

# WHITE PAPER

## BUSINESS INTELLIGENCE

### HOW TO BUILD SUCCESSFUL BI STRATEGY

#### SUMMARY

This paper focuses on building a BI strategy that aligns with the enterprise goals, improves knowledge management, advances business by making the best use of information, enables BI penetration into the business processes and helps enterprise with strategic, tactical and operational decision making. It discusses the essential components of BI strategy to enable the vision of driving better business performance by empowering all in the enterprise to be able to do their job effectively as a natural part of their daily work. It explains the steps to build the BI strategy that brings together the forces that drive business operations i.e. people, processes and technology in a collaborative environment and highlights the approach to enable successful adoption of BI to deliver true business value. BI is a very broad topic of study, however if you would like your business to succeed, it is extremely important to understand the factors that influence BI and learn how to design an effective BI strategy. This paper takes into account the fact that too often what's missing from BI is transformation of insight into action and thus failure to exploit the full potential of BI. It explains that building an effective BI strategy requires a conscious approach, a blending of enterprise resources to deliver a predictable, complete, consistent, reliable, and timely source of information to deliver on the promise of BI.

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## **1. Introduction: Why do you need BI Strategy?**

Gartner's 2008 CIO survey highlights that Business Intelligence (BI) is the top priority of CIOs. It is considered that BI can have a direct positive impact on business performance of an enterprise, dramatically improving the ability to accomplish the mission by making smarter decisions at every level of the business from corporate strategy to operational processes.<sup>1</sup>

If you are starting to build BI capabilities in your enterprise and you are not sure how to proceed, you aren't alone. It is a challenge to design a successful BI enterprise by selecting the right combination of people, processes and technology. To overcome this challenge you need to build an effective BI strategy, which is driven by business objectives, enables stakeholders with better decision making capabilities and helps enterprise achieve desired goals. It is common for an enterprise to build a BI strategy only to find it on the shelf later as it is not acceptable across the enterprise. Effective BI strategy should ensure that enterprise objectives, business strategy, investments and BI are aligned. Enterprises that are able to connect BI to overall enterprise objectives become intelligent enterprises.

It requires a conscious approach, a blending of enterprise resources to deliver a complete, consistent and reliable source of information to fulfill the promise of BI. A BI initiative is of no use if it is not driven by the objectives of the enterprise. Implementing a BI solution should help enterprise in achieving the objective of advancing business by making the best use of information. It sounds easy but in very few places this goal is attained. It must be ensured that business requirements and enterprise objectives drive the iterations. You must establish strategy before bringing technology or techniques in the conversation.

Business intelligence is a very broad topic of study, however if you would like your business to succeed, it is extremely important to understand the factors that influence BI and learn how to design an effective BI strategy. Prior to starting work on BI strategy, you must learn and document your overall business objectives to help formulate BI vision for the growth of business. After documenting the initial list of key objectives, you should work with the key stakeholders to confirm the validity of items on the list and their prioritization. This will ensure that you start building your BI strategy with a proper foundation aligned with your business and with the buy-in from stakeholders.

## **2. Scope of BI Strategy - Driven by Business Objectives**

Scope of BI should include making the best use of information for strategic, tactical and operational needs. Your purpose in building BI strategy is to help business with long term planning, help middle management with tactical reporting and help operations with day to day decision making to run the business efficiently. BI is all about providing people with the information they need to do their jobs more effectively. A wide range of BI services need to be provided to meet a wide range of requirements. Scope of BI Strategy should be determined by the business drivers and business goals. Scope should always account for the changing business requirements to keep the BI strategy aligned with business.

You should not limit your ability to apply the principles with a restrictive BI strategy. BI strategy should include a broad set of processes, technologies and stakeholders for collecting, integrating, accessing and analyzing information for the purpose of helping enterprise make better business decisions. BI solutions should enable users to be able to quickly adapt to new business requirements and evolving sources of information. Overall BI vision should be planned in

advance of any iteration being implemented. It is vital to establish a BI vision to ensure that implementation of specific components fits in the overall BI strategy. BI strategy should state and document the needs as identified by the stakeholders, highlighting how BI fits into the broader enterprise vision. BI strategy should take into consideration appropriate framework, methodology, processes, governance, systems and technology to deliver value that aligns with the business objectives and priorities.

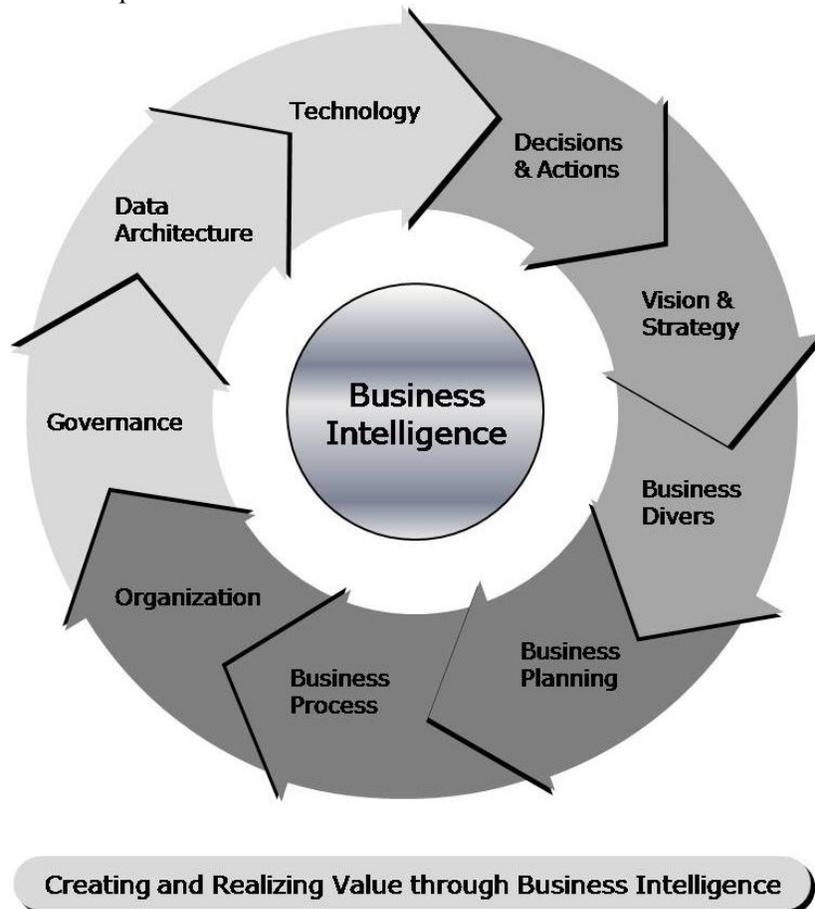


Figure 1 – BI aligning with enterprise strategy to deliver value

### 3. Dos and Don'ts - Proven Practices

There are certain proven practices that have been widely accepted in the BI arena, you should follow these practices. These can serve as broad guidelines in terms of things to do and things to avoid for ensuring success of the BI initiative.

Steps to ensure success of the BI strategy

- Create a business case and outline the expected benefits
- Obtain buy-in from stakeholders especially the senior executives
- Have an enterprise-wide perspective
- Establish criteria for success
- Treat information as an asset
- Adopt best practices and standards
- Setup change management procedures

- BI strategy should align with the overall IT strategy and enterprise goals
- Do a current state, future state and gap analysis
- Think actionable and baby steps
- Establish governance body
- Use iterative implementation approach with parallel tracks
- Work with frameworks and adopt proven methodologies
- Assess BI readiness of the organization and identify related gaps and issues
- Document and analyze the constraints and assumptions
- Consider all BI components (see section ‘11. Essential Components of BI Strategy’ for details)

Potential pitfalls to avoid when designing the BI strategy

- Don’t fall into the trap of starting with a narrow vision. BI strategy needs to be holistic and prepared in the context of the wider BI definition.
- Don’t plan to use big bang implementation approach. It has been proven that iterative implementation works better for BI initiatives.
- Always remember that scope of BI is not limited to just selection and implementation of technology. Often mistake is made by BI architects to associate the BI initiatives to specific technology components such as implementing parallel processing database technology or building OLAP cubes or dimensional modeling.
- BI iterations should not be done in the haphazard manner. BI strategy document is the necessary roadmap that you should follow as you begin designing BI environment.
- Don’t just focus on data integration and state of the art BI tools. BI strategy should be comprehensive and it should incorporate much more than a data warehouse or BI tools.
- During warehouse centric planning, don’t lose sight of the broad vision to ensure the design of a successful enterprise-wide informational asset.
- Don’t adopt inflexible approach. BI strategy should be treated as a living artifact. It should be constantly tuned and adjusted to reflect the needs of your business.

#### **4. As-Is State Analysis**

Complete assessment of processes, technology and people in the current state has to be done as these will be critical to the success of any changes made to the current environment. You should discuss and document the current information systems, technology, processes and governance procedures being used. You should detail how your organization is currently utilizing BI, which should include a complete inventory of all platforms, technologies and tools being used to develop and deliver BI content. Current state should include current users, user profiles and how users have been using information. It should document current processes, structures for managing information. All of it put together will help you determine the viability of the options based on overall enterprise objectives.

As part of current state analysis you should gauge your current state of BI capabilities. You should determine how various technologies and governance procedures are being implemented. You can focus on how people are using the BI solutions after analyzing how BI capabilities are being leveraged. You can visualize if users are currently receiving information in a format that allows them to make the best use of BI resources. It also helps to determine how the users are consuming information. Another important aspect to look at is the existing governance procedures and processes for data management to ensure proper definition and quality of the data. These are all important questions to keep in mind when you are gathering and documenting your current state information.

Current state analysis helps you in highlighting the pain points, which makes it easier to address them. You should plan to do analysis of current BI maturity state. By documenting current BI Maturity model you enhance your capability to identify the problem areas, which helps you in coming up with solution definitions. It is also useful to determine the BI readiness of the enterprise. It is easy to fill in the gaps once you define the issues that need to be addressed and you have a clear vision of the overall objectives and the direction to get to the future state.

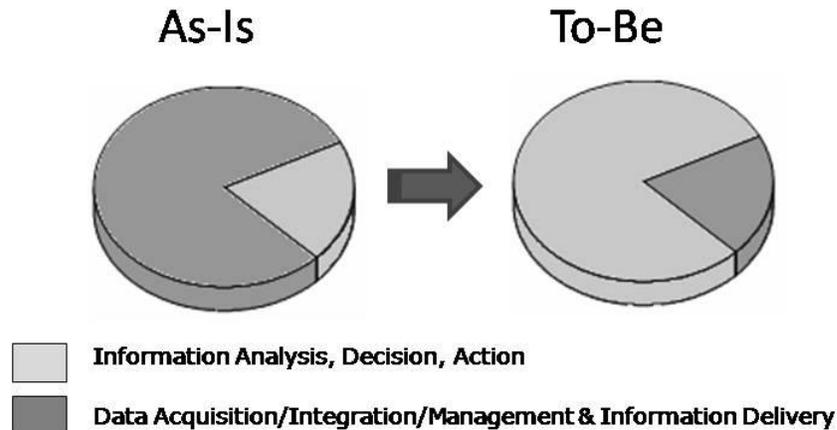


Figure 2 – Change of BI focus from current state to future state

## 5. To-Be State Analysis

After current state analysis you understand the BI environment that you have, now you must decide what you want your future environment to be in order to achieve the BI vision. In the current state analysis, you identified how stakeholders are currently accessing and using information. Now you have to determine the best approach for users to access and consume information. You should define how users will share information and knowledge in the target state and the kind of collaborative environment that will be made available to them for the best utilization of BI solutions. Use of multiple technologies and techniques could be needed to come up with the desired method of delivery and the best fit. Identifying business processes and key stakeholders is a must for this effort as these will be critical to obtain funding and to progress the project forward.

As part of the analysis you should review BI plans to confirm whether you are moving in the right direction. You should also assess the organizational readiness, enterprise ability to leverage BI to ensure success of the BI initiatives. Following the evaluation, you can begin to create a long-term program through recommended next steps for detailed planning and design. The target state should reflect the vision to combine BI with the areas of business process management, performance improvement, customer service, knowledge management, cross functional information exchange etc. Building on the BI driven initiatives provides opportunities for performance improvement and better business process management.

Assessment of imminent requirements, long term business needs should enable you to break down BI strategy work into multiple projects classified into phases. You must prioritize the objectives for efficient use of available BI resources. Prioritization of BI objectives also provides you and business with a better understanding of how the BI environment will take shape as you progress forward. Projects should be evaluated for their overall contribution to the BI strategy by

determining how a particular project helps you get a step closer to the BI strategic vision. For example, a project to build a performance measurement system for financials would align with the business strategy of effective utilization of funds. As you progress through the phases you can see the focus of projects transitioning from addressing the current requirements to the imminent and future needs.

## 6. Transformation Roadmap

According to the Ventana Research study, the biggest development challenges to BI are data-related issues such as assuring data quality (47 percent), supporting highly complex conceptual data models (36 percent) and supporting access to intra-day real-time data (34 percent).<sup>2</sup> Current and future state analysis should help you with building a transformation plan to bridge the gap between the current and future state. Transformation plan establishes the guidelines necessary for building the proposed BI structures and related technologies.

The sequence of implementation of core processes and data structures are laid out in this section. Transformation plan can start with a high level perspective, with detail being added to the plan as you progress forward. To transform from current to desired future state, plan should include actionable steps i.e. it should define a set of projects to be undertaken, establish governance and processes, set the conceptual, logical and physical architecture, establish the infrastructure outline, develop information delivery projects and incorporate information needs. When designing the transformation roadmap, you should take into account information needs of users, how users want to receive and consume the information.

In the transformation plan you can formalize how you plan to identify and prioritize BI iterations. Plan should account for the capacity, performance, data quality, data security, metadata control, data retention policies etc. You should also consider the BI implementation time frame, prioritization of individual BI projects and resource availability for BI centric projects. Broad policy outlines in transformation roadmap will help you when you get to the details. As an example, high level decisions made on data retention will impact data architecture such as partitioning of the data as well as technical architecture such as disk storage.

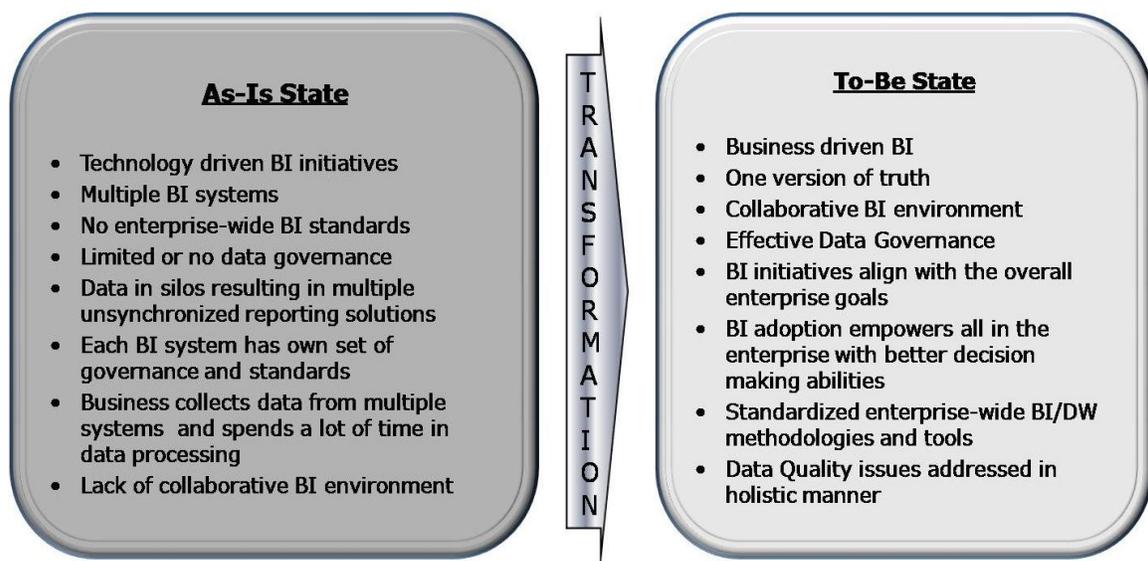


Figure 3 – Enable value by BI transformation

In the transformation plan you must outline high level process issues such as refresh rates, capacity plan, backup, recovery, archive, workflow and security. Again, you should address as many of these topics as possible even though no particular iteration of BI initiatives is being discussed. A component of the overall roadmap that is often overlooked is how iterations will be tested before rollout. Topics should include criteria for enterprise adherence and approval, criteria and plan for test data selection, capacity planning, scalability of the BI solutions, high level testing plans and overview of unit, integration, performance and user testing.

## 7. BI Framework

BI framework provides a broad overview of how different components of your BI strategy fit together to serve your entire BI vision. It brings together the forces that drive business operations: people, processes and technology in a collaborative environment. It highlights high level business drivers for the BI initiative, business need for BI and its link to broader enterprise strategy. Framework should begin by setting the business context and high level scope, overall objective, what is intended to be achieved, the intended enterprise-wide coverage of the BI strategy and criteria of success.

You should understand that a smart BI framework involves connecting together BI, business processes, collaborative applications and their underlying data stores. The framework further enhances the integration with business planning systems, supports knowledge management, business process, performance management technologies and users. BI strategy should have a comprehensive approach in describing the current and future behavior of the processes, technology, people and other components to ensure that they align with the goals and strategic direction of the enterprise. BI framework helps you in connecting these pieces together.

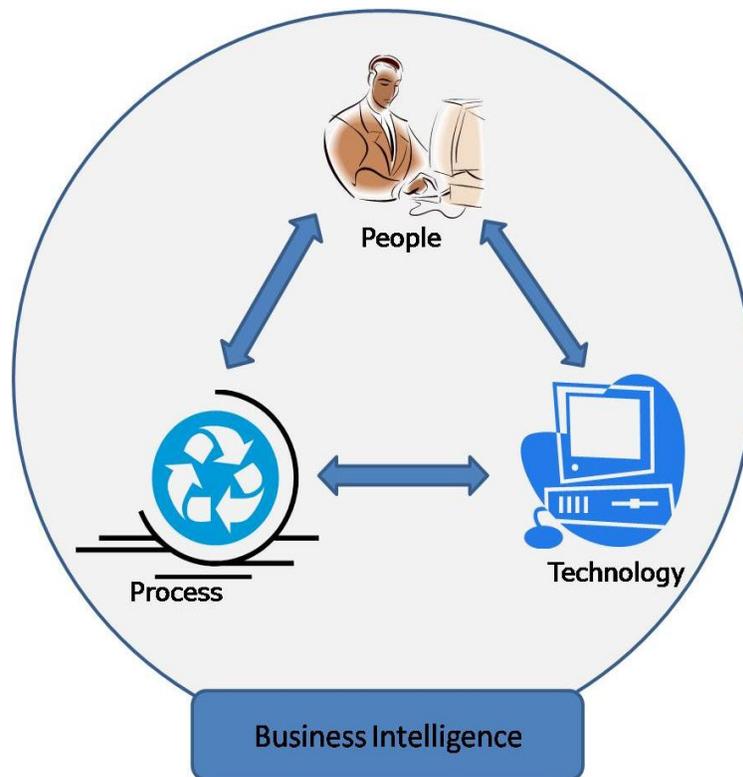


Figure 4 - BI using People, Process & Technology to enable value

BI framework brings together data governance, data architecture, technical architecture, data integration, data quality, end user information delivery, data security etc. to empower the BI initiatives. Framework should set standards that BI participants must adhere to. Framework should provide means to connect significant components that are part of your overall BI vision. Establishing BI competency center or center of excellence as part of framework will help you in integrating BI best practices with ongoing BI work and BI environment of the organization.

## 8. Vision to Empower ALL

You should outline how a BI initiative will help enterprise achieve strategic, tactical and operational goals. BI vision should be to help drive better business performance by enabling all decision makers essentially empowering all employees, customers, and external parties to be able to play their roles effectively as a result of the BI adoption. When laying out the BI strategy, you should have the vision to provide everyone with the ability to gain insight into business information to work on the strategic, tactical and operational levels. The idea should be to use BI to help all in the enterprise in making better informed decisions as a natural part of their daily work experience.

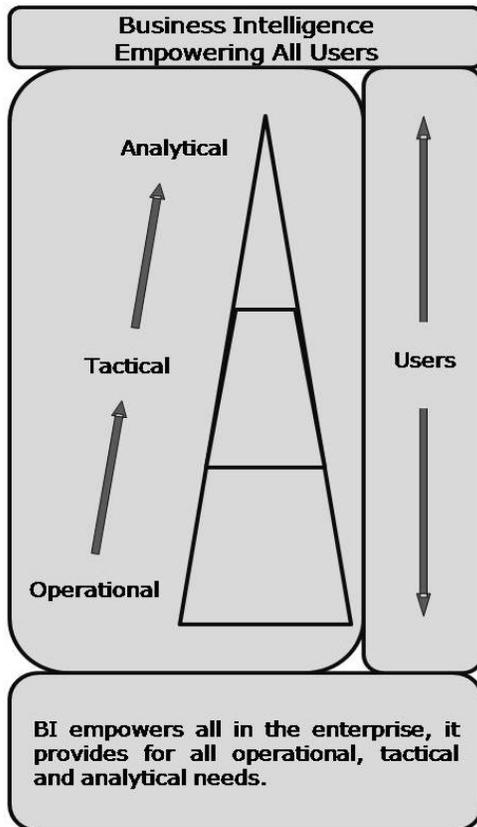


Figure 5 –BI enabling all in the enterprise

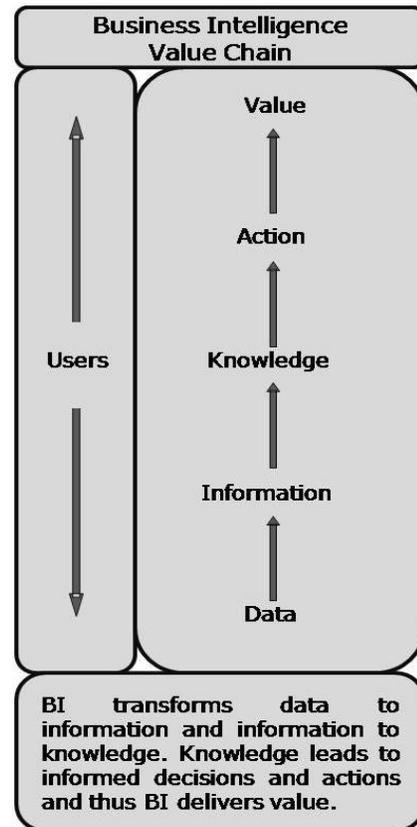


Figure 6 – BI value chain

BI strategy should aim to support the complete breadth of decision making ability in the enterprise. Strategic decisions deal with the long term planning, performed by top management, focus mostly on demographic, industry trends. These address broad issues to achieve general objectives. Strategic decisions are where BI traditionally has been implemented. Businesses today want more than just strategic insight from their BI implementations.

There is an expectation from BI to enable better execution of the tactical and operational decisions that enterprise makes numerous times per day through more effective use of information. An example of such a decision would be a product manager deciding about the discount schedule or making a pricing decision for a product. Tactical and operational decisions are the drivers for day-to-day management of the business at different levels. These decisions have smaller business impact when measured in silos as compared to strategic decisions. However when put together multiple tactical and operational decisions add up to account for a lot of value and can help significantly in driving better business. BI strategy should embody the approach to enable better decision making at all levels of the enterprise.

## **9. Implementation Approach - Think Big, Start Small, Deliver Value**

It has been proven that an iterative approach to implement BI vision works better than the approach of big-bang BI deployment. Iterations must be focused and well defined to address specific business requirements. At the same time, iterations should be assimilated into the long-term implementation of the BI enterprise. Iterations are driven by specific requirements but guided by the broader, enterprise-wide roadmap. You should try to develop an implementation vision for the project that could be built out in steps. It should be phased through multiple sub projects, each going through iterations.

BI implementation approach should be designed to be agile and adaptive so that the project implementations can be organized and managed effectively. Prioritization is the key in implementation. You should work with business to prioritize the iterations according to business needs leading to the value-based implementation plan. BI strategy should encourage parallel development tracks where multiple steps can be performed simultaneously and multiple activities within the steps can occur at the same time. You should make an effort to follow parallel development approach on various tracks of BI work such as for data integration (back end processing), reporting (front end information delivery), data governance (establishment of governance body, policy and processes) and metadata repository tracks (data navigation tool for information lineage, impact analysis and business definitions) keeping in mind the inter dependency of tracks.

## **10. BI Solution Adoption by Stakeholders**

True returns can only be achieved when the BI is adopted by the enterprise and it penetrates into the business processes. Too often what's missing from BI is moving from insight to action and therefore failing to exploit the potential of BI. Overall aim of a successful BI strategy is to help business with improved information management and better decision making. BI strategy should address the steps required for successful adoption of BI solution by stakeholders. Education and communication regarding BI initiatives is necessary to help your end users derive value from the BI environment. As the data is introduced in the BI environment, training sessions, data forums, and metadata need to be made available to the BI community. Be sure to offer good metadata (a data dictionary including definitions and data sources), business logic (tie the data to the business goal), key dimensions and metrics (including how to use them for best results), and data availability (when and where data can be found) to enable BI adoption.

Successful BI strategy aims to help the enterprise in leveraging the enterprise information assets effectively to gain competitive edge in the market. BI strategy document should highlight high level training programs, support organization, collaborative BI environment and socialization of

the BI solution. Objective is to provide enterprise with the improved analysis, planning, forecasting and decision making by all users. As part of BI strategy you should address cross functional business analysis and decision support environment. Creation of BI strategy provides an opportunity and a method to document and align BI investments to business objectives. This will also help you in determining the functional areas of your business that are being served well and the ones that need improvement. Always remember, the goal is to bring value to the business by empowering all stakeholders.

A plan to enable successful adoption of the BI solution is the key component of the BI strategy. You should create enterprise-wide processes for collection of data, transformation of data into information and knowledge. You should plan to support end users with education and communication. Establish cross functional support for the BI solutions at different levels in various functions of the enterprise. You should also plan for usage analysis to support and enhance the use of BI platform. Determination of usage patterns is critical to determine the success of your overall BI strategy as this will help you in determining the ROI to create and maintain the environment. The creation of a successful BI strategy that is widely accepted by users in the enterprise delivers true value.

## **11. Essential Components of BI Strategy**

There is often disagreement regarding the constituent components of the BI strategy but there are some topics that are widely agreed upon as essential components of BI strategy. What you ultimately include will be largely driven by the overall business goals, scope and objectives of your BI initiatives. You should describe core components when drafting your BI strategy to make it successful.

### **11.1 Business Context**

BI strategy should address how will it help enterprise achieve business objectives, how will it enable better decision making to enable better business performance and how will it lead to better process management in the enterprise. Keep in mind a successful BI strategy aligns with the enterprise goals, improves knowledge management, advances business by making the best use of information, enables BI penetration into the business processes and helps enterprise with strategic, tactical and operational decision making.

Always remember BI strategy and everything about it hinges completely upon business requirements. It is essential that BI strategy is aligned with the business strategy and goals. Business objectives, business drivers and business processes should drive the BI strategy to ensure the successful adoption of BI solutions. Driving BI strategy based on the inputs from business context ensures the successful alignment of business objectives, goals and processes with BI initiatives.

You should determine what business values are being delivered and what business needs are being addressed. Some examples of business objectives that should be addressed by BI strategy include how to increase customer loyalty, increase the number of customers, increase market share, plan product promotions, decide product and service bundles, analyze customer demographics to align business goals, determine customer profitability patterns etc. These are the end goals of BI strategy and not the BI tools and technologies being implemented. Keeping business context in the driver seat ensures that we don't start confusing *tool* with *solution* as we build the BI strategy.

## Business Intelligence Architecture

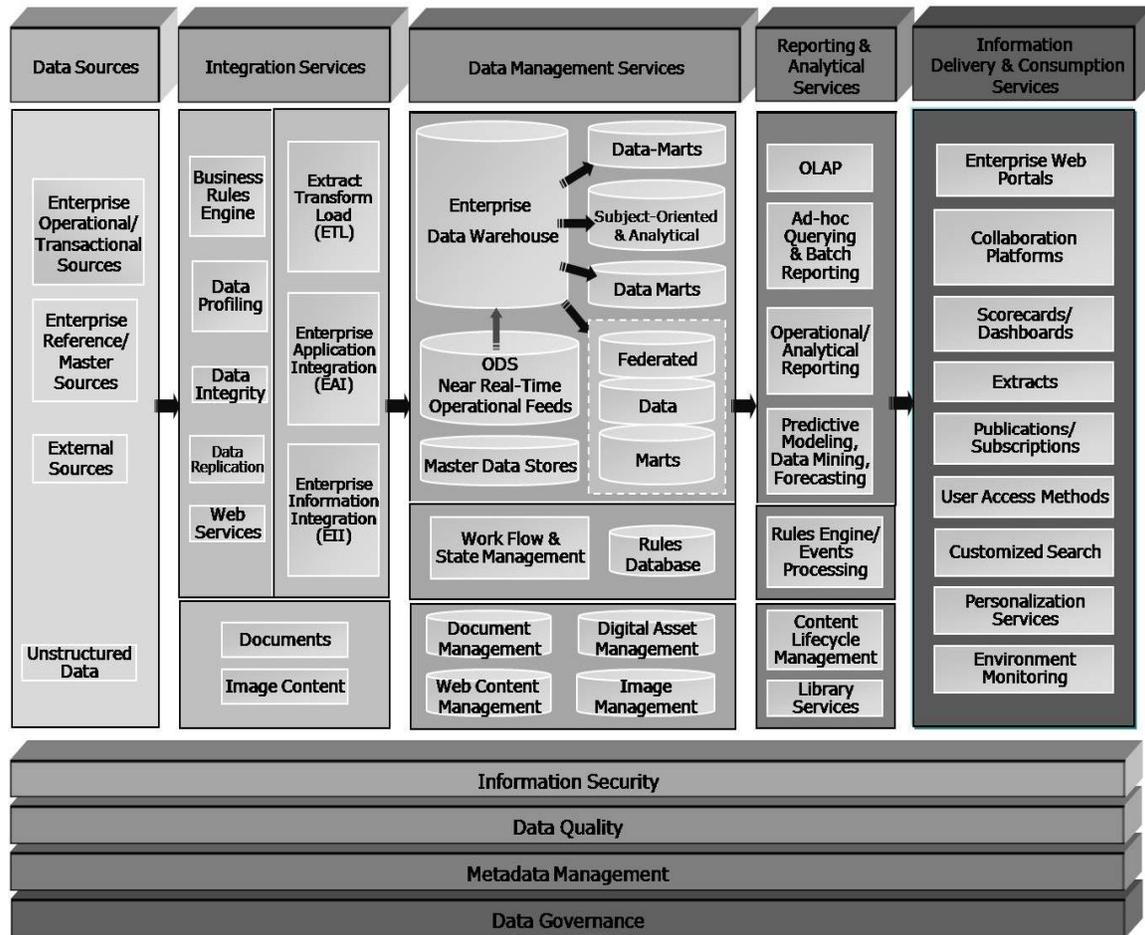


Figure 7 – Typical BI architecture

### 11.2 Key Performance Indicators (KPI)

As part of BI, KPIs are extensively used to evaluate the state of business. KPIs provide insight into the critical success factors of the enterprise and help the enterprise in measuring the progress. You should include KPIs in the BI strategy as KPIs are high level, well defined, quantifiable measurements based on pre-established criteria. KPIs should be designed to measure the performance against the targets. KPIs are not performance targets but are a mechanism to assist you in moving the enterprise to the desired state.

KPIs are used as a tool to measure and improve performance, they communicate to all what is important and where the focus should be and thus indirectly help in motivating people to reach goals. KPIs differ for business units and businesses depending on the nature of business and business strategies but in all enterprises they align with the overall goals of the business. KPIs include vital statistical information such as sales trends, profit values, customer satisfaction measurements, relative departmental performances, real time inventory statistics, or anything that is deemed critical for the success of the enterprise. KPIs are an integral part of a BI solution as they contribute to successful execution of the BI and overall enterprise strategy.

Use of KPIs provides enterprise users with key performance information within very little time. Without the use of KPIs it will take significant time and effort to collect and process the data to get the overall performance information causing further delay in addressing the business issues. At the BI strategy level, it is a good idea to highlight essential KPIs as these help in achieving the primary goals of the business. BI is increasingly being used to deliver corporate performance management. BI uses KPIs to gauge the current state of the business and relate it to the enterprise objective and help business come up with a course of action to get to the target state of business.

### **11.3 BI Platforms and Tools Selection**

Process of selection of BI tools requires tremendous effort as it can be perplexing to select the tools to best serve the needs of the enterprise. You should lay down a process for BI tools selection based on industry best practices as the use of these practices streamlines the selection process. Adoption of best practices helps you in mitigating business risk and managing effort.

Considering the importance of BI initiatives for the enterprise, executives are spending larger portions of IT budgets on BI. Increase in spending is due to urgent requirement to deliver consistent, accurate and trusted information to all stakeholders to meet the business goals. Often the selection process is launched without a methodology and guidance to realize later that the selection process is in a state of chaos. Industry best practices enable you to meet your schedule and budget. Following are some of the best practices for BI platforms and tools selection.

- Define and classify business, functional and technical Requirements
- Categorize requirements as essential, important and desired
- Evaluate the functionality, features and the fit
- Assess vendor capabilities, framework, stability and support
- Evaluate professional services, including consulting and education
- Leverage Gartner, Forrester, The Data Warehousing Institute (TDWI) research
- Assess licensing and support cost models
- Go through the vendor selection process to make an informed business decision

Processes and methodologies based on proven approaches help the enterprise manage risk, schedule, cost, and effort.

BI tools selection has less to do with the features and more to do with the fact that selected tools can deliver on the specific BI requirements of business. BI broadly refers to concepts and technologies used to analyze the information in enterprise. Existence of multiple disparate data sources and systems complicates the BI environment. Selection process should also take into account the existing infrastructure of the enterprise to enable the best use of existing capabilities. The idea is not to implement BI software with cutting edge features but to provide a collaborative environment enabling all users to work towards the common goals of the enterprise. Instead of comparing the products from BI vendors for the rich technology features, the focus should be to evaluate the tools and technologies to see how effectively the tools can deliver to achieve the enterprise goals.

### **11.4 Data Governance**

Data governance as part of BI strategy ensures that you achieve the goals of increasing confidence in decision making, making the data universally visible throughout the enterprise, and instilling confidence in users across enterprise that the data is accurate. Data governance provides

for an enterprise-wide data governance body, a policy, a set of processes, standards, controls and an execution plan for managing the data. It promotes data quality, data integrity, data consistency, data timeliness, data security, information privacy and thus increases the information usability and reliability. It provides a framework to create a consistent and methodical approach towards managing the data across the enterprise.

‘Anytime data crosses an organizational boundary, it should be governed, whether you’re sharing data among business units internally or publishing data to customers, partners, auditors, and regulatory bodies externally. Organizations are under renewed pressure to ensure that compliance and accountability requirements are met as the scope of data integration broadens.’<sup>3</sup> Data governance should include identification of data stakeholders such as data owners, data stewards and their roles in handling enterprise data assets. These individuals in data governance council provide for how the data is created, collected, processed, manipulated, stored, made available for use, or retired. Data governance comes into play as these activities require stakeholders from various functional areas to take decisions according to a set of defined processes. Data governance program encourages the understanding and management of the data from both business and technical perspectives, plus it promotes the importance of the data as a valuable resource, allowing the enterprise to use the data confidently to satisfy business needs.

Effective data governance can lead to new business opportunities and help in retaining existing customers by improving information reliability. Other business benefits include reduction in data redundancy, improved business decisions due to accurate data from the defined source of record, shorter time to compile information for better decision making and increased user trust in the data. Governance plays a fundamental role in BI strategy. When crafting BI strategy, you should take into account the fact that instituting a data governance program along with master data management (MDM) initiative will provide enterprise with a central focus for identifying and controlling the collection, storage and disposition of information resources. To support the volume and variety of enterprise data, your data governance program should be built on a robust and flexible technology infrastructure. Governance models should be comprehensive and provide for governance of both structured and unstructured content.

The realization that the data is a valuable and manageable enterprise asset is one of the main business benefits of a data governance initiative. Most enterprises carefully manage other assets such as financial, physical, human capital but overlook the immense value inherent in their data. In addition to focusing on traditional aspects of governance, enterprise should get a true handle on the data to go beyond just managing the data and use it as a vital asset for growth. You need governance models to protect and share the data on different levels across the enterprise. You must remember that data governance is an essential part of successful BI strategy as it improves information quality and confidence in decision making, lowers the costs of managing the data, designates accountability for data quality and makes the best use of the data to achieve the overall enterprise objectives. Governing thought here is that by including effective data governance program as part of BI strategy, you are ensuring that the data is defined, enriched, protected, and managed as a valued enterprise asset.

## **11.5 Data Architecture**

BI strategy should incorporate data architecture as it transforms abstract data models to logical business entities and subsequently leads to implementation of physical data models. Data architecture provides for detailing the subjects into atomic level data and then composing the desired form using them during the definition phase. Data models for the subject areas of the core

functions of the enterprise should be defined. Conceptual, logical and physical data models should be drawn to provide the foundation for overall data architecture goals. Conceptual data model lays out business entities and their relationships. Logical data model defines detailed attributes of business entities. Physical data model provides for the actual implementation of logical model.

Understanding and laying out a comprehensive enterprise data architecture map is an essential pre-requisite to building an effective BI strategy. Enterprises mostly have complicated data, which is commonly held in large legacy or packaged systems, custom databases and spreadsheets. Data may reside in external systems maintained by service providers or business partners. Across a number of systems, data will have significant variations in quality, format, and meaning. It is important to create powerful, simple, and effective models of the data structure from the enterprise viewpoint, a set of models known as the enterprise data architecture. You should define and document the data architecture goals, assumptions and constraints surrounding it. Document the guidelines detailing usage of the data modeling techniques, establishment of atomic level of the data, significant components of the data architecture, and appropriate security measures as part of the BI strategy.

Addressing the data architecture issues is critical for all BI initiatives. It's nearly impossible to have the complete data architecture for the whole enterprise defined at any point in time. The idea is to have enough information to enable a context for modeling activities. You should model the current state of the data architecture and then build upon it to mature the data architecture state. Always remember that modeling is just one way of looking at it, to make the data architecture comprehensive technical and non-technical issues surrounding better data collection, usage, and governance must be addressed. Data architecture helps you to get a handle on the data as it is really used by the business. Data architecture acts as a key artifact to help you in developing and implementing processes to support a data management strategy leading to effective BI governance.

## **11.6 Data Integration**

Data integration is a major component of the BI strategy as it refers to data assets, processes, methodologies, tools and philosophies of the enterprise by which fragmented data in multiple disparate systems is integrated to support business goals. You can optimize the data integration process by documenting it, making it repeatable, easy to define, and easy to use. Data is integrated to deliver useful information to enable better business decisions. You can adopt several strategies to achieve data integration for a given business purpose. Broadly the strategies can be termed as using virtual data federation, virtual data marts, virtual operational data stores, web data services, relational views, physical data warehouses, physical data marts, and physical operational data stores.

Most common of the data integration approaches use Extract, Transform and Load (ETL), Enterprise Application Integration (EAI) and Enterprise Information Integration (EII). ETL solutions read the data from a set of data sources, transform the data to the target form, and subsequently move that data to a target data store. EAI is sharing the data and processes among the various applications in the enterprise while keeping the changes to the existing applications at a minimum. EII uses data abstraction to present a single integrated view of the business. EII makes the data from multiple disparate data sources to appear as coming from a single data source. Keep in mind that many enterprises are also using MDM along with these approaches to deliver consistent data enabling 'one version of the truth'.

Data integration primarily uses middleware which integrates the data through connectors and adaptors. There is a big push in the enterprises for adopting the philosophy of service oriented architecture (SOA) using enterprise service bus (ESB), which promotes the use of the data, platform and software as a service. When addressing the component of the data integration in overall BI strategy, you should keep in mind the current data integration trends and also the coming wave of forward looking approaches.

## 11.7 Metadata

Metadata roadmap is an essential part of BI strategy as metadata explains how, why, where the data can be found, retrieved, stored and used in an information management system. An effective metadata strategy enables productivity improvements by helping with the data lineage, reduction in data redundancy, better understanding of how the information is used in the enterprise, impact analysis, better use of the data in the enterprise, information sharing, knowledge transfer, navigation of the corporate data assets, inventory of all corporate data assets, and identification of data discrepancies and overlap.

Technical metadata provides for the data lineage and impact analysis. It should include the data for all data integration, data modeling, data profiling, data quality, database, reporting, analysis, usage and monitoring processes. It should include source system information, entity and attribute definitions, system usage information and an understanding of what information is fed from BI to other systems. Business metadata provides context to the data and thus it makes the meaning of the data explicit and provides definitions of data elements in business terms from the business point of view.

Metadata repository is where all the metadata information about source, target, transformations, mappings, workflows, sessions, and business terms is stored. Metadata can be manipulated, queried and retrieved from the repository. In any enterprise metadata stored in the repository can be a useful knowledge resource. Architecture of a metadata repository could be centralized, distributed or hybrid. In centralized architecture, metadata from all sources is stored in a central repository and all users access it from here. In distributed architecture, users access metadata from all metadata repositories in real-time. Federated or hybrid architecture leverages the strengths and minimizes the weaknesses of both centralized and distributed architectures.

You should be able to trace the data as it flows from data entry, transactional systems, data-staging environments, data warehouse, and data marts to the means of information delivery used for business analysis. Metadata enables the tracking and monitoring of the data through the entire data flow. You must ensure that the business definitions are correctly incorporated in the metadata across the enterprise. It is common for each functional area in the enterprise to have different business definitions and attributes for data elements. You can overcome these anomalies by designing an effective metadata strategy as part of BI vision.

## 11.8 Data Quality

A recent Gartner BI survey of more than 600 BI users found that more than 35 per cent of users identified data quality as one of the top three BI problems facing their organization in the next 12-18 months, making it the second biggest challenge overall.<sup>4</sup> Data quality often dictates the success of a BI project. The impact of poor data quality is far reaching and the affects are both

tangible and intangible. Poor data quality leads users to abandon the system and creates considerable rework in deploying the BI solution. Ensuring complete and consistent data lays the true foundation of successful BI environment.

The Ideal BI strategy makes data quality the cornerstone of its success. BI strategy should emphasize data quality and this emphasis should be continued throughout the entire lifecycle and through all iterations. In order to address the data quality issues, first you have to define it properly. It is a common blunder that addressing bad data addresses the data quality issue. You should remember that data quality is not about the bad data. A data quality initiative includes setting up data governance council, defining roles of people in the enterprise to handle data, building consensus on definition of data, establishing framework to deal with and resolve the issues with data. Data quality is defined as providing complete, consistent, and accurate data.

Data quality approach should be holistic and it should have enterprise perspective, otherwise the data delivered against different data stores will deliver different information leading to inconsistent BI solutions. Data should be managed all the way from inception to the state of consumption and data quality issues should be addressed in a holistic manner. Data quality initiatives should not be put on the back seat just to comply with the schedule or budget targets. Keep in mind, disregarding the data quality issues results in limited acceptance or rejection at a later stage because the information delivered at the end can't be trusted. You should analyze the data issues to validate the ability of the data to meet the needs of the business.

Data quality should be a joint effort by business and IT to ensure the success of the initiative. IT can enable the processes to manage the data through technology, but business has to define it. Any gaps in the data should be documented and the results should be discussed and addressed by business and IT as a team. Data quality enables the users across the enterprise with better decision making ability to achieve the common goals of the enterprise. Data is a corporate asset and has to be consistent across the enterprise. You should establish common data definitions for providing the consistent information to business to enable 'single version of the truth' across the enterprise.

## **11.9 End User Information Delivery - A Collaborative Approach**

Use of knowledge management, content management and portals is the key to sharing information in a collaborative environment. Your purpose should be to bring everyone together to work towards the common goals of the enterprise. BI strategy should emphasize on the integration of BI with the overall knowledge management environment of the enterprise. All components of end user information delivery should be addressed in this section of BI strategy. To name a few, it could be the use of standard reporting, ad-hoc analysis, OLAP cubes, dashboards, scorecards, notifications and use of semantic layer, budgeting, planning, forecasting technologies etc. The purpose is to provide users with action-oriented information and analysis capabilities in a collaborative environment.

BI should be integrated with business operations to associate the results of BI with business activities. In this sense BI should attempt to be both process-centric and data-centric. This involves integrating performance improvement and process management technologies. Traditionally operational data store, enterprise data warehouse and data marts that supply the integrated, consistent data are the core of the BI system. As BI is integrated with the business environment to achieve the broader business goals, traditional architecture must evolve to provide for collaborative use of user friendly technologies to enable better decision making along with process and performance improvement.

## 12. Conclusion: BI Strategy – A Living Artifact

BI strategy should be designed to be agile and adaptive. It should be treated as a ‘living’ artifact, which can be continuously refined to meet the enterprise objectives. BI strategy must focus on communicating what you are planning to build, how you plan to build it and when users can expect their requirements to be met. It should start with broad policy statements, general guidelines and high-level diagrams. As the BI environment matures so will the formal documentation and depth of details identified in BI strategy. It should be your intent to evolve your BI strategy as part of the enterprise vision as you implement iterations and more details become available. Plan to continually assess and reinvent BI according to changing business needs. Consider the current BI trends and also the coming wave of forward looking approaches for building the successful BI strategy.

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