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A Hypothetical Configuration of Data Warehouse Success for Strategic Leaning Business Intelligence

Mithlesh Bekadia, Sunil Sharma, Vishnu Kumar
(Research Scholar)
Jagannath University, Chaksu,
Jaipur, India

Prof. A.K. Tiwari
(Director)
Wilfred Institute of Information Technology
St. Wilfred's College, Jaipur, India

Abstract: the propagation of the data warehouses as helpful resolution construction tools, organizations are increasingly looking forward for a complete data warehouse success model that would manage the enormous amounts of growing data. It's therefore important to measure the success of these enormous projects. At the same time as general IS success models have received enormous deals of attention, the minority of research has been conducted to evaluate the success of data warehouses for planned business cleverness purposes. The structure developed in this study consists of the following procedures are following like the vendor and consultant, Management Actions, the System Quality, the Information Quality, Data Warehouse Usage, professed utility, the Individual Decision Making Impact, Organizational conclusion Making Impact, and Business intentional Goals achievement.

Keywords: Data Warehouse, Business Intelligence, the Data Warehouse Success Model

1. Introduction to Data Warehouse

In computing, a data warehouse or enterprise data warehouse (DW, or EDW) is a database used for reporting and data analysis. It's a central repository of data which is created by integrating data from one or more dissimilar sources. The Data warehouses store up existing as well as historical data and are used for creating trending reports for senior management reporting such as annual and periodical comparisons. The data stored in the warehouse are uploaded from the prepared systems (such as marketing, sales etc., shown in the figure to the right). The data may pass through an operational data store for additional operations before they are used in the data warehouses for reporting. The volumes of detailed data already exist in Banner and other transactional database systems inside Rensselaer. A central part separation of this data will be imported into the data warehouse, prioritized by subject area (i.e. by business area), together with finance, research, contracts and grants, staffing analysis, alumni, etc.

A fundamental maxim of the data warehouse is that the imported data is together read-only and non-volatile. As the sum quantity of data within the data warehouse grows, the value of the data increases and allowing a user to perform the longer-term analysis of the data. In today's extremely aggressive business climate, initiate high quality decisions can be either the choice of surviving or thriving. The high risk or high arrival management of the Data Warehouses is a comprehensive undertaking, since the confront of the unexpected growth of high volumes of data can be unsafe in terms of cost efficiency and security manners. As a result, the Information Technologies such as Data warehouses can fall short and be a source of losses and concerns to organizations if not strategically planned. The Data Warehouse market has grown. Effortlessly, organizations are trying to create a competitive edge through leveraging their source of data in decision making for strategic intelligence purposes. A data warehouse is a query able source of highly organized cross functional data for the intention of enhancing problem identification and persuading critical management decision needs Simply put, as McFadden stated: "the Data Warehouse is a database that is optimized for decision support"; that explains the extensive acquisitions of these centralized data-driven repositories as basis to serve the need for highly integrated enterprise-wide information. However, organizations are eager to cut down the negative impacts of these huge IT investments, and therefore keen to measure the illusive factors behind successful information systems.

2. Evolution in organization use

These expressions refer to the level of complexity of a data warehouse are the following:

- **Offline operational data warehouse**
  - Data warehouses in this stage of evolution are updated on a regular time cycle (usually daily, weekly or monthly) from the operational systems and the data is stored in an integrated reporting-oriented data
- **Offline data warehouse**
  - Data warehouses at this stage are updated from data in the operational systems on a regular basis and the data warehouse data are stored in a data structure designed to facilitate reporting.
- **On time data warehouse**
  - Online Integrated Data Warehousing represent the real time Data warehouses stage data in the warehouse is updated for every transaction performed on the source data

- **Integrated data warehouse**
  - These data warehouses assemble data from different areas of big business, so users can look up the in sequence they need across other systems

3. Data Warehouse and Business Intelligence

The data warehouses have been at the forefront of information technology applications as a way for organizations to effectively use digital information for business planning and decision making. As researchers, we no doubt will encounter the data warehouse occurrence; hence, the considerate of data warehouse system architecture is or will be significant in roles and responsibilities of information management. A data warehouses is considered one of the most powerful decision support and business intelligence technologies that have emerged in the last decade. On the other hand, the realization of data warehouses benefits by business organizations has been below expectations. Therefore, this study focuses on two aspects: first, it discusses the role and value of data warehouses as an aspect or driver for business intelligence, and secondly its critically analyzing both organizational and technological issues affecting the process of leveraging data warehouse success for strategic oriented purposes.

The Data warehouse is a repository of an organization's electronically stored data, they are designed to facilitate reporting and analysis. However, the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary are also considered essential components of a data warehousing system. Many references to data warehousing use this broader context. Thus, an expanded definition for data warehousing includes business intelligence tools. In essence, the data warehousing concept was intended to provide an architectural model for the flow of data from operational systems to decision making environments. The Data warehouses are computer based information systems that are home for "secondhand" data that originated from either another application or from an external system or source.

The data warehouses is subject-oriented, integrated, non-volatile, and time variant, non-updatable collection of data to support management decision-making processes and business intelligence. The Data Warehouse contains cleaned, aggregated, consolidated large volumes of data that is accumulated to support multidimensional analysis. the data warehouse is: "Subject-oriented: The data in the data warehouse is organized so that all the data elements relating to the same real-world event or object are linked together; Time-variant: The changes to the data are tracked and recorded so that reports can be produced showing changes over time; Non-volatile: Data is never over-written or deleted - once committed, the data is static, read-only, and retained for future reporting; Integrated: The data warehouse contains data from most or all of an organization's operational systems and this data is made consistent".

Table 1. *Showing Characteristics of Data in Data Warehouse*

Characteristics of Data	**Brief description**
Subject-oriented	Data are grouped by subjects. For example, the data on customers are grouped and Stored as an consistent set.
Integrated	Data are stored in a globally dependable format. This implies purification the data so That data have consistent naming convention and physical attributes.
Time-Variant	Data captured are for long-term use often 5-10 years. So they are captured in a sequence of snapshots.
Non-volatile	Once data at a exacting time, say t1, are captured and stored, their attributes are Preserved.

on the other hand, after considering the various attributes and concepts of data warehousing systems, a broad definition of a data warehouse can be the following: A data warehouse is a structured extensible environment designed for the analysis of non-volatile data, logically and physically transformed from multiple source applications to align with business applications, updated and maintained for a long time period, and summarized for quick analysis. A data warehouse is a data repository which is relevant to the management of an organization and from which the needed information and knowledge to effectively manage the organization are emerged.

3.1 Important Reasons for Execution of Data Warehouses

A large diversity of substantial and intangible benefits can be gained from data warehouses applications. Initially, Data warehousing is viewed as a way by which business organization could solve the problems associated to their independently legacy systems which often contains imprecise, duplicate, and dissimilar data about the same entity . The data warehouses technology can help managers make more effective decisions by providing them with suitable information which is fundamentally different from the type of information that businesses use in their day to day operations .

Figure 1. *Showing the Data warehouses Benefits*

The data warehouses have meant to support managers with answers to important business questions that require analytics such as pivoting, drill-downs, roll-ups, aggregations and data slicing and dicing the data warehouses allows a business organization to manipulate a great deal of data in ways that are useful to it, such as: cleansing, organizing, describing, summarizing and storing large volumes of data to be transformed, analyzed and reported. Moreover, all levels of management decision-making processes are supported by data warehouses. the data warehouses could provide useful and valuable information and knowledge at a strategic, management control, knowledge and operational levels. data warehouses offers effective service data management and data delivery processes by expanding stovepipe knowledge into cross-functional integrative business intelligence argues that organizations could compete better by having the ability to learn from the past, to analyze current situations, and to predict the future scenarios.

The data warehousing provides the large scale Information Technology infrastructure for contemporary decision support and business intelligence. They argue that the main reasons behind that is the use of Multi-Dimensional Data Model (MDDM) or cubes, which organizes large data sets in ways that are meaningful to managers besides being relatively easy to query and analyze. It has been proved that MDDM is the most suitable for many analytical processes such as data mining, OLAP, and dashboards that used to analyze data from different angles and distilling it into actionable information run over data warehouse. Its provides a foundation for IS/IT application development (i.e. ERP, CRM) which could provide organizations with strategic competitive advantages. Another potential benefit of data warehouses is that using a single data source reduces data inconsistency and redundancy and may facilitate business process re-engineering at business organizations. To Despite the argument that the desire to improve decision-making and business performance has been the fundamental business driver behind data warehousing is experts suggest that handling the pressure to comply with governmental regulations such as Sarbanes-Oxley Act and others external pressures which require a real-time disclosure about business operations is the main reason behind the current growth rate of such initiatives. Consequently, some of the benefits that a data warehouse provides are as the following:

- A data warehouse provides a common data model for all data of interest regardless of the data's source. This makes it easier to report and analyze information than it would be if multiple data models were used to retrieve information such as sales invoices, order receipts, general ledger charges, etc.
- The Prior to loading data into the data warehouse, inconsistencies are identified and resolved. This greatly simplifies reporting and analysis.
- The Information in the data warehouse is under the control of data warehouse users so that, even if the source system data is purged over time, the information in the warehouse can be stored safely for extended periods of time.
- The Data warehouses can work in conjunction with and, hence, enhance the value of operational business applications, notably customer relationship management systems.

4. Success Model of Information Systems

The success of information systems is behind the success of any organization. And because success can be assessed at various levels and from multidimensional perspectives, that explains the continuous emergence of the IS success models. early on attempts of portraying metrics contributing to information systems success have been conceptually frame worked by DeLone and Mclean, This literature-based initiation has been derived to redefine the fuzziness of information systems success by then, and for the need of a more comprehensive measurement appliance. for that reason, the critical understanding of the nature of IS success grasped attention for more consistent success metrics as researchers began to propose further reformulations and modifications for this widely accepted model within different therefore, synthesis of previous research on the IS success model resulted in a deeper understanding of the elusive definition of IS success that was the main purpose behind DeLone and McLean breakthrough. consequently, the motivation behind this study as well as other studies investigating the measures of IS success differently relates to what DeLone and McLean commented:

"this success model clearly needs further development and validation before it could serve as a basis for the selection of appropriate IS measures". And they themselves proposing an updated model (which is shown below) assure that.

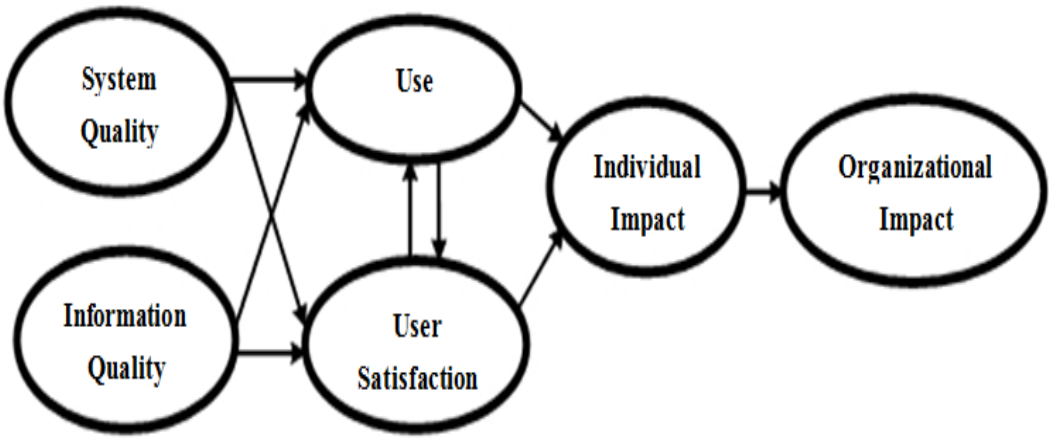

Figure 2.*Showing the DeLone and McLean IS Success Model*

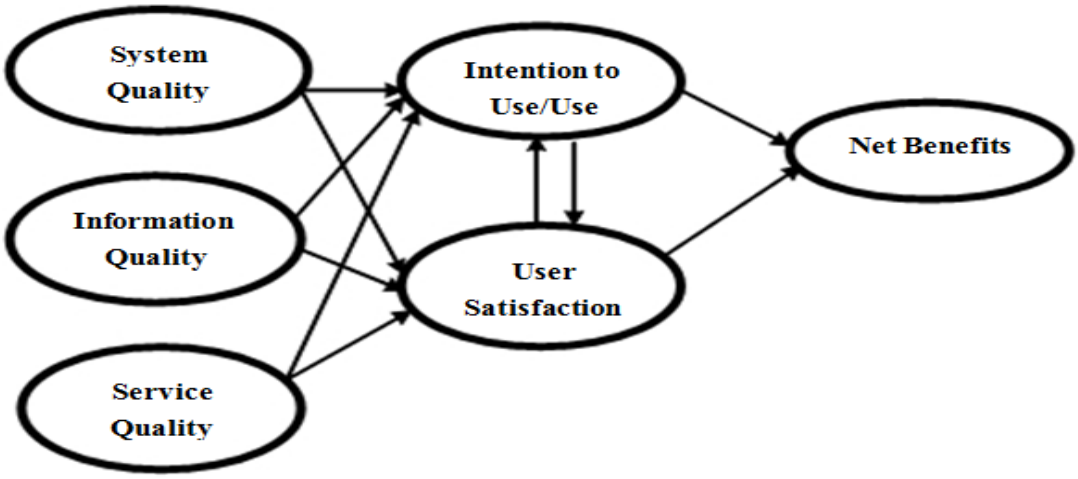

Figure 3. Shwoing the *DeLone and McLean's Updated IS Success Model*

The D&M model consists of measures of: System Quality, Information Quality, Service Quality, Intention to Use whether its a voluntary use or a compulsory one, the User Satisfaction, and Net Benefits which is referred to "net" due to the positive or negative possibility of outcomes. On the other hand, despite its wide acceptance, debates on the DeLone and McLean model addressed the relationships of the right hand side of the framework. For example, researchers critically reviewed on whether System Use is to be considered a appropriate IS success measure, nevertheless, DeLone and McLean explained the need to study this measure within a deeper sense, considering the extent, nature, appropriateness and quality of it. Other argued as well that the relationship between User Satisfaction and System Use is not causal, they suggest that the User Satisfaction causes System Use and not vice versa. Furthermore, this study recommends the D&M model as a base for further empirical and theoretical research through a combination of the technological and human elements as considerable measures to success and tends to evaluate that more thoroughly.

5. Proposing a Data Warehouse System Success (DWSS) Framework

in reality, the weight of this research comes from the increased importance of the data warehouses due to the enormous volumes of unmanaged data faced by organizations nowadays. Furthermore, areas studied by this research have been narrowly examined before, as data warehouses systems receive a great deal of attention, yet many questions remain unexplored. Scarce literature concentrated on evaluating data warehouses systems in the developing countries in terms of measuring and evaluating their success. Even though researchers did put lots of effort into finding the most comprehensive IS success framework, there is still a call for building the most compatible one, that not just supports what exists in literature, but also reunites the extant models of IS awareness, adoption, acceptance and success. The exemplified model of this research aims to over hall the gaps of the missing technical, managerial and functional aspects of the traditional information systems success models in a way that revitalizes the data warehouses success model as a whole. From a holistic point of view, the researcher differentiates this work by building up a comprehensive Organizational/Functional model.

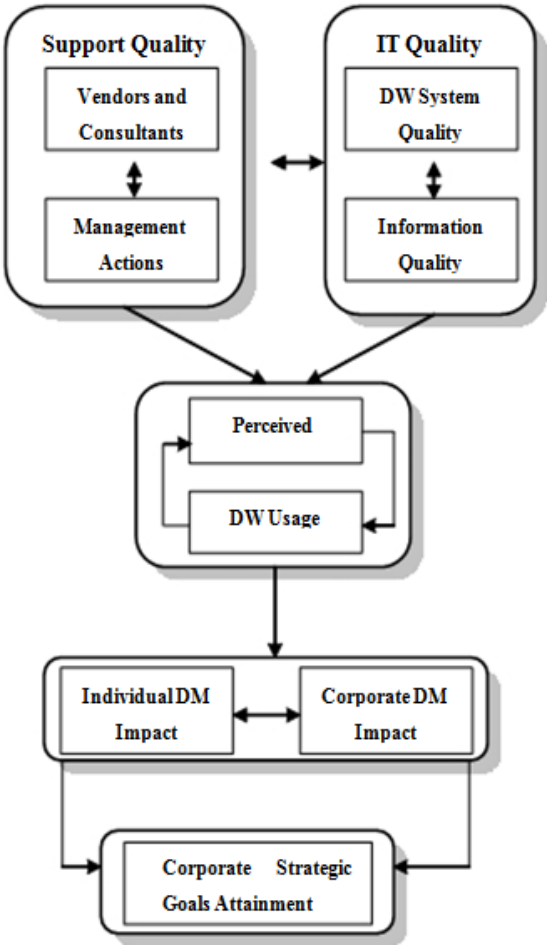

Figure 4. *Showing the data warehouses Success Framework*

The D&M success model has proposed causal relationships of metrics measuring success; however, it lacks the understanding of the importance of some supportive measures related to the technology itself, as well as the users of this system, such as actions held by the organization. As information systems are described as the interaction between people, processes and organizations, there is a need to combine what so called pre-implementation factors with the post implementation ones. The framework of this research illustrates that through the following interrelated levels: Level 1: "data warehouses Success Inputs" is divided into two categories; Support Quality: services and support offered by external entities (vendors and consultants) as well as the internal ones (management); Technology Quality: measures related to the technology itself such as the characteristics of the system and the information it captures (data, software, hardware). Level 2 demonstrates the "data warehouses Use": issues of the usage of the system and the perceived utility out of it. Level 3 exemplifies the factors augmenting "BI" such as individual DM impact that leads to corporate data warehouses in turn; these two measures are enhanced throughout the satisfaction of the data warehouses users. At last but not least, the "data warehouses success outputs" in Level 4 characterized by the success of all the above levels in reaching out to the overall strategic goals and attaining them as effectively and efficiently as possible.

6. Discussion

The Creating of a data warehouses has itself proved to be not easy and challenging, and it is extremely perceived as high-risk or high-return initiatives. The researcher analysis reveals that even though agreement in the information system literature on the significance of data warehouses to an organization success through attractive its decision-making quality, the achievement of such industry intelligence based on it is still poorly proved empirically. Furthermore and even though the wide variety of motivators mentioned in the IS literature for mounting data warehouses complying with the governmental regulations is the most conceivable reason for which organizations are building their data warehouses. data warehouses is highly recognized as an infrastructure; many applications can run over it such as CRM and DSS systems. On the other hand, many techniques, such as data mining, OLAP and dashboards have been rising to prominence to extract business intelligence from data warehouses. Furthermore, data warehouses meant to be used by managers since they support decision-making process. Nevertheless, these techniques are still not very effective and are highly perceived as technically oriented by the end-users. However, a data warehouse has experienced relatively high failure rates and its spread and/or use has been to some extent limited. Perhaps due to the facts that designing and developing a data warehouses is a risky, costly and complex process. It requires a huge amount of money as an investment, spans over years, and needs a wide variety of technical and managerial skills. Generally speaking, technology is shaped by its social contexts. Hence, their consistent interaction is the key determinant of data warehouses success.

7. Conclusions

This study offers future implications for hypothesis and practice. As of the theory perspective, the research structure has attributed that the measures of success originated by DeLone and McLean are not sufficient for revitalizing the success of data warehouses. The framework test what previous research was deficient in and that is bearing in mind IS implementation factors as critical as the traditional IS success measures. From the practical perspective, this research shows the importance of not neglecting the IS implementation factors in assessing and measuring its success, its embodies and proves that no single IS can be successful and sustain this success without the continuous involvement of other parties rather than users of the system. Thus, data warehouses project teams should deliberately and sensibly address the ongoing data warehouses system, and ensure high quality characteristics, and this can't be achievable without the presence of top management, consultancy, vendors, etc. In sum, this research underscores these points and highlights the importance of further model enhancements and justifications in the developing countries which still remains high on the researcher's agenda, as the model is tested through different stages on different time scales.

To remain high on the future agenda is that the future framework could be modified to serve up as a contingency model in future research, as no single proposal for success is guaranteed. A future framework that would distinguish situation specific factors for each information system and build the ideal model upon that, taking into consideration external variables along with the external ones (i.e. culture, policies, regulations).

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