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BI as IA Tool

"Leading organisations are investing in managing information and developing predictive insights to drive sustainable business results. These companies have become masters in Performance Management - going beyond mere users of business intelligence to become the "Intelligent Enterprises." [1]

Introduction

Business Intelligence (BI) is defined as "computer-based techniques used in spotting, digging-out and analyzing 'hard' business such as sales revenue by products or departments or associated costs and incomes. Objectives of a BI exercise include (1) understanding a firm's internal and external strengths and weaknesses, (2) understanding the relationship between different data for better decision making, (3) detection of opportunities for innovation, and (4) cost reduction and optimal deployment of resources"[2]. The objectives of the BI stated here would sound extremely familiar for Internal Auditors (IA), whose objectives are in line with these, except that they additionally focus on internal controls. Does this mean that the BI is a tool for IA? This paper attempts to examine this.

The Institute of Internal Auditors (IIA) defines "Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organisation's operations. It helps an organisation accomplish its objectives, by bringing in a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control and governance processes"[3]. The internal audit makes use of data of the client organisation and in order to evaluate and improve the effectiveness of risk management, control and governance processes; and for this purpose depend heavily on the database of the client organisation. Is the database always congenial to the use of the Internal Audit team? Is the database effective and efficient for the evaluation of the risk, control and governance?

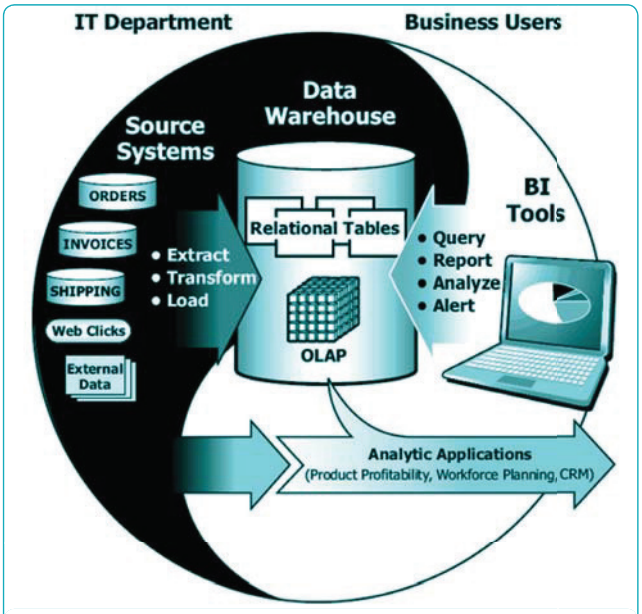
This paper attempts to explore the role of BI as an effective tool for Internal Audit.

The Business Intelligence Systems

Components of BI Systems

The BI systems are essentially made of three components:

- **Source Systems:** These are the hardcore transaction based systems where data is captured while the organisation does its business. The data is generated from functional areas like accounting, sales, production, marketing, human resources, etc. These are stored in the organisation's database. The source systems could be part of ERP or residing in distributed functionally with various departments who use their own software/database.



Components of BI Architecture[4]

1. Davenport, Thomas, January 2006, Harvard Business Review
2. "BusinessDictionary.com". Retrieved 02 September 2010
3. http://www.theiia.org/guidance/standards-and-guidance/ippf/definition-of-internal-auditing/Retrieved on 02 September 2010
4. Howson, Cindi,2007, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill

- **Data Warehouse:** This is another database specifically created taking into account the decision or reporting requirements. For every organisation, an exclusive data warehouse is created. This warehouse depends upon both the software and the user requirements. The objective of this data warehouse is to enable specifically required and designed reports for the need of users.

- **BI Tools:** These are the slicing and dicing tools that generate tailor-made report and analysis. The BI tools make use of data mining techniques and modeling software in order to understand the data behaviour and relationships.

Working of BI systems

There are several ways to look at the components of a BI system. The following one is a simple step-by-step approach to understanding how a BI system is built up and what it does.

- **Data warehouse development and administration:** Based on the requirements of the Management reporting and the data base architecture of the existing functional systems, specific data warehouse is developed.

- **Data mining:** The information requirements dictate the way the data are to be mined.

- **Data queries and report writing:** Queries are written and stored in the data warehouse and this populates the report structure on a periodic basis.

- **Data analytics and simulations:** This is another aspect of the data mining. Predictive analysis is done based on requirements and situation.

- **Benchmarking of business performance:** This is often done to make comparison of performance between organisations or within divisions/units within an organisation.

- **Dashboards:** These are final representation of the KPI, generally in a visually attractive form in order to support decision making.

- **Decision support systems:** Any other supportive decision support reports are also generated depending on the requirements.

Thus BI systems help the users generate reports and KPI as per their requirements. However, the requirements have to be planned properly and the relationships between the data have to be defined properly.

BI gaps for IA

An Internal Auditor, among other functions, looks at transactions which are recorded in the source systems. The data warehouse that is created as a sub-set of the source systems' database is based generally on the reporting requirements of the Management and Executives. This is where the requirements of IA have to be taken care. In most of the data warehouses this requirement is not taken care of and the IA has to use his tools and techniques from outside the system. In fact, it may be necessary that while constructing a data warehouse, the Internal Auditor be consulted. The BI tools for query and reporting or for analysis and alerting are built with the operations in mind and not control in view. Here again the IA's requirements are generally not considered. The independence and objectivity as contemplated in the Attribute Standard 1100 as contemplated by IPPF[5] can be achieved if these gaps are properly addressed.

BI Tools and Internal Audit

BI Tools

Data warehousing, online analytical processing and data mining are some of the tools in the IT application to large scale processing and analysis of data. These tools are extremely useful for an Internal Audit professional. Very effective and efficient internal audit can be done using these BI tools. Some of the essential details in this regard are discussed.

Data Warehousing

Data warehouse is a repository of subjectively selected and adapted operational data, which can successfully answer any ad hoc, complex, statistical or analytical queries. Basics of data warehousing design and management are:

- **Data warehouse architectures:** the way the data are related and arranged. The understanding of this will enable the IA get total grip of transaction processing.

- **Data marts and data stores:** These are sub-sets of the data warehouse. Since the Internal Audit requirements are very specific and may not be as per operational requirements, specific data marts could be built for the purpose of Internal Audit requirements.

- **Data structures and data flow:** An understanding of this by the IA will make the audit trail easy and evaluation of control systems will be very efficient.

- **Dimensional modeling:** This can be used for audit in depth.

5. IPPF – International Professional Practices Framework of the Institute of Internal Auditors

- **Extract, clean, conform and deliver:** These are excellent methods with which analysis of the data can be made as per the requirements of the IA. The IA will be in a position to identify any wild or non-conforming transactions.

- **Server management tools to package, backup and restore:** This gives the IA the insight into DR or BCP routines.

- **Database server activity monitoring and performance optimization:** Complete log of access and authority digression, intrusion, etc. can be assessed by IA.

OLAP

On-Line Analytical Processing (OLAP) is a category of software technology that enables analysts, managers and executives to gain insight into data through fast, consistent, interactive access to a wide variety of possible views of information that has been transformed from raw data to reflect the real dimensionality of the enterprise as understood by the user.

OLAP functionality is characterized by dynamic multi-dimensional analysis of consolidated enterprise data supporting end user analytical and navigational activities including:

- Calculations and modeling applied across dimensions, through hierarchies and/or across members

- Trend analysis over sequential time periods

- Slicing subsets for on-screen viewing

- Drill-down to deeper levels of consolidation

- Reach-through to underlying detail data

- Rotation to new dimensional comparisons in the viewing area

All the above features help IA go into depths of the transaction data, analyzing them in the way required and hence from establishing of audit trail the IA will be able to undertake benchmark data against periods and perform inter and intra firm analyses.

Data Mining

Data mining: the extraction of predictive information from large databases.

- Data trend, connection and behavior pattern analysis

- Data quality

- Data mining tools

- Predictive and business analytics

- Descriptive and decision models

- Statistical techniques and algorithms

The data mining capability is yet to be completely used by the IA community. The data mining becomes extremely important when handling large amount of data. Some of the tools available help in unearthing even remote relationship between variables. Some of the approaches in this regard are the use of: On-Line Analytical Processing (OLAP), Multidimensional/ hyper cubes, OLAP operations: Slice, Dice, Drill Down/ Up, Roll-up, Pivot. Data mining supports in addressing Risk Management (2120) and Control of the Performance Standards (2130).

Business Intelligence as a concept and practice has come to stay. Increasingly organisations are using BI along with ERP or distributed computing in order to make their reporting efficient and effective. The IA who constantly views the organisational data from control and compliance perspectives requires making use of appropriate technology to complement the Management of client organisations in upholding the functions of IA. The Continuing Professional Development (1230) and Quality Assurance and Improvement Programme of the Attribute Standards (1330) can be fully addressed by providing periodic updates to the Internal Auditors in some of the key areas. Hence, there is strong case today for the IA to build skills to get the best out of BI systems, by addressing the following:

- Knowledge of database systems and data warehousing technologies

- Ability to manage database system integration, implementation and testing

- Ability to manage relational databases and create complex reports

- Knowledge and ability to implement data and information policies, security requirements and government regulations.

About the Author:

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