Implementing Successful Data Warehouses

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Abstract

Much of what we know about data warehousing success comes from personal experiences and isolated cases. This article describes the results of a survey that investigated data warehousing implementation success based on a large number of diverse data warehousing experiences. One hundred and eleven companies responded to the survey, and their experiences identified several factors that are important for organizations that are implementing data warehouses.

Repeatedly, data warehousing professionals are warned about the many pitfalls that can slow down the progress of data warehousing projects. At conferences and in articles, consultants, vendors, and experienced practitioners offer valuable insights and words of wisdom regarding their personal experiences. These experiences are important, and they can provide guidance to professionals who are beginning or evolving their data warehouses. However, until now no one has examined a large number of diverse companies to determine if there really is an overall list of "success factors" that can lead to successful data warehousing implementations.

About two years ago, I began reading trade press articles and interviewing data warehousing experts to gather information regarding successful implementations. This process identified ten factors that consistently seemed important, and I developed a survey instrument that measured the presence of these factors along with how successful the data warehousing projects are in their organizations. Over two hundred organizations were contacted with the help of The Data Warehousing Institute, vendors, and consultants, and ultimately 111 data warehousing managers responded to the survey. This article describes what I found from these responses.

The Participants

The organizations that participated in the study represented the different regions of the United States with 24 from the Northeast, 29 from the South, 34 from the Midwest and 12 from the West. Also, 12 organizations that were based in South Africa, Canada or Austria participated in the study. These mainly were large organizations with mean gross revenues of $5.8 billion (minimum = $150,000; maximum = $40 billion) and mean number of employees of 23,571 (minimum = 35; maximum = 300,000). Figure 1 shows the different industries that were represented. All companies involved in the study had implemented a data warehouse prior to answering the survey.

Figure 1.
Industries Represented by the Study

- Financial Services
- Banking 10%
- Government 7%
- Health Care 1%
- Utilities 9%
- Education 3%
- Publishing 3%
- Telecom 12%
- Other 14%
- Retail 12%
- Wholesale 12%
- Petrochemical 2%
- Manufacturing 14%
- Insurance 8%
The participants considered their initiatives to be at least somewhat successful. In fact, most described their initiative as "an up and coming system" (72 percent). Twenty-six percent of the data warehousing initiatives were labeled as "a runaway success," and only two percent were "potentially in trouble."

A variety of data warehousing architectures were represented by the organizations in the study (see Figure 2). Most companies had a data warehouse (N=45) or both a data warehouse and a data mart(s) that users access (N=31). The least common architecture was multiple data marts (N=8). It was unsure at first if the different architectures would have unique success factors. For example, would an implementation of data mart have different success factors than an implementation of an enterprise-wide data warehouse? Analysis of the data showed that there were no differences between a data warehouse and a data mart initiative in terms of the factors investigated in this study. Thus, the information presented in this article pertains to all types of data warehousing implementations.

Organizational Factors are Critical to Data Warehousing Success

Over and over we hear that the business issues play a more important role in data warehousing than the technical issues. This study gives further evidence that this is the case. Data warehousing can create enormous change within an organization as data ownership is shifted and as people receive access to information that was never before possible. This change needs to be managed because the political resistance and lack of support can halt a project in its tracks.

For the organizations in this study, three main organizational factors were critical to successful data warehousing. All three factors were found to be directly linked with the ability to overcome political resistance, good change management practices, and widespread support for data warehousing.

First, the projects had a champion. Someone was on-board, usually a high level executive from a functional area, who passionately believed in data warehousing. This person provided information, resources, and political support when needed.
Implementing Successful Data Warehouses, continued

Second, management overall supported the initiative. For example, management allocated sufficient funds and encouraged users to use the data warehouse.

The first two factors played a part in securing the last factor—the data warehousing projects had the right resources. Having the money and enough people to do the job had a big effect on how smoothly the implementation moved ahead.

Make Sure that Functional Requirements Are Well-Defined

Defining functional requirements for data warehousing is tricky. Typically, there are a number of players involved, each with unique needs. Requirements change and evolve over time, especially as more and more people understand the possibilities that exist once a warehouse is in place. Throughout implementation, the project team needs to keep the focus on the appropriate needs so that the right business objectives are being met in the end.

Expect Technical Problems

The focus of this study was not on technical issues, primarily because so many experts agree that technical challenges can be overcome. Although this study did not find a direct link between technical problems and success, there were certain factors that did increase the chance of technology stumbling blocks. For example, data warehousing projects that (a) worked with source systems that did not have good standards, (b) had diverse and disparate source systems, and (c) did not have good data warehousing development technology available, all experienced greater technical problems.

<table>
<thead>
<tr>
<th>Table 1. Current Practices</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree = 1</td>
<td></td>
<td>Strongly Agree = 7</td>
</tr>
<tr>
<td>A structure was put in place to measure benefits.</td>
<td>3.22</td>
<td>1.8</td>
</tr>
<tr>
<td>Members of the DW team had prior experience with DW or large-scale systems implementations.</td>
<td>4.18</td>
<td>1.75</td>
</tr>
<tr>
<td>Prototyping was used as a proof of concept for DW.</td>
<td>4.37</td>
<td>2.19</td>
</tr>
<tr>
<td>The project team had prior experience with the technology used for DW.</td>
<td>3.75</td>
<td>1.84</td>
</tr>
</tbody>
</table>
Information Quality Is a Must-Have

There was no difference in the information quality for all of the respondents to this study—information quality was always high. The lesson in this is that to get past implementation, information quality is a must-have. Users will not use the data warehouse without it, and ensuring that information has high quality must be built into the implementation process itself. If not, project teams can face difficult credibility issues during the post-implementation phase.

Current Practices

In the survey, respondents were asked about their project and certain practices that were in place for the data warehousing implementation. Four practices in particular surprised me (see Table 1 for a list of the questions). First, most teams did not benchmark so that benefits of data warehousing can be measured. Also, prototyping was not used frequently as a proof of concept. Both practices can be quite beneficial when used appropriately, but most projects in this study did not take advantage of the techniques.

Some good news: the successful implementations in this study worked with teams who were not always data warehousing gurus. In fact, most members had very little prior experience with data warehousing and the technology involved. For companies having a hard time finding people with data warehousing skills, it may be sufficient to build a strong team out of people with good general IS experience. Of course, someone on the team has to understand data warehousing! Many companies have been very satisfied by hiring consultants or vendors to provide data warehousing skills and to transfer knowledge to the employees in-house.

Conclusions

Based on the experiences of the 111 organizations in this study, several recommendations can be made. First, make sure that your project has an upper level champion from a functional area and the support from management. Take care that the appropriate resources are allocated to the project team. Invest in planning and a good team. And, expect some technical problems, especially if your company has source systems with disparate, unstandardized data.

The next step to understanding success is to examine failed efforts or false-starts. The data warehousing initiatives in this study were, for the most part, successful initiatives. Projects that never get off the ground may fail for additional reasons, and these are important to identify. This fall, professors at the University of Georgia and the University of Virginia will begin a study that looks at data warehousing attempts that never quite got off the ground. If you have an experience that would be helpful to the study, please contact Hugh Watson (hwatson@arches.uga.edu) or Barbara Haley (bhaley@ mindspring.com). All information will remain confidential.

BIOGRAPHY

Dr. Barbara J. Haley is an Assistant Professor at the University of Virginia's McIntire School of Commerce. She received her Ph.D. in MIS from the University of Georgia. Barbara is an Associate Editor for the "Journal of Data Warehousing," has published in journals that include "Information Systems Research," "Information Systems Management," and "End User Computing," and has presented her work at national and international conferences. She worked for several years for the Business Consulting group of Arthur Andersen & Co. Recently Barbara was named a Fellow of the Data Warehousing Institute for her efforts in data warehousing research.

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