Understanding why marketing does not use the corporate data warehouse for CRM applications

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Fay Cobb Payton

is an assistant professor of Information Systems at NC State University, where she researches how companies can use corporate data warehousing for competitive advantage and improve their data quality efforts. She holds a doctorate in information systems from Case Western Reserve University in Cleveland, Ohio. Prior to receiving her doctorate, she worked in the information systems area and currently consults with large companies regarding their database and data warehousing strategies.

Debra Zahay

is the Axiom Professor of Interactive Marketing at Northern Illinois University in DeKalb, Illinois. She holds a doctorate in marketing from the University of Illinois in Urbana Champaign. She studies how companies can facilitate customer relationships. She has worked for various industrial firms in executive marketing positions, developing a specialty in business-to-business direct and database marketing and has been the president of her own relationship marketing consulting firm since 1993.

Abstract This study uses a previously validated model to explore the experiences of one large regional US health care payer in its implementation of a corporate data warehouse to support the marketing function via customer relationship management (CRM) applications. The organisation invested significant time and other valuable resources on its data warehouse applications but perceived that the warehouse was underutilised by the marketing function. Current estimates indicate that as many as 50–70 per cent of CRM implementations have failed and the figures for data warehouse applications are not much better. Using a case study methodology and independent coders, the authors analysed transcripts from five focus group sessions that they conducted with 21 marketing, information systems and strategic managers at a large regional healthcare payer. Their findings suggest that the ability of marketing to use the system for its functional needs, various aspects of information quality and the internal training were factors that ranked highly in terms of significance to implementation success. In this case, the corporate data warehouse and associated interface often failed to meet users' expectations.

INTRODUCTION AND RESEARCH QUESTION

Corporate data needs expand

The proliferation of data warehousing technologies and applications has been widely documented among information technology consultants and vendors.

According to Gartner,¹ organisations will

be confronted with the challenge of managing 30 times more data by 2004 in a continual effort to meet the demands associated with electronic commerce and supply chain applications. Defined as a well-defined central repository used for decision support, data warehouses are subject oriented, time variant and non volatile. Data are collected over time and

Debra Zahay
Axiom Professor of
Interactive Marketing,
College of Business,
Northern Illinois University,
DeKalb, IL 60015, USA.

Tel: +1 815 753 6215;
Fax: +1 815 753 6224;
e-mail: zahay@niv.edu

used to perform trend analyses, forecasting and comparative analyses. Typically, these data are not updated in real time. Rather, data are refreshed on a periodic basis from operational systems, as was the case with the company studied here. To enable these capabilities, data warehousing implementations can deploy multi, parallel and massive processing databases as well as a series of other hardware and software technologies.²

CRM and data warehousing are costly and often fail

Customer relationship management (CRM) applications as well as sales force automation (SFA) and contact management applications are often enabled by data warehousing technologies. These technologies offer significant research opportunities. Although there are many definitions of CRM, broadly defined, CRM is a process/application that permits organisations to gather and analyse customer data rapidly while seeking to improve customer retention and profitability via targeted products and services.^{3,4} A typical CRM implementation is costly with researchers and practitioners alike documenting expenditures well over \$1–2m in year one and record spending in 2003.⁵ In fact, IDC projected that the worldwide spending on CRM applications, including databases, would total \$20bn by 2004.⁶ Compounding the widely reported CRM implementation failures ranging in rates of 55–75 per cent^{7,8} is the fact that data warehouses have often been used as the underlying basis for CRM and add to the complexity of the applications.

In a study of 111 organisations, Wixon and Watson offered specific empirical findings affecting data warehousing

implementations.⁹ While their study expanded the existing information systems implementation knowledge, the research did not focus specifically on CRM applications for the information in the data warehouse. While one qualitative study has focused on the data aspect of CRM implementation,¹⁰ few studies have investigated the implementation of data warehouses for the purposes of supporting marketing applications, such as CRM. Moreover, few studies have pointed out the relevance of data quality to the users of the data warehouse.

Why is marketing not using the corporate data warehouse?

When the authors were approached in the spring of 2001 by a large regional US healthcare payer with the general question, ‘Why isn’t our marketing function using our corporate data warehouse information and applications?’ the authors had little empirical research on which to draw. They suggested a series of focus group interviews with functional marketing and information systems managers at the organisation which served as the basis for the case study. As a starting point for the research, they used an existing, validated model that looked at the factors leading to successful information technology implementations. This paper describes the model, the focus group process and presents the results of the study.

THE RESEARCH QUESTION AND RESEARCH MODEL

What factors lead to implementation success?

The authors restated the general question posed by the company to a question which could more specifically guide the

Figure 1: Implementation model by Payton and Ginzberg (2001)

research, that is, ‘What factors impact and/or stand to impact implementing our corporate data warehousing to support CRM applications for the marketing function?’ After investigating the existing options, they adopted a model used by Payton and Ginzberg¹¹ to explore the implementations of multiple health care information networks (Figure 1). Prior to the focus group interviews, they confirmed the relevance of the model to the particular organisation and the implementation in question through sharing with marketing, information technology and strategy managers the questions that guided the original model as published in Payton and Ginzberg.

In the original model, as shown in Figure 1, three factor clusters are defined: push/pull factors, behavioural factors and shared systems topologies. Push or pull factors are elements that can persuade an organisation’s willingness to adopt a given technology, strategy, and/or change

initiative. Behavioural factors are aspects that stand to affect and/or influence stakeholders including end-user support. Shared or integrated systems topologies represent certain aspects of the infrastructure needed for a data warehouse. These factors include arrangements for cooperation and information sharing as well as for assuring information quality.

Adapting an existing implementation model

Based on the initial discussions with management at the company the authors changed Figure 1 to eliminate factors not relevant to this situation. For example, government support was not relevant in this implementation since this was an intraorganisational effort not dependent on government funding. The resulting changes to the model are reflected on the left-hand side of Figure 2, which

Figure 2: Model as specified in this study (2003)

shows a more streamlined set of implementation issues.

The dependent variable in this implementation model is the success of the implementation effort. The authors sought to explore the implementation of a data warehouse that was not deployed initially and exclusively for CRM and other marketing applications. Therefore, in this effort, the dependent variable in this model is success of the implementation effort, in terms of the use of the corporate data warehouse by marketing for its functional work. It is interesting that the authors did not add any specifically marketing-oriented questions to their focus group questions as adapted from the original work by Payton and Ginzberg and shown in Appendix 1 to obtain their data. The initial questions as adapted were broad enough to elicit responses to the larger question at hand, 'What factors impact and/or stand to impact implementing our corporate data warehousing to support

CRM applications for the marketing function at this organisation?'

METHODOLOGY

Data collection

Data were gathered from five two-hour focus group sessions with this single large healthcare payer group. Sessions were held almost exclusively with marketing and information technology teams and included current, forthcoming and power users, data warehousing internal systems staff and middle management. Note that some power users represented the finance department, since marketing personnel relied upon these users for help with their marketing queries and applications. Appendix 1 lists the questions that were asked of all focus group participants, as adopted from the prior implementation work of Payton and Ginzburg. Prior to using these questions in the focus group sessions, the authors pre-tested their

Table 1: Summary of all coded items, ranked by frequency of mention

Frequency	Coded item	Model category
99	Quality: Believability, completeness, timeliness, amount, ease of understanding and accessibility	Data quality
76	Ease of use of interface (aka quality accessibility)	Marketing needs
69	Top management support	Top management support
64	Ease of use of CDW itself (aka quality accessibility)	Marketing needs
57	Marketing analysis needs	Marketing needs
51	System provides accurate/right data	Data quality accuracy
49	Standardisation of data definitions and structures	Data integration
38	Training should be based on the actual users' roles, job tasks	Training
38	Need other data in CDW (aka quality completeness)	Marketing needs
38	Marketing needs not a priority	Marketing needs
34	Systems used prior to current applications	Legacy systems
30	Lack of trust in system (aka quality believability)	Marketing needs
29	The training potential of users should be assessed	Training
29	Legacy systems are vital data sources for CDW	Legacy systems
27	Data dictionary needs (aka quality ease of understanding)	Marketing needs
25	Determination of user requirements	Needs assessment
23	External data needs (aka quality completeness)	Marketing needs
22	Communication between group members, users and managers	Needs assessment
20	Power users have functional jobs and also are gurus for CDW	Power users
18	Data that are fit to be used by data consumers (data quality accuracy)	Data quality
16	Perceived management support with willingness to commit resources	Needs assessment
13	Tools used to educate users	Training
10	Users should be engaged in the training process from the beginning	Training
9	System supports functional elasticity	Flexibility
8	The ability of CDW to contribute to perceived economic benefits	Economic impact
7	Strength of management's message re: CDW	Needs assessment
6	Where and how the CDW must evolve (system flexibility)	Flexibility
5	Links architecture, planning, HR skills	Flexibility
5	Implementing CDW is expensive but nevertheless useful	Economic impact
3	Alternative system needs	Marketing needs
1	Definitions agreed upon over time	Data integration

919 total statements, 462 per each of two coders

research model via five one-hour interviews, meeting notes and other fact-finding sessions with managers from the healthcare organisation. This pre-work enabled them to determine the validity and appropriateness of their constructs in the context of the organisation.

Top management agreed not to attend the focus group sessions to avoid biased responses to questions asked. The sessions were conducted over the summer of 2001. All focus group sessions were recorded and transcribed by a professional writer on the staff at the healthcare organisation as well as a member of the research team within 48

hours. Names and titles were withheld from all transcribed documents.

Data analysis

To analyse the focus group data, the authors adopted the analysis method prescribed by Yin.¹² This method allows for re-examination of the data to see emerging patterns. They analysed the data in the transcripts themselves and then developed coding dictionaries to capture the marketing and information systems-related constructs. Their coding dictionaries can be found in Appendices 2 and 3. Two independent coders were then asked to categorise statements from

the focus groups and the results were then combined to develop a content analysis based on frequency of mention.

FINDINGS

Quality and marketing needs dominate

The detailed results of the analysis of all five focus groups are reported in Appendices 2 and 3 and summarised in Table 1. As Table 1 indicates, the needs of marketing were most frequently mentioned as important to the participants and as preventing them from using the corporate data warehouse (CDW) application. The entire model was supported, but quality issues and needs of marketing dominated. Marketing needs that can be linked to data quality issues, marketing needs, overall data quality issues and training were the most important factors in preventing the widespread adoption of the CDW in this organisation. These categories represent 66 per cent of the total 919 statements coded by the two independent coders. Thus the analysis that follows will focus on describing these categories in more detail. Again, more details on the coded statements are available in Appendices 2 and 3.

Overall, users supported the idea of the warehouse and the benefits derived from the technology. The focus groups, however, indicated that marketing needs included specialised analysis that could not be performed with the present combination of warehouse data and analysis tools. These analyses were fairly standard data mining/database marketing types of applications,^{13–15} such as segment profile characteristics to target marketing programmes, longitudinal analysis and the comparison of customers who had purchased and those who had not. Apparently, these analyses had not been

considered in detail prior to implementation, particularly the needs of marketing for historical data on lost customers and information about future prospects. As one frustrated focus group participant noted: “‘What would you expect from (our) data warehouse?’ I would say that you (are) either looking to do one of a few things. That is, decrease your costs, increase your membership — increase or retain your membership. We cannot do this or it takes a *lot* of work to meet our marketing needs.’ (Marketing manager).

The dimensions of quality

Although the marketing has considered itself with the notion of quality of research reports¹⁶ and service experiences,¹⁷ it is information systems studies which provide the most comprehensive assessment of data quality. In particular, Wang and Strong administered a two-stage survey to 25 industry consumers and 112 MBA students to explore the scope of data quality.¹⁸ Some of the data quality dimensions identified were believability, completeness, timeliness, amount, ease of understanding and accessibility. In this study the authors instructed the data coders to include general quality statements in one category and also include a separate category for data accuracy, given that accuracy was identified separately and specifically by those in the focus groups. All mentions of quality totalled 18 per cent of total statements coded.

Marketing needs dominate, relate to quality

So many mentions were made of overall marketing needs that were not considered in implementation that considering marketing needs as a factor

relating to implementation success was identified in the revised model in Figure 2. Overall, marketing needs accounted for 356 coded statements or 39 per cent of all statements. In addition, the general category of marketing needs included several categories which, after the initial analysis, appeared to be strongly related to overall data quality dimensions as delineated by Wang and Strong.¹⁹ These marketing needs which related to quality dimensions accounted for 28 per cent of total statements coded, meaning that quality related issues accounted for over 50 per cent of statements coded. As a focus group participant noted: 'All right, so we're using less than ideal ways of measuring the effectiveness of those things right now, I would say. Because we don't, I think, have the data or don't understand how to use the existing data (from the warehouse) well enough to be able to get at it. This is a matter of trusting this data and its quality to make major business decisions and we are not there, yet.' (Marketing manager).

Specifically, the users mentioned the ease of use of the interface as well as overall ease of use of the warehouse, which could also be considered as relating to the accessibility dimension of quality,²⁰ so those needs were broken out separately and the coders were instructed to classify them according to how marketing needs related to dimensions of quality. Another example is that users mentioned that they needed other data that were not in the warehouse, which relates to the completeness dimension of data quality. These needs were for external, demographic and descriptive data for the consumer market and Dun & Bradstreet company descriptive data for the commercial (business-to-business,

B2B) applications which were missing from the data warehouse. Other missing data included information on former customers and prospective customers, neither of which are in the CDW. In addition, users expressed interest in a data dictionary, which relates to the perceived ease of understanding of the data. Users did not have an exact idea what data items meant and consequently could not use them.

Perhaps most importantly, users and potential users continue to distrust data extracted from the warehouse, which relates to the dimension of quality known as believability.²¹ Focus group participants reported 'reconciling' mainframe reports to the information from the data warehouse. In addition, overall quality issues were mentioned frequently, such as overall accuracy of the information and other dimensions of data quality.

Training and the user interface

In addition, marketers expected the interface to resemble that experienced in training or to be similar to other packages (eg SPSS) that they used in their work by capturing 'click and drag' features. In training, the queries were set up prior to the session and the users had an impression that the system would have a more 'canned' appearance than the system they eventually received. Participants were less likely to use what they perceived as more technically oriented reporting tools (eg business objects) and more likely to consult local 'power users' to get an answer to a query. These power users had become resident experts with the application and as a consequence were somewhat overworked in the organisation.

Finally, the issue of training was one of the most frequently mentioned, with users

reporting that training should be based on actual job roles and responsibilities, not on imagined data sets not related to their work. Also, the focus groups indicated that users should be involved in the training from the beginning and that potential users should be assessed before entering internal training sessions. In fact, it seems as if training and data quality could be related, since users might be more comfortable with the data if they understood the content of the warehouse.

Trust and quality

Although issues like training and the user interface are important to implementation success, why are the dimensions of quality or marketing needs related to quality so important in the implementation of a data warehouse by the marketing function? One possible explanation for the overriding importance of data quality issues in the adoption of the corporate data warehouse comes from social relations theory. The adoption of an information technology system is analogous to a commercial relationship in which trust is a critical element in determining whether partners will enter into and continue in a relationship.²² Trust can be defined as a willingness to rely on an exchange partner in whom one has confidence,²³ in this case another department in the same organisation. That is, to what extent marketing trusts the data provided by the information systems function in the corporate data warehouse will be related to the propensity of marketing to use those data in their daily analysis tasks. Moorman *et al.* suggest that information supplier and information user relationships influence the extent to which marketing research data are used in decision making.²⁴ To this end, well-defined, pre-established relationships with high quality interactions and data

quality define the degree of trust in the provider–user relationship.

In fact, Moorman *et al.* suggest that, although trust and data quality are separate, trust *heightens* the perception of data quality. Quality appears to signal trust in a system and a willingness to move forward in the relationship, or, in this case, the implementation of the data warehouse. The importance of quality might be heightened in this context in particular because of the competitive pressures in healthcare as they strive to use corporate data to obtain new and retain existing customers. The authors wish to expand the model in the future as seen by the emerging issues identified in Figure 2 to include the trust dimension and to explore further the interrelationship between trust and quality in the context of the adoption of data from the corporate data warehouse for CRM functions.

CASE STUDY CONCLUSIONS

While this paper complements prior research which suggested data quality is important in CRM implementations,²⁵ the authors' work suggests what specific elements of data quality are critical in determining data warehousing implementation success among marketing users. Another contribution of this research is in further identifying the components of an overarching model which can facilitate success in the field of CRM systems supported by a corporate data warehouse. This research can be seen as the first step in understanding the process of how data are used in CRM implementations and how the corporate data warehouse can play a role.

This study indicates that marketing applications must be considered carefully before the data are developed for a corporate data warehouse if marketing is going to use the data. In particular, the

data and analysis needs of the marketing function were not necessarily consistent with the concept of a corporate data warehouse. Marketing managers have special data needs, such as external data and data about prospects, not just current customers.

These additional data are not always kept in the data warehouse, nor did marketing managers/users accept the quality of the data when they were. Compounding the problem, these users found data warehousing data analysis tools difficult to use. While the users agreed that the data warehouse could have economic benefit, this company discovered, through this research, that data warehousing technologies implemented to meet strategic corporate and IT objectives can be less than successful in the CRM context.

In fact, when the research ended, the company was considering purchasing a separate CRM system using a mini 'data mart' to support marketing applications. This research suggests that data warehousing implementations that fail to adhere to marketing analyses (including data quality) and functional support needs will not gain and sustain the benefits normally associated with these technologies. In sum, the challenge remains for practitioners to migrate data warehousing applications from operational, financial, accounting and production functions to value-added marketing and strategic functions in a meaningful way.

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APPENDIX 1: INTERVIEW GUIDE

Push/Pull Factors

1. What *economic* benefit is your organisation anticipating (has experienced) as a result of data warehouse implementation?
2. Were there any costs to your organisation as a result of participating in this effort? Do (have) the benefits outweigh costs? Explain.
3. How has the *competitive* environment influenced your decision to implement the data warehouse?

Shared Topology

4. What types of information will be shared (are shared) among data warehouse users?
5. How (has) will *information sharing* benefit your organisation?
6. Does the data warehouse provide the precise (eg content), timely, current, relevant and accurate information you need? Does the data warehouse provide quality information to

facilitate your needs? If not, what is needed to improve *information quality*?

7. How has the data warehouse impacted (expected to impact) the *quality of the information* that you receive (will receive) and use to facilitate decision making?

Behavioural Facilitators

8. What (has been) will be the role of the internal IT group (*vendor*)?
9. What types of services/expertise has/should the IT group provided?
10. How has (will) *top management* been involved in the implementation process?
11. Who are the *champions* and what are their roles?
12. What *end-users* are (will be) involved in the data warehouse implementation process? How was (will be) end-user support gained and assessed?
13. How has (will be) departmental *control and autonomy* been impacted during the implementation process?

APPENDIX 2

Coded items relating to marketing needs, ranked by frequency of mention, major topic, sub-topic

Frequency	Average	Coded item
Ease of use of interface		
15	7.5	Can't meet time frame using CDW currently
14	7	Takes too long for analysis
12	6	Business objects not accessible to all analysts
10	5	Takes too long for requests for changes
10	5	Business objects are easier to use
7	3.5	Executive area can't get answers to marketing questions easily
5	2.5	SQL not accessible to all analysts
3	1.5	Ad hoc queries only, not production of marketing applications
76	38	Total-Ease of use of interface
Ease of use of CDW itself		
54	27	Expect to be able to access data easily
10	5	CDW can't be used to answer basic questions
64	32	Total- Ease of use of CDW itself
Marketing analysis needs		
		Types of analysis that CDW can't perform:
15	7.5	Group characteristics
9	4.5	Contains information only on enrolled groups and members
7	3.5	How many members in each group
4	2	Identifying profitable customers
4	2	Link leads historical data (longitudinal)
4	2	Can't monitor prospects because they are in CDW
3	1.5	Segmentation of offers
3	1.5	Inability to track things longitudinally and across products
3	1.5	Should identify type of business producer (sales person) has been selling over time
3	1.5	Need to manage customers more effectively and efficiently (analysis)
1	0.5	Differences between customers who purchased and did not
1	0.5	Others
57	28.5	Total-Marketing analysis needs
Need other data in CDW		
38	19	Data not there (Need to gather information)
38	19	Total-Need other data in CDW
Marketing needs not a priority		
21	10.5	Marketing needs not given top priority
10	5	Technical people don't know marketing terms so they can't help us
7	3.5	Marketing lost influence over the warehouse
38	19	Total-Marketing needs not a priority
Lack of trust in system (Quality)		
17	8.5	CDW reports are 'reconciled' to mainframe reports
13	6.5	Mainframe reports are still used, believed in more than CDW
30	15	Total-Lack of trust in system (Quality)
Data dictionary needs		
16	8	Have common definitions
8	4	Need 'data definition sheets'
3	1.5	Expect all data to be in one place
27	13.5	Total-Data dictionary needs
External data needs		
11	5.5	Need demographic data in CDW
9	4.5	Need a marketing 'data universe'
3	1.5	Need Dun & Bradstreet data in CDW
23	11.5	Total-External data needs
Alternative system needs		
		Other systems that might meet needs:
2	1	Opportunity management (being considered)
1	0.5	Marketing system outside of CDW
3	1.5	Total-Alternative system needs

924 total statements coded, 462 per each of two coders

APPENDIX 3

Coded items relating to is needs, ranked by frequency of mention, major topic, sub-topic

Frequency	Average	Coded item
Data integration		
49	24.5	Standardisation of data definitions & structures
1	0.5	Definitions agreed upon over time
50	25	Total-Data integration
Flexibility		
9	4.5	System supports functional elasticity
6	3	Where & how the CDW must evolve (system flexibility)
10	5	Links architecture, planning, HR skills
25	12.5	Total-Flexibility
Training		
38	19	Training should be based on the actual users roles, job tasks
29	14.5	The training potential of users should be assessed
13	6.5	Tools used to educate users
10	5	Users should be engaged in the training process from the beginning
90	45	Total-Training
Data accuracy		
51	25.5	System provides accurate/right data (as dimension of quality)
Data quality		
18	9	Data that are fit to be used by data consumers a
99	49.5	Other quality dimensions: Believability, completeness, timeliness, amount, ease of understanding and accessibility
117	58.5	Total-Data quality
Legacy systems		
34	17	Systems used prior to current applications
29	14.5	Legacy systems are vital data sources for CDW
63	31.5	Total-Legacy systems
Needs assessment		
25	12.5	Determination of user requirements
22	11	Communication between work group members, users and managers
16	8	Perceived management support with willingness to commit resources
7	3.5	Strength of management's message re: CDW
70	3.5	Total-Needs assessment
Power user roles		
20	10	Power users have functional jobs and also are gurus for CDW
20	10	Total-Power users
Economic impact		
8	4	The ability of the application to contribute to perceived economic benefits
5	2.5	Implementing CDW is expensive but nevertheless useful
13	6.5	Total-Economic impact
Top management support:		
13	6.5	Message is not communicated throughout the company that CDW is important
13	6.5	Top managers don't have time to learn about warehouse
11	5.5	Top managers need to find out what is going on in warehouse
10	5	Top management role not visible
9	4.5	Managers are key to making CDW a success, vendor evaluation
7	3.5	Top management role not clear
3	1.5	Managers came to training session
2	1	Should have realistic expectation out of warehouse, have better communication
1	0.5	Managers left the training session early; questions importance of CDW
69	34.5	Total-Top management support

924 total statements coded, 462 per coder