Executive Information Systems Development Lifecycle

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The main objective of EIS (Executive Information Systems) is to provide in real time representative informations to the high-level management. EIS is a subset of a class of technology solutions that also are referred to in the industry as Business Intelligence (BI) software. EIS provide solutions to support strategic activities such as goal setting, planning and forecasting and tracking performance. This paper presents the concept and the arhitecture of EIS and also the criteria for evaluating Executive Information Systems.
***Keywords**: Business Intelligence (BI), EIS, DSS, data integration, Data Warehouse, OLAP (On-Line Analytical Processing), Data Mining.*

Introduction

EIS is a subset of a class of technology solutions that also are referred to in the industry as business intelligence (BI) software. The main objective of EIS (Executive Information Systems) is to provide in real time representative informations to the high-level management, to support strategic activities such as goal setting, planning and forecasting, and also tracking performance.

Another objective of these systems is to gather, analyze, and integrate internal and external data into dynamic profiles of key performance indicators. Based on each executive's information needs, EIS can access both historical and real-time data through ad-hoc queries. EIS users can manage and manipulate multidimensional or cube-like databases. In essence, managers at every level can have a customized view that extracts information from disparate sources and summarizes it into meaningful indicators.

Many organizations use modern ERP systems for transaction processing and reporting. Information from applications within a ERP system is managed by a relational software database. Executives need informations for strategic and tactical decision that often requires the combination of data from ERP and non-ERP application sources.

EIS Lifecycle

There are some major differencies between OLTP sytems lifecycle and EIS lifecycle which depends on executive systems characteristics, but the same traditional techniques and stages are used for development: justification, project planning, analysis, design, construction, deployment (fig. 1).

In these stages there are many steps used for modelling EIS characteristics such as:

- EIS are oriented o business oportunities rather than transactional needs;
- EIS have to implement strategical decisions, not only departamental or operational decisions;
- EIS analysis is focused on business needs. This stage is the most important of the process;
- Development process is cyclical, focused on evaluation and improvement of successive versions, not only building and major delivering of a singular an final version.

EIS lifecycle is divided in 6 stages and 16 steps as following:

Stage 1: Justification

Step 1: Business case assesment - business needs and oportunities are identified and then the team proposes an initial solution justified by costs and benefits. A preliminary report is built-up.

Stage 2: Planning

Step 2: Enterprise infrastructure evaluation – this step estimates and values organization's capabilities to sustain and accomplish the

EIS project in terms of: infrastructure, components, devices, network and aslo future needs of these equipments. In this step is built organization's infrastructure.

Step 3: Project planning – EIS involves dynamical project planning which leeds to rapid changes in technology, organization and business needs, human resources and implementing team. The project plan is detailed, progresiv, each stage and step has cheking points and test documents and reports.

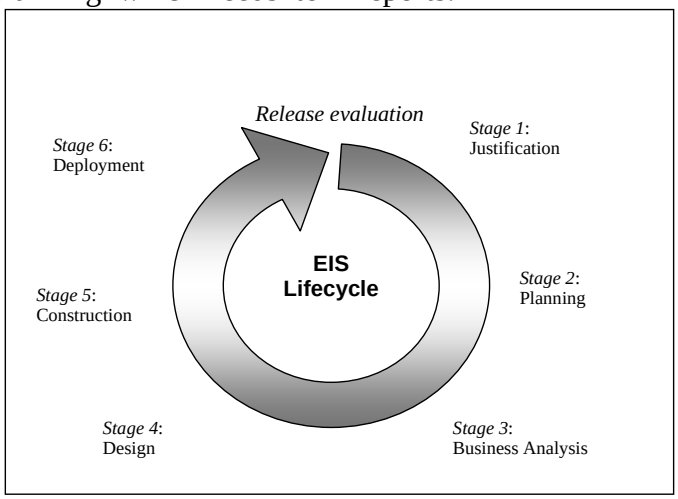

Fig 1. EIS development lifecycle

Stage 3: Business analysis

Step 4: Defining business needs and project requirements – interviews and meetings are organized with executives and managers and business needs and requirements are identified and defined. An initial solution is proposed, discussed and adopted.

Step 5: Data analysis – this step involves identifing and designing data sources, designing detailed ER diagrams with attributes and references between data. The logical model is designed.

Step 6: Application prototyping – An initial prototype is built and tested in order to validate business needs. After testing results are estimated and reported with pozitive and negative aspects.

Step 7: Metadata analysis – metadata are designed and data sources are mapped on metadata structure. CASE tools are used for designing and mapping process.

Stage 4: System design

Step 8: Data design – in this step the logical model is detailed and refined and physical model is designed. The data model for processing and storage are selected from the following options: relational, object oriented and multidimensional model.

Step 9: Designing ETL process (extract / transform / load) – this step is the most difficult in the entire cycle and depends on quality of data sources. It is reccomended that the proces should be built in one environment which integrate all modules of the organization and not separately, on each department. The rule should be: *share one coordinated ETL process*.

Step 10: Metadata repository design – if it is used a pre-defined solution for metadata repository then in this step it is adjusted for project requirements, otherwise a metadata repository is designed in terms of metadata logical model depening on data model: relational, object oriented or multidimensional.

Stage 5: Construction

Step 11: ETL devepolment – filtering tools, procedures, operators are used for building ETL process. Data filtering and transformations depends on data sources quality. These sources are different like: files, databases, e-mail, internet, unconventional sources.

Step 12: Application development – after prototype validation, building the final aplication may be a simple process. Procedures templates and interfaces are re-built, user rigths and priviledges are granted.

Step 13: Data Mining – executive systems have to implement data mining capabilities in

order to succed and accomplish managers requirements. This step involves testing algorithms, data mining techniques like clustering, predictive and organizing methods.

Step 14: Developing metadata repository – if the metadata repository has to be built-up then metadata dictionary and data access interfaces are developed.

Stage 6: System deployment

Step 15: Implementation – it is the delivering process in which the develoment team organize training sessions for managers, final documentatios and technical support are prepared, data loading process and application setup is accomplished

Step 16: Release evaluation – after system implementation preliminary conclusions are made, costs are estimated and the development team build a final report in which are describe system performaces and also some parts which have to be improved or re-built-up.

Criteria for Evaluating EIS

Developing EIS systems involves time, high-costs and human resources, efforts and an EIS must be capable to provide in real time representative informations to the executive management.

Deploying EIS involves many risks: system design, data quality, and technology obsolescence. System design risks stem from poor conceptualization of an enterprise's true business needs before the technology is deployed. Data quality risks relate primarily to whether or not data has been properly cleansed. Technology obsolescence refers to the failure on the part of the vendor to anticipate new technologies.

Large budgets and strategic information are involve in deploying EIS systems – this is the reason to establish rigorous criteria for evaluating EIS systems. These criteria are discussed below.

Decisions based on business process

EIS should not be viewed only as a data repository or a large set of data. Instead, system's implementation should be concern on conceptualizing new data models, processes, and indicators that form the content of EIS. EIS should provide extensive understanding of the benchmarks that are useful to evaluate business processes.

Performance

This feature typically refers to the response time that a system provides to its users. Most responses should range from a few seconds to a maximum of 30 seconds for routine queries. Response times depend on the complexity of the database and the queries being requested.

Flexibility and scalability

Flexibility determines whether an EIS solution can continually adapt to changing business conditions after the system has been delivered. An EIS should be able to accommodate changes in any type of business process and functions like personnel, services, and processes, as well as new mandates, laws, and regulations requiring the capture of different types of data.

An EIS should be expandable to accommodate data growth and changes to organizational structure. EIS also should allow contributed content to grow without a slowdown in performance.

Integration

Integration involves two types of issues: *data integration* and *system integration.* Data integration is the ability to acces data from many different type of systems. An EIS will be particularly effective if it can overcome the challenge of information fragmentation, allowing executives to measure features of business processes that involve information from inside and outside of the organization..

System integration refers to two things: the ability to extent the EIS software with new capabilities and modules and the system's ability to coexist with other enterprise solutions.

Friendly user interface

An EIS should be designed to allow managers who are not trained to use query languages and advanced technologies, a fast, easy, and understandable way to navigate into data and identify trends and patterns. EIS should permit the user interface to

accommodate different degrees of technical knowledge.

Conclusions

EIS systems have a powerful impact on strategic decisions quality to reduce the time for making decisions. EIS must have the ability to allow managers to view data in different perspective, to drill-down and roll-up to aggregate levels, to navigate and on-line query data sets in order to discover new factors that affect business process and also to anticipate and forecast chenges inside and outside the organization. EIS improve the quality of management in organization through new type of technology and techniques for extracting, transforming, processing and presenting data in order to provide strategic information.

References

1.Kaniclides, A., Kimble, C. – "A Development Framework for Executive Information Systems", Proceedings of GRONICS '95, Groningen, The Netherlands, T LOURENS, Feb 1995

2.Liang, Leo Yonghong; Miranda, Rowan – "Dashboards and Scorecards: Executive Information Systems for the Public Sector", Government Finance Review, Dec 2001

3.Moss L., Atre S. – "Business Intelligence Roadmap – The complete project lifecycle for decision-support applications", Addison-Wesley, 2004

4.Wheeler, Frederick P. – "The Potential for Executive Information Systems to Support the Management of Business Reconfiguration", Journal of Financial Information Systems, 1996

5.*** Internet resources:
http://www.sdmagazine.com
http://www.intelligenenterprise.com