A Study of Success Factors of Data Warehouse to estimate ROI

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ABSTRACT

As we all know that developing a data warehouse is a costly affair in terms of resources and investment. This cost can be recurring as well as non recurring depending on the requirements of the organization as a whole. The warehouse is supposed to give benefits to the business as a fixed cost is associated with it. This paper discusses the need of a warehouse and its potential benefits by studying the data warehouse process since each data warehouse process changes as the organizational need changes. We have identified success factors of warehouse and calculated it to define ROI.
Keywords:- Data warehouse, recurring, ROI, success factors.

1. INTRODUCTION

Data warehouse is a large repository of data collected from various sources. It has memory in terms of TB. Procuring it costs a huge amount of money. But its implementations are never monitored for its performance and success. It is only monitored for technical parameters like speed, memory size, as opposed to the business facets. Business people generally treat success of data warehouse as success of any operational system. Inexperienced IT specialists don't care about measuring the success of data warehouse. We must understand that data warehouse process is mainly business.
Our Work: We have studied various types of success factors that will determine the success of a warehouse. The success of a data warehouse depends upon the following:

1. Vision: It is not possible to get success of a data warehouse without knowing its vision. Unless you know what to achieve, how to find the success?
2. Dynamic nature: The success of a data warehouse is very dynamic since business goals are changing very fast.
3. Internal influence: It is the entity that determines how well the data warehouse is performing with its current expectations. That is, it determines how easily users can get the data stored in the warehouse.

The success of warehouse can be measured in terms of internal influences. The internal success factor is given by the formula:

$$IS = \frac{\text{Analysis Time}}{\text{Access Time} + \text{Analysis Time}}$$

4. External Influence: It is the entity that is based on what is not included in the data warehouse. It is a measure of the ratio between what DW is doing vs what it should be doing. Such a measurement is possible only when the vision is completely clear.

The external success factor is defined as follows:

$$ES = \frac{\Sigma\text{Enterprise needs addressed}}{\Sigma\text{Enterprise all needs}}$$

5. Overall success factors: The overall aim of the DW should be to have the users performing analysis 100% for every single defined enterprise need to be addressed.

$$OSF = \frac{IS + ES}{2}$$

Calculation of Various Success Factors: We have calculated the different success factors by assuming a hypothetical situation. Let a company has the following needs:

1. Monitoring the sale of software by zone to give a view of its use. (5)
2. Improving the inventory process on sales. (5)
3. Analyzing return merchandize to determine any key patterns with an aim to reduce the amount returned. (4)
4. Analyzing the maintenance needed and the total AMC registered. (4)
5. Analyzing the online and offline sale. (3)

The figures in parenthesis indicates the importance of each enterprise needs with (5) being most important.

While discussing with users it has been found that out of five needs only four were actually implemented and it was determined that following ratios of each of the four needs were applicable.

Enterprise Needs	Time spent accessing data	Time spent analyzing data
1	10%	90%
2	30%	70%
4	40%	60%
5	20%	80%

These figures are based upon the user's perception as much as reality. The important point to note here is that how much time is spent in analyzing the data.

The Internal Success Factor is calculated as:

$$IS = \frac{0.9 * 5 + 0.7 * 5 + 0.6 * 4 + 0.8 * 3}{17} = 0.753$$

This factor shows that we are 75.3% successful in implementing the data warehouse. The goal of the organization is for users to spend all of their time in analyzing data and not in manipulation. Similarly, external influences on the success factor of the data warehouse are not based on what is included within the warehouse, but what is not included. The External Success is calculated as:

$$ES = \frac{\sum \text{Wt. of implemented needs}}{\sum \text{Wt. of all needs}} = \frac{17}{21} = 0.809$$

This means here we are 80.9% successful in implementing all the needs of the organization that are documented based on vision. Finally, the overall success of the warehouse is defined by combining the two success factors discussed above and is given by:

$$OSF = \frac{0.753 + 0.809}{2} = 0.781$$

This shows that data warehouse is 78.1% successful in implementing the needs.

One question that may goes in mind, "What is a good OSF?" This depends upon the organization which has designed the data warehouse. It might well be that for certain organizations, it is more important to address all needs than to have a proper analysis. So weights associated with the needs also changes depending on the situation. Thus, we can say that success factor is nothing but an indicator of how the data warehouse is performing.

Return on Investment (ROI): The ROI of a data warehouse is very difficult to calculate. The overall success factor calculated above does not take into account any ROI. The monetary cost of data warehouse should not only include hardware, software or people resource but also the continuing cost of maintenance and usage. This means is a data warehouse is used 24 hours than this is the cost of warehouse. ROI is very complex to calculate and it is influenced by various factors which are not always identified. So careful selection has to be made while identifying business needs.

2. CONCLUSION

We have calculated values for IS, ES and OS of a data warehouse by identifying certain needs for a business and found that for those needs the warehouse is 78.1% successful. Attempts can be made to include more needs which are real and faced by business professionals.

REFERENCES

[1] Peter R. Welbrock, "Is your data warehouse successful?" 23rd Annual SAS User Group International Conference, Nashville, Tennessee, March 22 – 25, 1998.
[2] Kimball R., "The Data Warehouse Toolkit: Practical Techniques for Building Dimensional Data Warehouses." John Wiley and Sons, 1996.
[3] Pal Bikramjit, Rout Laxmi, Shah Priyadarshani, Dr. De Mallika, "Logical Data Warehouse Design Using Distributed Schema Architecture", International Journal of Computer Science and Technology, Vol. 3, Issue 2, April – June 2012, pp. 191 – 194.
[4] KALIDO, "Dynamic information warehouse—a technical overview." Technical report, KALIDO White Paper, 2004.
[5] Pal Bikramjit, Mishra Awnish Pati, De Mallika, "ROI Estimation of Data Warehouse with Bottom Up Architecture and Top Down Implementation", International Journal of Computer Trends and Technology, Vol. 4, Issue 5, May 2013, pp 998 – 1001.
[6] Patel, A., Patel, J., M., "Data Modeling Techniques for Data Warehouse", International Journal of Multidisciplinary Research, Vol.2, Issue 2, (2012), pp. 240–246

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