconded to the project for a minimum of three months, in which time he worked at the client's site, interacted with key personnel and had access to project documents; this gave him ample

opportunity to collect relevant evidence. Although each case study was chosen on the basis of convenience, they still form a they still constitute a fairly homogeneous sample as each organisation is a large and highly sophisticated, UK-based public limited company. Profiles of each of the eight case study organisations have been presented in table 1.

For the purposes of this study, the following three data collection techniques were widely employed, so that the findings could be triangulated (Yin, 1994):

- **Document reviews:** The principal researcher had access to a wide variety of documents, including IT, marketing and corporate strategy reports, staff communication documents and detailed design documents.
- **Interviews:** Formal interviews or informal discussions were conducted with a wide variety of stakeholders in each project, ranging from users through to very senior managers.
- **Observation:** Being an active participant in each project, the principal researcher was able to observe, and keep a detailed record of, their execution at very close quarters, including participation in the vast majority of important project meetings.

The source data from each case study, i.e. the notebooks, formal business documents and the verbatim transcripts from interviews, was captured in an electronic form so that it could be managed and analysed using the '*QSR NUD*IST Vivo*' (Nvivo) software. This product was chosen as it provides a range of tools for handling rich data records, for browsing and enriching text, coding it visually, and for grouping the data records by many categories. Once transferred to Nvivo, the data was coded to facilitate its analysis. Having coded the data for each case, it was subjected to a '*within-case*' analysis, before embarking upon a '*cross case*' analysis, once all the cases were complete (Miles and Huberman, 1994).

4. RESEARCH FINDINGS

The aim of this section is to present the evidence with respect to each of the three key areas of marketing activity which most obviously benefited from the introduction of the data warehouses.

4.1 Segmentation

For three of the case study organisations, effective market segmentation was a critical strategic priority, which required significant quantities of high quality, customer-focused information. Unfortunately, such information had not been readily available within these organisations, and a key objective of the data warehousing investments, as testified by the following discussion, was to rectify these deficiencies:

- **Clearing bank:** The bank's efforts to develop a much more customer oriented culture were greatly handicapped due to the absence of good quality customer-information. As an internal report noted '*marketing decision are being made with little or no reference to reliable information - the ability of product managers to access information about customers and products is severely limited at present*' (feasibility study). A key objective of the bank's data warehousing initiative was, therefore, to deliver appropriate marketing information in a timely and accurate manner to support a variety of marketing activities, and in particular market segmentation. As they had identified '*the bank is committed to a customer orientation in all its marketing and sales activities and information about customers will be of fundamental importance in the future*' (feasibility study).
- **Insurance company 'C':** The marketing strategy of this organisation was centred upon the development of a truly global brand, through the identification and exploitation of carefully chosen customer and product segments, and geographies. For this strategy to be achieved, it was recognised that '*there would be a need for an integrated, holistic view of all customers*' (IT strategy document). To this end, a data warehousing project had been initiated to provide '*external demographic and geo-demographic data to allow market segmentation calculations to take*

Table 1: Case Study Organisation Profiles

Case	Size	Areas of business activity
Clearing Bank	Large, National	Retail banking; credit cards; mortgages; insurance
Retailer	Large, International	Clothing; food; financial services
Insurance Company 'A'	Medium, national	Motor / household insurance
Insurance Company 'B'	Large, national	Life assurance; general insurance; financial services
Commercial Bank	Medium, national	Personal loans; insurance; mortgages
Insurance Company 'C'	Large; international	Life assurance; general insurance; financial service
Car maker	Large, international	Car / truck manufacturing; financial services
Insurance Company 'D'	Large, national	Life assurance; general insurance; financial service

place', which would 'provide the company with the ability to develop expertise in segmentation and to understand target customers' (Notebook (NBk)).

- **Insurance Company 'D':** Being a market leader, insurance company 'D' was more focused on the profitability of its business than on increasing market share. It had developed a number of strategies for achieving this and amongst these there was recognition that by better understanding the characteristics of the markets it operated in, there would be more opportunity to increase the profitability of its business. However, they were faced with a fundamental problem: '*there are currently no information developments which comprehensively respond to the needs of the segmentation strategy*' (Strategic analysis document). It was therefore recognised that a key objective of the data warehousing project was to provide the high quality information '*required to facilitate segmentation analysis*' (NBk).

4.2 Product Development

Product development was a high priority activity that two of the case study organisations were actively engaged in.

- **Clearing bank:** A central plank of the bank's strategy to become much more customer focused was through the development of '*value for money products that would be attractive to the market, as they were based on the needs and desires of the customers*' (NBk). Consequently, a product development unit was created to undertake the identification and development of these products. However, the unit's performance was being greatly handicapped by the lack of appropriate information. As the IT architecture manager noted, a key objective of the bank's data warehousing initiative was, therefore, to provide the information required to '*help the bank understand who the products are for and when they are needed*'.
- **Insurance company 'A':** This organisation was battling against the onslaught of the emerging direct insurers. They recognised that to survive they had to be much smarter at developing the right products that could be targeted at the right customers. To achieve this the managers recognised the need for more better quality and focused information to satisfy current and future needs. They were particularly anxious to '*obtain information that would enable them to exploit the existing customer base and enable new product development to be better focused*' (Proposal document). There was a belief in the firm that this information would '*provide the ability to more effectively to target brokers*' with appropriately customised products (Proposal document).

4.3 Competitive Analysis

Three case study organisations were also using their data warehousing projects as an explicit mechanism to facilitate competitor analysis, as it was recognised as an important marketing activity that was dependent on the provision of good quality information.

- **Insurance company 'A':** This organisation had identified that to compete in its rapidly changing market it had an urgent need to understand the competition and their products. This was essential to ensure that the company's products were recognised as being as competitive as the other products on the market. As an internal report noted '*monitoring the actions of competitors in the market is important*' (Proposal document), not least because it would allow the organisation to '*compare where we are with where we want to be*' (Interview: underwriting manager). Moreover, it was proposed that the competitor information should be made available by: '*broker, geographical area, age and car group*' (Proposal document).
- **Insurance Company 'C':** For many years insurance company 'C' had operated on a global basis, but its global operations had been fragmented and operated as a loose federation of companies rather than a single, coherent unit. It was recognised that to guarantee future success, it would need to establish a single global

identity and operate as a unified business unit. Moreover, it also realised that it did not have an adequate view or understanding of its global competitors, because this information was not readily available. To rectify this situation a project was initiated to develop the strategy for gathering and disseminating competitor information on a global basis. As the IT strategy manager recognised '*some of the most important information needed by the business will come from the external environment. This will include information on competitors and commoditisation*' (NBk).

- **Clearing Bank:** To develop competitive products the clearing bank recognised that it had to develop a much better understanding of its competitors and their products. Gathering information to conduct competitor analysis was identified as being an important activity. As an internal report made clear, '*competitor tracking is a key marketing process which will require information on competitor activity at each level of the branch hierarchy, market share information, and customer segment volumes*' (feasibility study).

5. CONCLUSIONS AND LESSONS LEARNED

There is a growing literature addressing the use of information in support of marketing, which emphasises its importance, yet recognises that too rarely are organisations able to provide or apply it, in practice. This research presents important new empirical evidence that the implementation of data warehouses has an important role to play in the provision of high quality information in support of information-intensive marketing activities. However, the application of data warehouses in support of strategic marketing requirements was not consistent across all the case study organisations. The evidence suggests that marketing information was a high priority at four case study organisations, namely: insurance companies 'A', 'C' and 'D' and the clearing bank. A common theme in these four case organisations was the recognition that their future economic well-being was dependent upon the adoption of a clear customer orientation, which in turn could only be achieved through the provision and application of high quality customer and market focussed information. By contrast, as the other four case organisations were all, to a greater or lesser extent, already market leaders, at the time of the study, whose products and services sold well without a significant amount of promotional activity, the provision of marketing information was not, therefore, considered to be a high priority.

There was a recognition amongst all the case study companies that their investments in information resources would only deliver real and sustainable value if a range of important initiatives were initiated in parallel with the adoption of data warehouses. In particular, the companies stressed the importance of the: provision of training; provision of meta-information; cleaning-up of data sources; development of procedures to ensure data quality and accessibility and provision of analytical and reporting tools for managers. Above all, there was a recognition that the data warehousing initiatives could only really be judged successful if they resulted in a move towards a more customer-oriented culture (Doherty & Doig, 2003). Whilst the study provides many interesting and novel insights, into the application of data warehouses, there is a pressing need for follow-up studies that adopt different methods, and target different populations and respondents, to investigate the wider application of the results.

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